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IndieBook.

Interactive and Automatic Generation of Fictive Worlds

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1 Introduction

> *Just as the computer promises to reshape knowledge in ways that sometimes complement and sometimes supersede the work of the book and the lecture hall, so too does it promise to reshape the spectrum of narrative expression, not by replacing the novel or the movie but by continuing their timeless bardic work within another framework.*
> – Janet H. Murray, 1998 [72, pp. 9-10]

Since the beginning of literature, readers long to leave behind their passive role of the recipient and interact with the narrative. What was easy in oral tradition, became nearly impossible in written literature. However, the wish to affect and reshape a story has not disappeared, instead it manifested itself within literature and became a motif in fiction. Furthermore in real life, it led to many more or less successful attempts in which readers became productive themselves, like in fan fiction, or influenced the author[1]. The concept of IndieBook goes even further by empowering the recipient to affect the narrative according to his or her intention.

Imagine the following situation: Caroline is a great fan of Stieg Larsson's *Millennium Series*. Unfortunately, the author died before finishing the series. Despite this sad fact, she has downloaded recently the tenth volume and enjoys the long-awaited ending. She is even more eager to know how it ends, because she has changed the protagonist Mikael Blomkvist into her mysterious neighbor Peter and of course the story is set in her home town. How is this possible? The publisher of Stieg Larsson has decided to convert the

[1] In Japan, readers are able to influence the course of a story by "questionnaires on detachable pre-paid postcards inside most *mangashi*". [44, p. 14]

sketches, the threads and style of the existing volumes into the interactive generation system that allows readers to create their version of the *Millennium-Series*.

Caroline's story is not possible with the conceptual theory and technology available at present. Nevertheless, the concept of individualized books presented in this thesis provides a step closer to this futuristic vision and discusses the challenges, limitations, and possibilities.

The discussion of the concept is focused on the creation of the fictive world providing numerous stories and variations of them. The reason for this focus is that although research has developed various approaches to interactively or automatically generate stories, plot structures, and natural language texts in the last decades, the story world or knowledge domain remained marginalized and mostly reduced to static data bases.

1.1 Recent Situation and Tendencies

The innovative developments in digital media have changed our life style and culture radically. One of the many tendencies in the virtual media culture is the personalized article, which has affected the entire range of media. The magazine sector offers individualized magazines (e.g., the APP Flipboard). Even the mainstream media, radio and television, have become interactive and viewers can arrange their own program. Furthermore, one is not limited to creating his or her individual TV-program[2], but may also establish a personal music channel on YouTube and other platforms. In addition to the interactive arrangement, there is also the possibility to personalize its content, for instance, children e-books, videos, or multimedia APPs and computer games that involve the player by letting him or her create levels or decorate the game world (e.g., *Little Big Planet*, Role Playing Games, etc.). Throughout the evolution of the internet, a trend (of what) from broadcast media to social, interactive media is visible. The belletristic book market also starts to recognize the potential of this trend and some publishers, indeed, offer personalized novels. Nevertheless, they lack innovation and attractiveness due to their trivial technique of "search & replace".

[2] Before the online streams of the main channels, Konstantinos Chorianopoulos and Diomidis Spinellis discussed "Interactive Music Television Channel" in 2004 [23].

The concept of individualization is preceded by subcultural developments of interactive media, such as hypertexts, interactive fiction, and literary generators. Another essential expression of readers' productivity and engagement with personalization is the phenomenon of fan fiction: "In addition to sharing critical commentary and gossip, fans create their own stories by taking characters and situations from the series and developing them in ways closer to their own concern" [72, p. 41]. These individual tendencies have peaked in a distinctive "do it yourself" style self-publishing business.

Since Janet H. Murray's work *Hamlet on the Holodeck* [72], Interactive Storytelling (IS) and all its related forms, such as Interactive Drama, have become a dynamic and fruitful domain of research (cf. [36], [88], [87], [65], [25], [42], or the papers of the ICIDS and TIDSE conferences). IS, as an interdisciplinary field, combines the achievements of Natural Language Generation (NLG), Computer Linguistics, Computer Philology, Computational Narratology, and Game Design[3].

> In recent years, interactive narrative has been the major driver in the field, promising new varieties of aesthetic experience, aided by game engines and vivid animations. One of the challenges here (Mateas & Stern 2005) is retaining authorial control over the plot while granting some freedom to the user (who may act as an animated protagonist) in shaping the evolution of the narrative. Empowering the user can lead to aesthetically unsatisfying outcomes, but restricting her through constraints from the plot can limit engagement. The need for generation of text snippets and dialogue rather than full stories [...] to accompany storyworld animations has also spurred a trend of increased use of text generation based on templates that map non-linguistic input directly to the linguistic output form, sacrificing linguistic generalization for rapid prototyping. Overall, key issues include the modeling of narrative progression and the invention of suitable metrics for aesthetic satisfaction (Mani 2010a, 2010b). [60, ğ18]

Before IS, automatically generated texts have been the focus of research. Beside numerous poetic generators, the generation of prose has been the more challenging due to its length, coherence, and creativity (reader's interest). The implementations produce simple and short stories, particularly fairy tales, such as the Virtual Storyteller ([111], [109], [74], and [110]), PRINCE, the front-end of ProtoPropp [83], or STORYBOOK ([16] and [17]), or fables like Picture Book [3]. Apart from these examples, there are

[3] While dramatic and written narrative traditions have moved closer to the computer and computer-based entertainments have become more storylike, computer science itself is moving into domains that were previously the province of creative artists. [72, p. 59]

the prominent generators named Suspenser [22], MAKEBELIEVE [56], BRUTUS [15], MINSTREL [113], UNIVERSE [55], RACTER [93], and TALE-SPIN [66]. Most of the implementations focus on specific problems, such as story planning or emotions, and only some present a holistic approach.

The commercial applications of these generation systems range from summaries to museum descriptions or author supporting devices for story generation, such as the playful STORYLAND by Nanette Wylde [116].

1.2 Methodology and Overview of the Thesis

The purpose of this thesis is to present a theoretical attempt for an individualized book system. It aims to show up the problems of artificial narrating and to design a concept that can be expanded, further developed, and finally implemented in further works. Furthermore, it is limited to the basic generation of story worlds. The applied methodology intertwines the theories of Narratology and the recent research of Computer Science[4]. During the progress of research, a special focus on Possible World Theories, structural and semantic Narratology, Field Theory, and Cognitive Science has emerged. The concept is more feasible for trivial literature due to its applied patterns. Because of this, the illustrating examples originate from the canon of popular culture.

This diploma thesis outlines the interactive generation of a fictive world in the following structure: The introduction provides the necessary background information. After the overview of the recent situation and this methodological and structural remarks, the general idea of this concept is presented and its core aspects are discussed. In the second and third chapter, the concept is described in the order of the creative process. It begins with general presettings (chapter 2). Then the fictive world and its constituents are defined under the term *diegesis* and the core challenges of its generation are discussed (chapter 3). Afterwards, an appropriate world model is chosen from several. This model is further defined by its references to reality and the resulting degree of fictivity in chapter

[4] Jan Christoph Meister and his colleges established for this symbiosis the term *Computational Narratology* (cf. [68], [57]).

3.1. On this foundation, the components of the world are established: the setting, the characters, and the events.

Each constituent of the diegesis is separately treated by sketching a formalization, discussing the main challenges. Afterwards, its concept-intern relations and influences are treated and, finally, suggesting possibilities of interactivity and automatization—or summarizing existing implementations. These three entities form the actual stories, that can be arranged in narrative discourse and textualized or transferred in other media.

1.3 General Concept of IndieBook

Innombrables sont les récits du monde.
– Roland Barthes, 1966 [10, p. 1]

The idea behind this concept is the collaboration of three entities in the generation process. First, the individual style of an author has to be analyzed. Then a program designer transfers the resulting pattern into a story generation system including the static style defaults, random elements of the automatic generation, and variables. On an online platform, this program offers the reader the ability to interact with it and to modify the story world, the story, or/and the modes of presentation through these variables. After ordering the book, the actual generation process starts by using the pool of online data. Accordingly, the production can be summarized in the implementation of the automation system, the personalization by the reader, and the automatic generation.

This concept is implicit in the name IndieBook with two connotations that are crucial aspects for the concept: The author-independent generation according to the reader's preferences and the individualized content.

The conceptual architecture of IndieBook orientates on its operational levels. Despite the narratological tradition of bipartite and tripartite models, the concept is based on a five-layer system (figure 1.1) which correlates with the "idealgenetische"[5] model of Wolf

[5] In den idealgenetischen Modellen geht es weniger um die Unterscheidung der Ebenen (die ohnehin der Beobachtung nicht zugänglich sind) als um die Identifizierung der Operationen, die den Übergang von einer Ebene zur anderen bedingen. Die Aufgabe der idealgenetischen Modelle besteht also darin,

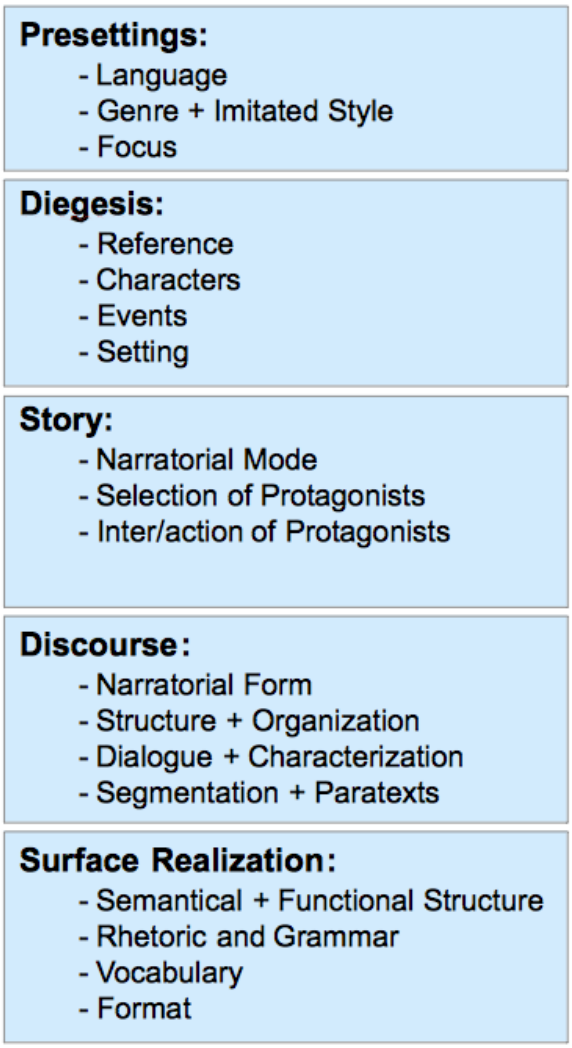

Figure 1.1: Five-layer system for the IndieBook.

Schmid adding solely the general presettings. The reasons for this addition and the preference of Schmid's quadripartite model are pragmatic. The narratological models are analytical tools and Schmid's system supports the generation process. The preset specifications reduce the complexity of the structure and vastness of data. Distinguishing between diegesis and story provides an increase in the complexity of output because it allows the extraction of various story lines from the same fictional world repertoire meaning constant characters, setting, or events. The last division in discourse and surface realization has already proven itself in existing generation systems and separates narratological and linguistic processes (e.g., Virtual Storyteller ([111], [74]), Suspenser [22], BRUTUS [15], or StoryBook [16]).

Each of the five levels are further separated into its own constituents including various choices and modes that the author conventionally decides upon. This system is ordered from the top down like the possible steps of computational realization. Accordingly, the upper levels influence the lower and not the other way around.

Nevertheless, the system is not intended to be comprehensive in every detailed aspect for each existing novel, but gives a flexible, expandable framework orientated on common mainstream novels. Specific generators can be created by integrating and reworking deviations, like a specialty of the author's style or some kind of avant-garde criteria.

jene narrativen Operationen zu unterscheiden, die das im Erzählwerk enthaltene Ausgangsmaterial in einen der Beobachtung zugänglichen Erzähltext transformieren. [103, p. 230]

1.4 Interdisciplinary Discussion on Core Aspects

> *Literature always has had an affinity with playing [...].*
> *With electronic devices and nets this playful literature*
> *now enters other dimensions[.]*
> – Peter Gendolla and Jörgen Schäfer, 2006 [41, p. 13]

Permutation and Variation

Since the beginning of text generation[6], the variation and permutation were the main strategy to "automatically" create texts. Beside the combination of syntactic entities or text fragments (called "primitives"[7]), Murray proposes a variation of recurring themes as the basis of every narration[8]. She considers, however, that the "mere mechanical shuffling of patterns" [72, p. 187] or "primitives" is not enough. Charles B. Callaway suggests therefor a constant story world and variety through presentation [17].

Randomness and Constraints

To avoid the less innovative and repetitive permutations advanced literary generators

[6] The history of (literary) text generators is outlined by Norbert Bachleitner [6] and Chris T. Funkhouser [39]. Florian Cramer has digitalized a collection of the earliest generators [24]. Bachleitner defines this combinatorial generation as "Textproduktion durch Permutation von Elementen aus einem vorgegebenen Repertoire ('dictionairy') sprachlichen Materials. In diesen Texten werden Wörter oder Phrasen wie Gegenstände behandelt, nicht wie bedeutungsvolle Einheiten. Permutative Dichtung, die manchmal auch als kombinatorische Dichtung bezeichnet wird, kann als ein Programm beschrieben werden, das es erlaubt, eine – meist unüberschaubar groSSe – Anzahl von Texten zu generieren. Die Satzbildung geht durch algorithmisch gesteuerte Prozesse vor sich. Wie so viele experimentelle literarische Formen lässt sich auch die permutative Dichtung bis in die Antike zurückführen" [5, p. 119].

[7] But even if a verbal substitution system cannot by itself produce satisfying and coherent digital narratives, it is a useful model for establishing the "primitives" or basic building blocks of a story construction system. In computer programming systems the "primitives" are the smallest components (such as simple arithmetical calculations) upon which the larger operations (such as complex calculations) are built. [72, p. 190]

[8] Some have argued that all of the world's great wisdom stories express the same religious and psychological truths and therefore are just variant versions of a single tale. [...] Many narrative theorists and writers have insisted that there are a limited number of plots in the world, corresponding to the basic patterns of desire, fulfilment, and loss in human life. Rudyard Kipling counted sixty-nine basic plots, and Borges thought that there were less than a dozen. Ronald B. Tobias, in one of the more competent of the many guidebooks for writers, suggests there are twenty "master plot" in all of literature. Here is his list:
Quest, Adventure, Pursuit, Rescue, Escape Revenge, Riddle, Rivalry, Underdog, Temptation, Metamorphosis, Transformation, Maturation, Love, Forbidden Love, Sacrifice, Discovery, Wretched Excess, Ascension, Descension. [72, p. 186]

apply the oppositional strategies of randomness and constraints. The first serves as an excellent tool for surprise and innovation in the creation process and was instrumentalized in avant-garde art, such as Cut-Up techniques, and also in the permutative text constructions, such as Raymond Queneau's *Cent mille milliards de poèmes* [92][9]. In digital generation systems however, the random combination is solely a part of the design—especially for the input selection—and is calculated by random number generation. Nevertheless, random elements in story or text generations are avoided due to the resulting inconsistency and deviation, as Norbert Bachleitner points out:

> [...] [D]ie Artificial Intelligence Entwickler versuchen den störenden Faktor [Zufall, Entropie] des Maschinellen, Mechanischen zu beseitigen, mit dem Ziel, die aus ihren Programmen resultierenden Produkte möglichst täuschend humaner Textproduktion anzugleichen. Die dichterische Avantgarde interessiert dagegen gerade die aus der mechanischen, ohne Nachdenken und Berücksichtigung des Kontexts erfolgende Produktion und die daraus resultierenden Ver- und Befremdungseffekte. [5, S. 132]

The quote leads to the next strategy for computational innovation. Constraints, like algorithms, document planners, or frames, limit entropy.

Human Involvement

Computational and human involvement share a symbiotic relationship in most generation systems. This concerns the input or interactivity. The former transforms texts of authors in a destructive or imitative manner. Whereas the destruction of literary texts underlies most artistic generators, such as Simon Biggs' *The Great Wall of China* [11], the purpose of systems of the field of Natural Language Generation is to imitate and to challenge the romantic concept of genius (e.g., Nathanael Fillmore's *A* Romantic Poetry Generator* [33]). The imitation of literary traditions or preceding works has a crucial role in the interactive generation because it provides familiarity for the interactor and serves to anticipate his or her expectations and behaviors[10].

[9] The essay collection *Die Künste des Zufalls* examines the contingency in art from various perspectives. [40]

[10] The fantasy environment provided the interactor with a familiar role and made it possible for the programmers to anticipate the interactor's behaviors. By using these literary and gaming conventions to constrain the players' behaviors to a dramatically appropriate but limited set of commands, the designers could focus their inventive powers on making the virtual world as responsive as possible

The concept of IndieBook supports random variation, constraints, and imitative strategies alike. The imitation would not be necessary, but leads the reader's expectations according to former lecture experiences. The system can imitate the style of a single literary work, an individual style, a genre, or even the traditions of a certain period. This stylistic pattern is integrated into the system in the form of constraints and defaults and is referred to as "author's style". The main challenge lies in identifying and defining the unique or unusual author's style that is the objective of General and Comparative Literature and studies of Stylistics.

Interactivity

Interactivity is one of the main characteristics of digital literature and an important source of creativity in computational generation. Roberto Simanowski distinguishes programmed interactivity and the network dependent interactivity[11]. IndieBook provides solely programmed interaction (human-software). Murray defines interactivity as procedural and participatory environment that is constructed out of constraints[12]. The interaction within IndieBook is also embedded in the framework of rules and patterns and regulated by the design of the system.

Existing generators of literary texts apply various modes of interaction:

> There are generators where one can insert an input [Auer, Suter & Bauer2011, Gehl1996], define the selection of the input material [Arens2001] or influence the generation directly by editing [Piringer2006] or stopping it by click [Hennessey2011] and – more often in installations than in online works – by the physical presence (movement [Utterback & Achituv2011, Andrews1999] or still-standing [Nadeau & Lewis2004-5]) of the reader. [70]

Beside the more commercial domains, such as computer games, systems of Interactive Fiction and Storytelling generate their narrative contents with the help of the user. How-

to every possible combination of these commands. [72, p. 79]

[11] Mit Interaktivität ist dabei die Teilhabe der Rezipienten an der Konstruktion des Werkes (programmierte Interaktivität: Mensch-Software) oder in Reaktion auf Handlungen anderer Rezipienten (netzgebundene Interaktivität: Mensch-Mensch via Software) erfolgen kann. [107, p. 5]

[12] Because of the vague and pervasive use of the term *interactivity*, the pleasure of agency in electronic environments is often confused with the mere ability to move a joystick or click on a mouse. But activity alone is not agency. [...] The players' actions have effect, but the actions are not chosen and the effects are not related to the players' intentions. [p. 128]
We mean they create an environment that is both procedural and participatory. [p. 74]
In an interactive medium the interpretive framework is embedded in the rules by which the system works and in the way in which participation is shaped. [72, p. 89]

ever, the interactivity of games or environments is different to IndieBook as the reader modifies the content during his or her reading experience. In IndieBook, the reception process remains linear and passive. According to several academics, interactivity in the creation of the diegesis increases the reader's emergence and joy of lecture because of a stronger identification and the feeling of almighty power over a whole world[13]. Furthermore, it can serve as a source of information and creativity in the automatic generation process. Despite the intensive application of interactivity in story generation, there is an essential issue described by Gonzalo Frasca:

> The biggest fallacy of "interactive narrative" is that it pretends to give freedom to the player while maintaining narrative coherence. [...] Certainly, simulation challenges narrauthors because it takes away their source of power: the ability to make statements through sequences of causes and effects. To use a metaphor, narrauthors "train" their stories so they always perform in an almost predictable way. [37]

Murray warns that "[g]iving the audience access to the raw materials of creation runs the risk of undermining the narrative experience" [72, p. 39]. Furthermore, inconsistencies resulting from too many variables could destroy the illusion while too much restriction could undermine the idea of personalization. Therefore, it is suggested to limit the participatory elements of the system to the story world in favor of contingency and because generally belletristic narratives focus more on the setting, characters, and events than on the esthetics of the discourse. In addition to the challenge of balancing total interactivity and narratorial control, one must be mindful of the structure and capacity of data and of the coherence of the output:

> The complexity of pattern manipulation made possible by the computer seems to be pushing stories into the realm of higher degrees of abstraction and variation. But in pursuing complexity and abstraction, we run the risk of incoherence. Since the success of any abstract representation of plot will depend on how much control remains in the hands of the human author, we may find that less computational abstraction will produce more satisfying stories. Or we may discover new abstraction models that are closer to the way writers like to make up stories than the models that have arisen so far from the collaboration between cognitive theorists and computer scientists. [72, p. 203]

[13] Various academics have written on the reception processes and effects of interactive fiction, for instance Chris Crawford [25], Andreas Glassner [42], and of course Murray [72].

Fictional and Factual Input

As already mentioned fictional texts are often used as a source of inspiration. The generation systems integrate patterns, vocabulary, and stylistics, but also whole constituents, like characters, (cf. chapter 3.1) of fictional texts. Beside these intertextual references, the system accesses factual resources, such as data bases, dictionaries, or online content. There are several examples of projects that generate artistic texts out of non literary, digital texts, like news articles[14]. The recent efforts in the development of a semantical enrichment of the web and its content—subsumed under Web 3.0—enable a more precise and adequate use of information. Beside the multifarious available facilities to gather information from the Internet, the access to the personal Social Web accounts could individualize the book in a surprising and creative way, for instance populating the fictive world with Facebook friends. The advantages of Social Web projects as a source of data are the structure, recentness, flexibility, and quantity of data (cf. [30]). Nevertheless, there are still essential difficulties in data processing with online data bases. Furthermore, the program—if permitted by the reader—could locate the reader and augment the fiction with the data of his or her recent location for the construction of the setting.

Especially for the models and types of the story world in chapter 3.1, the ambivalent term "fiction" and all its derivates need a brief specification within this context. The fictional narratives differ from factual by their presentation mode and the special communication situation, which implies that the narrated is not existing (cf. [104, p. 29]). Therefore, the semantic distinction between factual and fictitious is referred to because "factual narrative *is* referential whereas fictional narrative has no reference (at least not in 'our' world)" [101, ğ2][15]. Despite this, many fictional stories include historical persons

[14] *3by3by3* fabricates poems out of news articles in the following manner: "Pick 3 stories from Google News. Using only words that occur in the first 3 paragraphs of each story, make a poem with 3 stanzas, 3 lines each, no more than 60 characters per line. The 3-word title should use a word from each story". [73]

[15] The semantic definition of the distinction between factual and fictional narrative is the most classical one. [...] It emphasizes the ontological status of represented entities and/or the truth value status of the proposition or the sequence of propositions which assert these entities. The ontological status of entities and the truth value status of propositions are related, since an assertion which states something about an entity that is non-existent is *ipso facto* referentially void. But it is important to bear in mind, firstly, that some types of fiction assign "fictive" properties and actions to proper names that refer to existing entities. This is the case for example of the subgenre of counterfactual novels which, like counterfactual history (see Ferguson ed. 1997), ascribe fictional actions to historical

and events in geographically located places decorated by common properties other than fictive elements. All these factual elements refer to existing objects, but due to the fictional context of the narration they are not identical to reality and can vary in many ways.

persons (e.g. Hitler winning World War II). Autofiction can be seen as a special case of such counterfactual fictions. Secondly, historical persons and descriptions of their real historical actions figure prominently in fictional texts, as in historical novels that often contain a fair amount of factual information. [101, ğ23]

2 General Presettings

The most essential decisions made by the producers of the generator concern the language of the text, the genre or the style to imitate, and the general focus. Although one can argue that they do not have to be predefined or can be integrated later into the discourse level, these preset definitions are useful in practice due to the decrease of data and complexity.

The language of the narrative text is determined in advance as a default or by the reader. If it is chosen by the reader, one will require separated systems of surface realization and a translation of the author-specific vocabulary (i.e., neologisms or deviant use of words) in every language system. However, all the other elements of the diegesis or story level are not dependent on this configuration. Despite this, if these diverse surface realization systems are not already on hand, the multi-lingual system will not be time- and cost-effective.

On the contrary, the genre and the imitated style must be defined in advance by the programmer due to their influence on the whole generation system. The stylistic imitation can be person-orientated (one author) or institutionalized, for instance, a certain publisher, group or school of authors, or magazines. The characteristics of this style can be situated on all following levels. It is useful to sketch the unique features from the beginning to define the resulting defaults and the reader's interactive choices. The genre specific presetting that can be further specified into period or thematic subgenre has the same influence. Some genres imply even concrete patterns influencing the entire generation system and every deviation therein can be seen as "author's style". On the level of the story world, every element can be set in advance by genre specifications. For instance, the popular genre of crime fiction dictates a certain degree of fictionality, types of world construction, traditional settings, characters, or events. While only a

few genres affect the story level, like narratorial preferences, the discourse is often determined by "Erzählschemas"[16]. Especially the narrative structure depends on whether it is an analytical detective story or a teleological love story. The genre has a minor effect on surface realization which is more reflecting the author's style or conventions of the period.

The last presetting concerns the general focus of the narration. The main interest can lie on the events ("novel of action"), protagonists ("novel of character"), criticism of social context, and so on. This typology is in certain cases not clearly applicable, for instance some narrations balance the figural development and actions. However, if a main emphasis on one of them is analyzed, it will influence every level in its richness of detail or sketchiness of the input data (chapter 3.3, chapter 3.4), selection, narrative modes, and textual realization.

[16] Der Begriff des Handlungsschemas ist von den verwandten Termini <plot> und <Erzählschema> zu unterscheiden. Das *Handlungsschema* ist ein typischer, d. h. mehreren narrativen Texten (z. B. den Texten einer Gattung) gemeinsamer Handlungsverlauf. [...] In einem weiteren Sinne bezeichnet man mit <Handlungsschema> nicht nur Strukturen der Handlung narrativer Texte, sondern typische Muster von Erzählungen und Erzählvorgängen insgesamt, einschlieSSlich der Darstellung und erzählpragmatischer Aspekte; für solche [...] sollte man jedoch besser den Ausdruck *Erzählschema* verwenden. [63, p. 135]

3 Conceptual Generation of a Fictive World

The first step towards a novel is the creation of the "narrated world" ("erzählte Welt" according to Schmid [103]) or even a whole "textual universe" [98] inheriting worlds and many possible stories. Therefore, the more open term "diegesis" is preferred and defined by Gerald Prince as a "(fictional) world in which the situations and events narrated occur" [90, p. 20][17].

According to Possible World Theory, every diegesis includes not only one but many fictional worlds. Ruth Ronen describes them as to be "composed of sets of *entities* (characters, objects, places) and of networks of relations that can be described as *organizing principles*: spatio-temporal relations, event and action sequences" [96, p. 8]. Furthermore, Ludomir Doležel distinguished them from the real world as "ensembles of nonactualized possible states of affairs", which are unlimited, maximally varied, incomplete, and "constructs of textual poieisis" [27, p. 16ff]. To further differentiate the multifarious types of worlds Marie-Laure Ryan's taxonomy is adapted, which distinguishes the factual, Actual World (AW) from the fictional or Textual, Actual World (TAW) as a part of the worlds non-actualized in the AW[18]. The AW and TAW are linked

[17] This corresponds with the definition of the OED: "[< French diégèse, introduced in this sense by E. Souriau 1953, L'Univers Filmique 7.] spec. The narrative presented by a cinematographic film or literary work; the fictional time, place, characters, and events which constitute the universe of the narrative". [76]

[18] The TAW and all the following worlds connected with it are fictive due to their metatextual context of literature, as Schmid stresses: "Die literarische Fiktion ist die Darstellung einer Welt, die keine direkte Beziehung des Dargestellten zu einer realen auSSerliteratischen Welt impliziert. Die Fiktion besteht im Machen, in der Konstruktion einer ausgedachten, möglichen Welt. Für die Mimesis kann der Schöpfer der dargestellten Welt Elemente aus unterschiedlichen Welten nehmen und zusammenfügen. Die thematischen Einheiten, die als Elemente in die fiktive Welt eingehen, können

"by a relation of accessibility" and have to respect "the principles of non-contradiction and of the excluded middle"[19]. Thus, the TAW has to refer to the AW (even if the only reference is the human nature of the protagonists or the language) and a proposition, for instance "Hamlet dies", cannot be true and false at the same time and in one world (cf. [98, p. 31]). Beside the TAW, there are also non-actualized but possible worlds based on or constructed by the character (hereinafter referred to as character's Possible World, short cPW), for example their dreams, wishes, and so on[20].

The originality of fantastic worlds, the conflicting horizons of characters, and the modification of the reality are main ingredients of a good story[21] and dominate main stream novels over stylistic esthetics or complex narrating techniques. Therefore, the focus on accurately constructing a rich and coherent diegesis and the inclusion of the reader into this process is suggested.

Inherently, the human mind remains the invincible creator of the diegesis and no gener-

aus der realen Welt bekannt sein, in unterschiedlichen Diskursen der jeweiligen Kultur figurieren, älteren oder fremden Kulturen entstammen oder nur in der Imagination existieren. Unabhängig von ihrer Herkunft werden alle thematischen Einheiten beim Eingang in das fiktionale Werk zu fiktiven Elementen". [103, p. 37]

[19] This universe is hierarchically structured by the opposition of one element, which functions as the center of the system, to all the other members of the set (Kripke 1963). The central element is known as the "actual" or "real" world (henceforth AW) while the other members of the system are alternative, or non-actual possible worlds (APWs). For a world to be possible, it must be linked to the actual world by a relation of accessibility. The boundaries of the possible depend on the particular interpretation given to this notion of accessibility. The most common interpretation associates possibility with logical laws: every world that respects the principles of non-contradiction and of the excluded middle is a possible world. On the basis of this model, we can define a proposition as necessary if it is true in all worlds linked to the actual world (including this actual world itself); as possible if it is true in only some of these worlds; as impossible (e.g. contradictory) if it is false in all of them; and as true, without being necessary, if it is verified in the actual world of the system but not in some other possible world. [99, ğ4]

[20] "At first sight, the concept of factual domain, or actual world, is rather unproblematic for narrative semantics: it is made up of what exists absolutely in the semantic universe of the text, as opposed to what exists in the minds of characters" [98, p. 112]. The cPWs are discussed in chapter 3.3 based on the theory of Ryan ([98] and [99, ğ26]).

[21] Ryan regards also "the ability of a narrative to evoke multiple non-actual possible worlds as a major principle of tellability [...]. For instance, a narrative based on deception is usually more interesting than a narrative based on cooperation, because deception relies on a contrast between a feigned and a real intent, while asking for collaboration requires only the consideration of an actual goal. Similarly, a goal achieved in an unexpected way is narratively more interesting than a goal achieved through the successful execution of a plan, because the unexpected solution contrasts with the anticipated events. In this way, the reader is led to contemplate a richer semantic universe". [99, ğ30]

ators with this ability exist. The main reasons for this are two difficulties which occur in the automatic construction of a fictional world: the vastness of information needed for a coherent and holistic world design and the complexity of formalization and rules. The former can be defused by the following arguments:

1. The diegesis must not to be complete or whole, as Doležel has already pointed out[22]. In contrast to open world computer games, in which physic engines simulate convincing movements and incompleteness disturbs the emergence of the player, the textual gaps are completed by the reader. The only disruptions of the reader's emergence are incoherencies and contradictions in the logic of the TAW.

2. Depending on the genre or the author's intention, TAWs can range from abstract to realistic worlds, which are richer in detail.

3. It is not necessary to program the whole TAW from the beginning for every generator. If there would be (like engines of computer games) a template of a TAW that is very close to the AW, the programmer will only need to transfer, modify, and complement it to achieve a new, author-specific TAW.

Consequently, the focus should not lie in the extensive piling of information but in the second difficulty: in the structure, contextualization, and establishment of logical laws to facilitate semantic coherence. This is further elaborated in the next chapters.

Due to its increase of reader's emergence and joy of lecture, the interactivity in the creation of the diegesis serves as a source of information and creativity in the generation process. Creating an interactive world requires a clearly defined framework of defaults and orientational rules with variables and gaps to interact, rework, or expand the world. Too many variables cause inconsistencies which lead to the disillusion of the reader, while too much restriction undermines the idea of personalization.

[22] Ronen notes the same on the diegetic constituents like its characters, setting, or events: "Fictional entities are inherently incomplete. Their incompleteness is primarily logical and secondly semantic. Fictional entities are *logically* incomplete because many conceivable statements about a fictional entity are undecidable. A fictional entity is *semantically* incomplete because, being constructed by language, characteristics and relations of the fictional object cannot be specified in every detail". [96, p. 114]

3.1 References and Fictive World Models

Combining the AW, TAW, and cPW described in the preceding chapter one can establish different types of fictional diegesis. The following typology provides an overview of the various world models in fiction and consequently supports their creation.

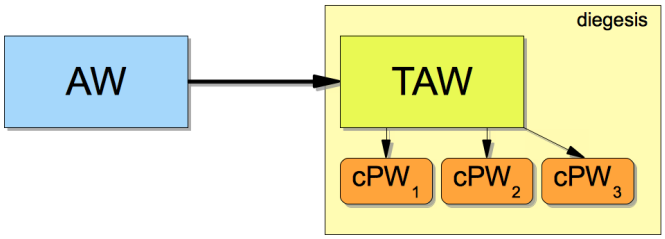

Figure 3.1: Basic model of diegesis.

The most **basic, diegetic model** (figure 3.1) contains one TAW, that refers to the AW, and one cPW or more cPWs depending on the amount of characters[23]. Doležel differentiates according to this the one-person world and the multi-person world. The latter is more common due to its potential for conflicts, events, and "networks of interpersonal relationships"[24]. Nevertheless one has to bear in mind, that a one-person TAW does not exclude the possibility that other characters exist in the cPW of the main character. Hence, this distinct potential has to be adapted on each world and can lead to a hybrid form of diegesis where a lonesome protagonist interacts with others only in his or her hallucination, memory, and fantasy (eg., in *Oryx and Crake*, *Robinson Crusoe*, etc; cf. chapter 3.3). Proceeding from this basic model, one can derive three other types: the pluriregional, the split, and the auto-referential diegesis.

For the first type, Félix Martínez-Bonati's terminological distinction of fictional worlds

[23] Doležel stresses the special status of cPWs as intermediate worlds: "Dreams, hallucination, madness, drug-induced altered states are physically, natural human experiences; at the same time, physically impossible persons, objects, and events appear in these frames". [27, p. 117]

[24] "If a person exists in the solitude of the one-person world, either his or her acting is a response to events in the natural environment or it originates in his or her mind. [...] The conditions of acting in the multiperson world are radically different" due to "agential constellation", "interaction and communication", and "interactional accidents". [27, p. 96ff]

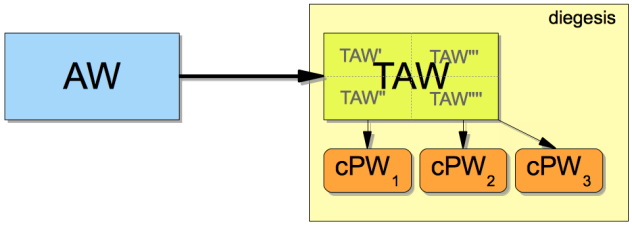

Figure 3.2: Heterogeneous model of diegesis.

in "either *homogeneous (uniregional)* or *heterogeneous (pluriregional)*"[25] is adapted. The TAW of the basic model is homogeneous. In literary practice, this case is quite rare due to its lack of closeness to the AW, complexity, and conflict. The **heterogeneous model** (figure 3.2) means that the TAW is subdivided in spatial or social areas (TAW', TAW", ...)[26] that differ from the TAW in one or more aspects like norms, laws, rites, language, etc. This diversity of areas can lead to complex constellations and hierarchies. However, it is important to stress that these areas are not autonomous but only subsection. Thus, they obey still the frame of the superordinated TAW in the other aspects. One can compare them with the cPWs because both are linked to the TAW. But the difference is that cPWs are not actualized and can only influence the TAW by the actions of the character.

The second type (figure 3.3) describes a **diegisis split in autonomous TAWs** existing simultaneously but obeying different rules[27]. However, these two or more TAWs do not need to be hermeneutically distinct domains but can influence each other and their borders can be transgressed. This transgression "is apprehended as the scandalous intrusion of a foreign element" [98, p. 114] and results often in conflict or initiates ad-

[25] "[Fictional worlds] are either *homogeneous (uniregional)* or *heterogeneous (pluriregional)*—i.e., contain one or, side by side, more than one system of reality" [64, p. 193]. This terminology differs from Mathías Martínez and Michael Scheffel's who differentiate "homogene Welten" from "heterogenen" due to the latter's integration of two opposing systems of reality, like fantastic content and realistic rules. [63, p. 127ff]

[26] The spatial areas can range from clearly distincted geographical or political regions to personal and semantic spaces like the house of the Bovarys or the dichotomy of outside/inside. The social areas can be social milieus, cultures or any other groups: Social representations and collective emotions are essential for group cohesion, splitting the world into "us" and "them" and, consequently, motivating interacting between groups. [27, p. 101]

[27] The here used term "split diegesis" for this model corresponds with the concepts of Thomas G. Pavel's "dual or layered ontology" [80], Ryan's "split ontology" [98], and Doležel's "dyadic worlds" [27].

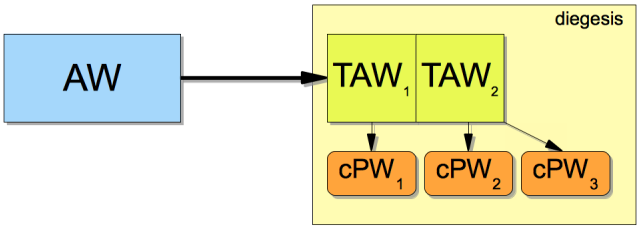

Figure 3.3: Split model of diegesis.

ventures[28]. Martínez and Scheffel mention the extra-diegetic TAW as another special type of split diegeses (cf. [63, p. 127f]). It describes an embedded narration in which an autonomous TAW is presented. Nevertheless, the embedded TAW is treated like the other split TAWs on this stage and this hierarchical structure will not be induced before the stage of discourse.

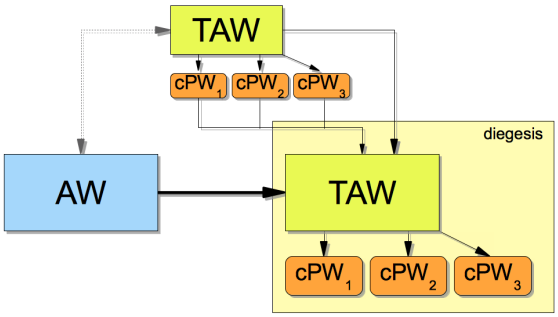

Figure 3.4: Transfictional reference of diegesis.

The last type (figure 3.4) is in literary theory better known as intertextuality, transtextuality, or hypertextuality. In the context of Possible World Theory, it describes the reference from the TAW to an already existing, external TAW instead of or additionally referencing the AW. Ryan subsumes this under the term **transfictionality** that she describes as "the migration of elements such as characters, plot structures, or setting from one fictional text to another. It can be thought of as a relation between possible

[28] Doležel calls the latter "cross-world journeys": "In the divided world with rigid boundaries, the story of the cross-world journey is of perennial fascination. Special permits are needed to visit the supernatural domain, and they are granted only to selected humans for a definite purpose and under strict conditions". [27, p. 131]

worlds". [99, ğ36] The reference to TAWs compared to the AW offers advantages, because they are already structured and it is the same sign system. This can simplify the world construction especially when implying the help of digital analyzing tools. Thus, it is not astonishing that this led to simulations of fairy tales (e.g., *Little Red Riding Hood* in STORYBOOK [16]). Close to the transfictional type is the rare auto-reference or self-reference, in its extreme also called "mise-en-abyme". It refers to its own fictional TAW and constructs similar to or same TAW's. But like the split diegesis, this TAW is solely a part of the diegesis, whereas the transfictional TAW can be the only world in it.

All the previously described worlds and types are rarely definite and static, but dynamic[29]. The AW is naturally dynamic. Consequently, a **progressing TAW** seems more realistic than a static world. Although every diegetic level can be progressive, the change in only one specific domain is more frequent in literary practice, because a specific change accentuates the main theme of the narration. For instance, novels of character imply progress in cPWs, whereas all other constituents of the diegesis stay the same. The quantity of domains and intensity of progress depend also on the narrated time span and the extent of focus. Hence, an intimate story like Johann Wolfgang Goethe's *Die Leiden des jungen Werther* has a more limited progression in the diegesis than Michael Ende's *Die unendliche Geschichte* in which the whole Phantásien is constantly altering and is destroyed in the end. Therefore, the domain of change is specified in advance by the genre or the logic of the world itself, like Phantásien is dependent of the fantasies of "real people". Nevertheless, the trigger for a change is situated in the story because it is the result or consequence of the development of characters or their events. The most illustrious examples of necessary events for the diegetic change are the huge physical battles between characters and inner struggles of individuals, for instance, in *The Lord of the Rings* that result in the victory of the good TAW' over the bad TAW" and the elimination of the loser. All these examples show the variety of progressions ranging from only a limited, marginal effect on single elements or a resetting of the whole TAW. This can be sorted out by identifying the changing world type or diegetic element and its influences on the others:

[29] The critics of Possible World Theory see the progress of a world more as feature than a own type, but for generation it is a completely different way of world construction.

Firstly, there are different possibilities of change in the TAW structure like the merging of two TAWs or, vice-versa, the splitting of one. The former can be accomplished by the domination of one, like after the battles in *Lord of the Rings*, or a symbiosis of two worlds into an (often heterogeneous) TAW. This fusion can also occur inside one TAW like from heterogeneous to homogeneous. Furthermore, a multi-person world can become an one-person world by special circumstances, like the shipwreck of Robinson Crusoe, and vice-versa, like in the TV series *Lost* (2004 – 10). These cases, in which a new world is induced or an existing world is eliminated or altered, have enormous consequences and lead to a reconstruction of the affected worlds. Additionally, a world can be introduced or eliminated by certain actions (e.g., a character with his or her cPW).

Secondly and more commonly, the change affects only the relations or its elements that are discussed in the following part of this chapter. The seriousness of the consequences depends on the position of the relation or element inside the hierarchical system of the diegesis. For example, when a natural force, like gravity, is repealed, the effects are massive compared to a change of values.

The fictivity of the TAW is the most characteristic and challenging feature of the diegesis construction because it opens an infinite variety of complex worlds referring to our native reality or fantasies. Depending on the genre[30] and the author's style, the diegesis can range from realistic to absurd. To differentiate this scale in its details I derive a taxonomy from Ryan's "accessibility relations" [98, p. 32ff] and Doležel's "narrative modalities" [27, p. 113ff][31]. This taxonomy categorizes all the various modes of reference or compatibility of the TAW to the AW in the basic model, TAW' to TAW in a heterogeneous TAW, cPW to TAW, and so on. Doležel differentiates the relation between cPW and TAW from the other. The codexal relation links a TAW to the AW or another TAW and the subjective

[30] For instance, Ryan differentiates the epic genres by the fictionality or—in her terminology—by the accessibility of their represented worlds. This typology is described and discussed in this chapter concerning the relations between the various worlds. But Ryan adds to discussion, that this "taxonomic classes yielded by computing the various combinations of relations does not necessarily correspond to the generic labels in use in a given culture. [...] To refine the categories provided by the various combinations of accessibility relations into a taxonomy corresponding to accepted generic labels we must introduce additional factors of semantic diversification [...]: thematic focus, stylistic filtering, and probabilistic emphasis". [98, p. 43]

[31] Modalities are the main formative factors of this kind. They play this role because they have a direct impact on acting; they are rudimentary and inescapable constraints, which each person acting in the world faces. [27, p. 113ff]

relation connects the cPW with the TAW. While the codexal relation establishes a frame[32] in which the characters interact, the deviation of a cPW from this frame causes conflict and, consequently, increases according to Ryan the narrativity [98].

The "degree of fictivity"[33] results from the amount of deviations in relations and the position on the scale of relations. Due to the different importance or effect of the single relations[34], it is best to organize them in descending order: The higher the relation is positioned the more significant is its influence on the fictivity of the diegesis. Each element (proposition or object) of a relation is either positive (factive, real, true) or negative (fictive, false) compared with the referred world.

Before discussing the single relations, it has to be stressed, that the worlds of all genres and literary works are generally opposed in realism and fictivity. The former restricts that all relations be positive, whereas the latter is more variable and can deviate in one or all relations. However, a complete negation of the AW is not comprehensible and not found in literary tradition. In addition, some fantastic genres preset a set of negative relations and some negative relations cause further negative: For instance, a protagonist who is able to fly lives in a non-existent place in a supernatural world and belongs to the non-existent specie of fairies which follows special norms and values and has a different knowledge of the world.

[32] The term "frame" correlates with computational terminology and is defined by Marvin Lee Minsky as follows:
"When one encounters a new situation (or makes a substantial change in one's view of the present problem) one selects from memory a substantial structure called a frame. This is a remembered framework to be adapted to fit reality by changing details as necessary. A *frame* is a data-structure for representing a stereotyped situation, like being in a certain kind of living room [...]. Attached to each frame are several kinds of information. Some of this information is about how to use the frame. Some is about what one can expect to happen next. Some is about what to do if these expectations are not confirmed. We can think of a frame as a network of nodes and relations. The 'top levels' of a frame are fixed, and represent things that are always true about the supposed situation. The lower levels have many *terminals*-'slots' that must be filled by specific instances or data". [71, p. 212]
The following relations of the TAW build the fixed frames of the "top levels". The implementation of these frames are further discussed in the section of the setting 3.2.

[33] This degree can be compared to Ryan's "principle of departure": "The worlds of dreams and of madness, of ritual and of nonsense may be patterned according to what Thomas Pavel (1986:93) calls a principle of *maximal* departure". [98, p. 58]

[34] For instance, a deviation of natural laws influences the diegesis more than a neologism.

Alethic Relation

I adapt for the first reference Doležel's term "alethic constraints" based on the opposition of possibility/impossibility and the necessity. He differs natural and supernatural worlds according to this relation: "If the modalities of the actual world determine what is possible, impossible and necessary in the fictional world, than a natural fictional world is formed. [F]ictional worlds that violate the laws of the actual world are physically impossible, supernatural worlds". [27, p. 115] The laws can be logical or natural[35] and construct a framework to which all diegetic constituents (setting, characters, and events) have to orientate to reduce inconsistencies. Concludingly, there are laws in the referred world, that define the realms of possibility. For example, if something is possible in AW but not in the TAW or the other way around, this is a negative alethic relation. This something can be an action (telepathy) or a feature of an object (transparency). The construction of the natural world is mimetic and includes only positive, alethic relations[36]. According to Doležel, the alethic relations determine ...

> ... the structure of the supernatural worlds in several important aspects: a. Physically impossible beings [...] endowed with properties and action capacities that are denied to persons of the natural world. [...] b. Selected natural-world persons are granted properties and action capacities that are not available to ordinary persons of that world: becoming invisible, flying on a carpet, and so on. This procedure creates hybrid persons [...], who are capable of performing supernatural acts while remaining natural in their basic properties (especially mortality). c. Inanimated objects are personified, that is, given mental life and intentionality. [27, p. 116]

Beside the dichotomy of natural and supernatural, Doležel mentions intermediate worlds. For instance, "[d]reams, hallucination, madness, drug-induced altered states are physically, natural human experiences; at the same time, physically impossible persons, objects, and events appear in these frames" [27, p. 117]. But according to the typology of worlds, they class among cPWs and thus are separated from the frame of the TAW.

[35] In Ryan's system of accessibility this corresponds with "(E) Physical compatibility [...] TAW is accessible from AW if they share natural laws", "(G) Logical compatibility [...]: TAW is accessible from AW if both worlds respect the principles of noncontradiction and of excluded middle". [98, p. 32]

[36] The natural world generates stories of the human condition. These stories are many varied, but from the very beginning of storytelling they tend to be tragic. Their most common pattern is degradation–from culture to savagery [...], from civilization to its destruction [...], from life to death [...], from love to betrayal [...], from family to solitude [...]. [27, p. 117]

Ontological Relation

While the alethic frame determines the actions and events, the ontological relations concern the spatial setting and the characters of the diegetic world by defining whether an object of one world exists in the referred world or not. Adapting Ryan's four categories[37], the relations can be classified by the concerning constituent. Hence, the spatial setting is defined by a geographical relation and the existence of its enduement. The existence of characters is established by the biological (species like fairies) and individual (i.e., Emma Bovary) relation. Some non-existing objects and persons show the strong connection between the alethic and ontological relation. For example, ghosts or Harry Potter's "invisibility cloak" are non-existent due to their impossibility inside the alethic frame. On the other hand, there are also elements that are non-existent but do not violate any logical or natural laws with their existence, like Emma Bovary. Vice-versa, a supernatural world can be populated with existent persons or can correlate with existent places.

Historical Relation

The chronological relation defines the temporal setting, as Ryan declares:

> (D) Chronological compatibility [...]: TAW is accessible from AW if it takes no temporal relocation for a member of AW to contemplate the entire history of TAW. (This condition means that TAW is not older than AW, i.e., that its present is not posterior in absolute time to AW's present. We can contemplate facts of the past from the viewpoint of the present, but since the future holds no facts, only projections, it takes a relocation beyond the time of their occurrence to regard as facts events located in the future.) [98, p. 32]

Beside the relocation into the future, there are also deviations of the referred history like in counterfactual fiction or in multiperspective narrations in which a historical event or person is changed, added, or negated. The addition of an element that is non-existent in the referred history correlates with the ontological relation except the consequences on

[37] (A) Identity of properties [...]: TAW is accessible from AW if the objects common to TAW and AW have the same properties. (B) Identity of inventory [...]: TAW is accessible from AW if TAW and AW are furnished by the same objects. (C) Compatibility of inventory [...]: TAW is accessible from AW if TAW's inventory includes all the members of AW, as well as some native members. [...] (F) Taxonomic compatibility [...]: TAW is accessible from AW if both worlds contain the same species, and the species are characterized by the same properties. Within F, it may be useful to distinguish a narrower version F' stipulating that TAW must contain not only the same inventory of natural species, but also the same types of manufactured objects as found in AW up to the present. [98, p. 32ff]

history. For example, the existence of Madame Bovary has any influence on the historical compatibility, but the appearance of Marty Mc Fly in the past of his parents would have almost led to his annihilation in *Back to the Future* (1985). The more significant the historical change is and the more far-reaching its consequences are, the more complex becomes the simulation of these effects and the whole world construction.

Epistemic Relation

The knowledge and mental capacities of characters are subsumed under epistemic relation.

> The modal system of knowledge, ignorance, and belief imposes epistemic order on the fictional world. Codexal epistemic modalities are expressed in social representations, such as scientific knowledge, ideologies, religions, cultural myths. Subjective K-operators define a personal epistemic set, an individual's knowledge of and beliefs about self and the world. [27, p. 126ff]

The knowledge of characters or the whole society determines their interpretation of the world and their actions. Furthermore, it influences the inventory of the spatial setting which is dependent on technical achievement. Mostly this relation orientates on historical relations and is integrated into the social setting.

Deontic Relation

This relation determines the social setting by its norms. Doležel defines the influence of the "deontic constraints" as follows:

> The modalities of the deontic system (the P-operators) affect the design of fictional worlds primarily as proscriptive or prescriptive norms; the norms determine which actions are prohibited, obligatory, or permitted. [T]he P-operators differ—just as the other modalities do—in their scope (domain of validity): codexal norms are valid for an entire world, subjective norms spell out prohibitions or duties for individual persons. Deontic norms are binding either as tacitly accepted conventions (such are customs of a culture) or as explicitly promulgated rules, regulations, and laws. [...] Under different deontic conditions, one and the same action can have a completely different status and consequences. The deontic marking of actions is the richest source of narrativity; it generates the famous triad of the *fall* (violation of a norm—punishment), the *test* (obligation fulfilled—reward), and the *predicament* (conflict of obligations) [...]. [27, p. 120ff]

The conflicts mentioned by Doležel result from a negative, deontic relation between the TAW and a cPW which can lead to violation and punishment (cf. chapter 3.3). The

aggregate of the deontic elements build a frame similar to the alethic one and serves the characters as an orientation for their behavior, actions, and thoughts in the cPWs.

Axiological Relation

The second relation relevant for a social frame concerns values. Doležel uses for it the term "axiological codex" and illustrates it on the two extremes of nihilists and rebels: "The nihilist is a person who negates the axiological order of the world and replaces it with a subjective axiology that has a single operator: indifference. [...] [T]he axiological rebel negates the G-codex by setting up a contrary subjective axiology" [27, p. 124ff]. The axiological relation of an element (events) is expressed by oppositional adjective, for instance, helping the poor is valued in TAW_1 as good and in TAW_2 as bad. According to Doležel, "the axiological system underlies stories of quest and moral dilemma" [27, p. 126].

Linguistic Relation

The last relation defined by Ryan is the "(I) Linguistic compatibility [...]: TAW is accessible from AW if the language in which TAW is described can be understood in AW" [98, p. 33]. A negative element can be realized by neologism, non-existent names (for characters, places, objects, actions, etc.), and non-existent dialects or even a whole language. A deviation in the linguistic relation can further affect the vocabulary, dialogue, and characterization on the surface realization.

Exemplified on the afore-discussed world models, the interactor could choose between a basic or split TAW and, in the case of the latter, the amount of worlds from one to four. This simple decision has enormous effects on the story world and the discourse level, because the references and the data has to be generated or provided for each TAW. Therefore, the maximum of four worlds is suggested. The selection of a range of possibilities is the most applicable interaction in the basic structure of diegesis. Furthermore, the adjustments on a scale is suitable for the manipulation of the degree of fictivity. To enable these interactions, one has to design a very sophisticated system, necessary data have to be accumulated and structured, and the generative rules, frames, and algorithms have to correlate with the decisions of the interactor. Hence, the system provides a clearly defined frame of defaults with numerous combination possibilities to facilitate varying output. Within this frame, there are variables and gaps to interact with or to rework and expand the world.

As explained above, a TAW is generated by its references to the AW (and another TAW in the transfictional model). This set of negative and positive relations forms the temporal, spatial, and social setting, the characters, and events.

Prior to this, the AW can—but is not necessarily bound to—be formalized as a template for this and all the other TAWs. The advantage of the template is not immediate, but will decrease the effort for following projects. To set up such a template is not a task for a single generation project, but it develops and expands with every TAW generation. Like the enhanced dictionaries, such as *WordNet* in Natural Language Processing, it enables many other applications too. Furthermore, databases, online sources, and semantic or social web applications can be used to simplify and fasten the process. For instance, the alethic relation can be defined by physical, chemical, and logical rules like simulated in scientific scenario processors; ontological, historical, and epistemic knowledge can be extracted from online databases (cf. chapter 3.2). All these possibilities need further discussion in the context of the single constituents of the diegesis. Concerning the different world models, there are different production efforts, listed in increasing order:

(1) The dynamics in the world models are the most challenging, because every change even in a single aspect of a reference can affect the story world. Although the causal chain need not to be in fiction as stringent as in reality, there need to be a coherence in the story world. These changes, minor and major alike, are mostly connected to a core theme or function of the story and, therefore, need an accurate design.

(2) The efforts of constructing a basic model depends on the degree of fictivity. While "real-like" worlds simply copy the AW, the "fantastic" worlds deviate in many or a single relation, and sometimes only some aspects of one relation.

(3) The regions of one TAW share the same relations and few—commonly concerning society, namely the epistemic, deontic, axiological, or linguistic relation—relations or only some aspects of it are deviating. In some cases they differ more, like the future Earth and Pandora in the movie *Avatar* (2009). However, the differentiation between this model and the split TAW becomes fuzzy with increasing deviation and the heterogeneous model seems more likely a split one.

(4) The split TAWs can share single relations, but the deviation dominate.

(5) The next model is related to more worlds, the AW and other TAWs. The relations between the TAW and the AW operates like in the basic model. On the contrary, the references to the other TAWs are very limited and only positive otherwise one would not realize them as allusions. Except sequels, that adopt the preceding TAW, there are genre-specific traditions with standardized relations. Nevertheless, the transfictionality according to narrower definition, such as the afore-cited definition of Ryan, adopts more likely elementary components like a prominent character or an impressive setting and not the profound references.

Due to the increased complexity and exhaustive data quantity, one has to question the cost-benefit of letting the reader decide on the diegetic structure. Studies on Interactive Fiction (or on Literary Reception) do not mention the manipulation of that essential story world elements as main factor for emergence and assess their constituents, like setting, character, and events, as more emergent and interesting. In the domain of Role Playing Games, this emergency effect has been applied to elaborated character creator interfaces (cf. chapter 3.3).

As already discussed, the core problem of Interactive Fiction is the balance between authorial control and creative freedom of reader. Too many choices and too much "work" for the reader decrease the pleasure, the suspense, and the dominating interest in playing with the tool than reading the output. Furthermore, Murray [72, S. 39], Glassner [42] and others suggest the narrative techniques remain in the control of the author. The diegetic structure and the references are the technical essence of the story world. Concludingly, the focus of interaction is more joyful and realizable not on this level but in the setting, characters, or events.

3.2 Setting and Frames

> *Perhaps the first thing to say is that [...], the establishment of an identifiable setting is a strong psychological preference in most readers. We like, in our reading of narratives, to know where we are, and look for clear spatiotemporal indications of just where and when a thing happened.*
> – Michael J. Toolan, 1991 [112, p. 91]

The term "setting" used in this chapter does not follow Toolan's conventional definition[38], but adds the social and cultural aspects, like Ryan has defined it as "the general socio-historico-geographical environment in which the action takes place" [100, ğ10]. The parts of this triad are not clearly separated or independent, although different, are complementary and together they cover all dimensions of the story world. Murray suggests a interconnected frame-system to establish author control over the random or reader's decisions of a story world[39]. Despite her focus on Interactive Fiction, the frame-system is useful for this approach too. Manfred Jahn summarizes that ...

> ... frames and scripts specify "defaults" to encode expectations, "nodes and relations" to capture categories and hierarchies, and "terminals" and "slots" to provide data integration points. The usual mode of frame or script structure visualization is the directed graph

[38] Besides Toolan, Prince [90, p. 89] and many more have defined "setting" only over time and space.

[39] One way of giving the author control over both the abstract and the particular elements is to describe all the story elements as a system of interconnected "frames". The frame is a powerful conceptual format of the digital representation of qualitative information. [p. 208]
A frame-based authoring system would allow a writer to enter each element in its generic and particular forms and would keep track of the connections between them, for example, which kinds of characters fit into the possible plot possibilities, eliminating many of them and specifying appropriate choices or priorities for situations where the story pulls in multiple directions. The off-the-shelf elements would provide most of the story for a purely formulaic writer, but they would provide only the palette for a more inventive one. As in any genre, the more original the writer the more she would have to invent her own elements and the more actively she would inflect the conventional formulas. What the computer would provide would be a means for using formulaic patterning, in much the same way the oral bards did, as a system for assembling multiform plots. The electronic system might be able to generate more variants than the author could ever read in a lifetime (let alone write individually), but since she would have specified all the important details and all the rules of variation, the computer would be merely the instrument of the author, an extension of her memory and narrating voice. [72, p. 212]

> or tree diagram (Minsky 1979, 3, Schank and Abelson 1977, 43), a structure that is well manageable in computational terms. Frames and scripts are required to be "flexible" and adapt to "new and unusual situations," to deal with variants or "tracks" (Schank and Abelson 1977, 40), and to allow exceptions, "excuses" (Minsky 1979, 18), "interferences and distractions" (Schank and Abelson 1977, chapter 3.4). For both frames and scripts, the actual integration of lower level data is regulated by "conditions" and "requirements". Some of these are necessary conditions representing "things that are always true about the supposed situation" (Minsky), others are of a more probabilistic or modal nature, specifying ideal types or defaults, but also marginal cases, permissible exceptions, and so on. Preference rules [non-necessary conditions of frames or scripts] usually come in pairs, groups, and oppositions, and accumulate in complex *preference-rule systems* in which each rule is weighted and ranked according to a specific priority, confidence, or stability rating.
>
> Frames/scripts and data enter into a mutual dependency-and-reinforcement relationship which constitutes an operationally practicable version of the hermeneutic circle. On the one hand, frames and scripts offer slots within which the data accumulate and "make sense," and on the other, the data continually test the adequacy of whichever frames and scripts are active. [49, p. 175ff]

The constraints of the "top level" [71, p. 212] or "necessary conditions" are fixed by the degree of fictivity on the afore-discussed relations between the TAW and the referred world(s). The constituents of the diegesis build the several databases of the story. They are created by the accumulation of data and further definition of new defaults, relations, and nodes. On the contrary to the top level these configurations are flexible and must not contradict the top level constraints.

Consequently, the hierarchy of the story frame mirrors the order of the following concept: The top level constraints determine the elements of the setting. These two levels influence the characters, their cPWs, and events and finally characters orientate their actions on all the previous conditions. Furthermore, the previously discussed relations work like a blueprint for another TAW by adding or negating elements, like data sets or rules, of the referred world(s).

3.2.1 Temporal Setting

The temporal setting determines in which period, past, present, or future, relative to the referred world—or neither of them, if it is a counterfactual or a completely fictive history—the story is set. Furthermore, this period is defined by a temporal limitation

which spans the whole story time from the beginning to the end with all prequels, sequels, analepses, and prolepses. This time line is stringently chronological in the diegesis, except the alethic frame allows time travel. Depending on the chronological fictivity, the specification can correlate with "our" calendars or its own, e.g. the stardate of *Star Trek*, but normally it is defined by time designation like century, year, season, day, hour, and so forth. The actual story time or "Erzählzeit" will be constructed by the events[40], as Bal explains: "An event, no matter how insignificant, always takes up *time*. This time has a hypothetical status: in a fabula the events have not 'actually' occurred. Nevertheless, the time is often important for the continuation of the fabula and must consequently, be made describable" [8, p. 7]. This resulting story time will be constructed not on the stage of the setting, but by the events discussed in chapter 3.4.

Beside this reactive influence on events, the temporal setting affects all the following constituents of the diegesis too. The inventory of the literary space is defined by a historical period, for instance, the settlements of the middle age differ from futuristic cities. The culture, society, and characters are also influenced by the historical date. Finally, the historical date excludes certain activities and happenings by the change of daytime, seasons or historical setting.

This requires a more complex and flexible system due to the great effects on all the other aspects of the setting and consequently the expansiveness of data. In the extreme of completely free interaction, the reader chooses any historical or future period. Then, the program activates the data for spatial and social setting and assimilates some features of characters adequately to this point of time. The retrospective selection is only realizable, if the system accesses immense databases and extracts the required information. Although online databases and encyclopedic projects—paradigmatically Wikipedia—could provide detailed information, the system has to be able to filter and assign the data correctly. Assuming the reader chooses the 1950s as temporal setting for his or her detective story, the system searches the Wikipedia for this decade and easily finds an entry. Despite the helpful, thematic structure of political, economic, scientific, and cultural issues or prominent people, the challenge for the system lies in the coherence of details. Another difficulty is the specification of temporally affected constituents

[40] Story-space contains existents, as story-time contains events. Events are not spatial, though they occur in space; it is the entities that perform or are affected by them that are spatial. [20, p. 96]

because the consequences of the temporal setting concerns not only the setting, but also the characters with all their attributes and events.

The realizability of this interactivity lies mostly in the importance and effects of the temporal setting for the story world. If the detective story—taking up the former example—is restricted to a close space with a limited set of characters and events, this will be more practical than in less constrained genres.

3.2.2 Spatial Setting

Because of the novelty of theories on literary space[41], the terminology and classifications lack conformity and unambiguity. Therefore, a working definition of "space" precedes the discussion of spatial configurations. Mieke Bal defines basically ...

> ... location or place as an element of the fabula. There the term referred to the topological position in which the actors were situated and the events took place. The contrasts between locations and the borderlines between them were there viewed as predominant means of highlighting the significance of the fabula or even determining it. [...] The concept of *place* is related to the physical, mathematically measurable shape of spatial dimensions. Of course, in fiction, these places do not actually exist, as they do in reality. But our imaginative faculty dictates that they be included in the fabula. [7, p. 93]

Bal further distinguishes these places of the story (or "fabula" in her terminology) from the "space" of the discourse ("story") level[42]. Bal's "space" correlates with the concept of Gabriel Zoran's "textual level" and Ryan's "story space". Furthermore, the spatial setting is also distinguished from any textual or metaphorical uses of space.

The spatial setting analyzed in this section follows the afore-cited, basic definition of Bal as a **three dimensional container for existents that is constructed by its alethic,**

[41] The literary space advanced to an equal constituent of the diegesis like time, characters, and events in narratology only in the last decades. The article *Zum <topographical turn>* [115], which compares the European with the US-American approaches on this topic, the essay collection *Raumtheorie* [28], and the English written article *Space* [100] offer an excellent introduction to these studies.

[42] "The story is determined by the way in which the fabula is presented. During this process, places are linked to certain points of perception. These places seen *in relations to their perception* are called *space*. [7, p. 93] In the third and revised edition of *Narratology*, Bal further defines "[t]he concept of space [...] sandwiched between that of focalization, of which the representation of space constitutes in a way a specialized case, and that of place, a category of fabula elements". [8, p. 134] Nevertheless, the focus lies on the "place" in this chapter.

ontological, historical, and linguistic relations to an external world[43]. The former relation defines the physical fictivity of the created landscapes and its inventory, so that it can range from the typical earth-like topography to physically impossible worlds, for instance Terry Pratchett's Discworld or Edwin Abbott's Flatland. The ontological deviation is more frequent and alters the referenced geography and its inventory. When the former two relations are coinciding, space has to be historically defined. Especially the inventory, such as buildings and their architecture, is depending on the temporal setting. Spatial elements can also alter over the story time, though, this spatial change is rare and would concern the semantic organization more often than static elements. Finally, the linguistic relation names the places, areas, and inventory by deviation or conformity. Depending on the genre and the diegetic fictivity, the impact of the spatial setting on the other levels ranges from fundamental to insignificant. This is obvious in the more fictional and spatial genres, like high fantasy à la J. R. R. Tolkien, that are set in completely invented world. Therefore, Barbara Piatti differentiates generally the "Georaum" and "fiktionalisierte Räume" describing "real existierende Gegenden, die in einem fiktionalen Text zum Handlungsraum modelliert werden" from the "Räume der Fiktion" which are "reine Produkte der dichterischen Imagination" [85, p. 23]. She concedes, however, that there need to be a certain positive relation between TAW and AW[44] also in spaces of fiction. Nevertheless, in the case of highly fictive spaces, the spatial setting has to be completely constructed and, therefore, the generation process differs from the more realistic genres in which the program adapts existing places.

The actual construction of the literary space occurs on six levels, whereas the first three are subsumed under setting and the other three provide a "mutual dependency-and-reinforcement relationship" [49, p. 175ff]. The first and basic production step is the geographical specification that is here termed "mapping". Political territories are defined in the "bordering" step. Then the resulting map is enhanced historically with

[43] This definition correlates with Ryan's "narrative space": "This is the physically existing environment in which characters live and move (Buchholz & Jahn 2005). We may call it 'setting,' but this intuitive notion of setting needs to be further refined: just as, in the theater, we can distinguish the stage on which events are shown from the broader world alluded to by the characters, in written narrative we can distinguish the individual locations in which narratively significant events take place from the total space implied by these events (Ronen 1986)". [100, ğ8]

[44] Es gibt Berührungspunkte zwischen fiktionaler und realer Geographie. Literaturgeographie geht davon aus, *muss* davon ausgehen, dass eine referentielle Beziehung zwischen inner- und auSSerliterarischer Wirklichkeit besteht [...]. [85, p. 25]

its inventory and markers in the "locating" step. The connotations are projected on this map in the "semantizing" process. Afterwards the characters are allocated. The last step is labelled by Zoran "chronotopic" [118] and by Huaxin Wei et al. "operational level" [114] and is formed by the actions and movements of the characters.

Mapping Step

This geographical reconstruction correlates with Zoran's "static entity" of narrative termed "topographical level" [118, p. 315] of a "total space"[45]:

> From the point of view of the topographic level, the concept "total space" is needed because it enables us to locate the events [...]. Apart from the question of specific location, total space also has to do with the assumptions of the text about the nature of the world in general, and thus it is strongly connected with the external field of reference (see Hrushovski 1976). The text refers the reader to a certain model of external reality by means of which he must reconstruct the world. As regards the spatial complex of the text, there is constant play between this model and the internal field of reference whereas in total space the external field of reference becomes the prominent factor. The external field of reference may be of several types: historical, geographical, mythical, science-fictional, fantastic, etc. Naturally, the clarity of the localization and reconstruction is dependent on the type of field of reference referred to in the text. In any event, it should be emphasized that the connection between total space and the external field of reference in no way signifies that we are dealing here with something which depends for its validity on something outside the text. The text itself determines the nature of its total world, and the model of external reality, although not necessarily created by the text, is chosen, modified, and fully controlled by it. [118, p. 329ff]

The mentioned "external field of reference" correlates with the alethic and ontological relation. While realistic spaces, which have positive relations to the AW, simply apply the corresponding geography, unreal spaces open a variety of map constructions. The alethic deviation leads to irrational spaces that contradict natural laws (e.g., worlds of M. C. Escher or folk tales like *Jack and the Beanstalk* or *Frau Holle*). This often involves

[45] Total space includes according to Zoran "spatial elements that the text presupposes, or provides indirectly, but does not 'show.' This information belongs to the total space – that spatial information which exists beyond the boundaries of the actually presented space. The concept of total space in a text is necessary because of the way we generally think about space. It is impossible to imagine space as anything other than total. Of course, we do consider limited sections of space, but at the same time we regard them as parts of a larger space encompassing them. Total space, however, is not merely a vague duplication of space actually shaped in a literary text: it is an essential component with its own functions and modes of existence, as can be shown with regard to the three levels of structuring". [118, p. 329]

ontological unrealities represented by magical inventory, like the gigantic beanstalk, or transitional portals inside one TAW map, like the *Star Gate*, or between different TAW's like the wardrobe in C. S. Lewis' *The Chronicles of Narnia* or the railway station in J. K. Rowling's *Harry Potter*. In the majority of literary spaces, the deviations are only in the details of the single constituents and not completely unreal.

A map is basically shaped by natural boundaries (in the locating step defined as coasts, rivers, etc.) and the in-between areas. Only rare fiction genres require additionally world or even universe building[46], but the vast majority of narratives are set on an earth-like planet or on earth. Furthermore, literary maps are seldom "entirely exhaustive" as Zoran has examined [118, p. 316]. Therefore, the expanse of the map depends on the genre and limits the characters' action and knowledge scope. For instance, a conventional detective story requires a clearly restricted, small space, like a mansion, whereas the spatial setting of travel literature is confined by the stations of the journey and the knowledge of the traveler's former journeys. Despite the minimalism of literary maps attached to several novels, the map for story generation needs also a coordination system to calculate distances, sizes, etc. and a topography to represent natural features of the terrain. This resulting three dimensional, (normally) static map is enhanced in the next three steps with additional data and story elements.

Bordering Step

The territorial definition is proceeded as in the creation of geographical maps. Depending on the ontological and historical relation, the borders of our native maps can be copied or fantastic realms can be established. These political boundaries may alter while the story unfolds and define in many TAWs regions of different social, cultural, juristic or economic frames (heteroregional TAW). The political borders are defined before the locating because the governance or social form influence the agriculture and cultural inventory.

Locating Step

The locating process adds the "qualities"[47] and the inventory to the map. These qualities of a landscape can be defined by the climate, fauna, flora and geologic features and are

[46] For instance, Poul Anderson wrote on *The Creation of Imaginary Worlds* (cf. [2]).

[47] In addition, the map has patterns which refer not to the location of things, but rather to their quality – patterns of colors, substances, types of objects, etc. [118, p. 316]

quite static. Apart from that, the inventory includes cultural and artificial elements, like cities, buildings, infrastructure, and so on. While the qualitative design is closer to the mapping step and follows the alethic and ontological relations, the inventory is historically dependent too and orientates on the semantic compositions and political territories. The simulation of a realistic environment is well developed and implemented, but the creation of a deviating one requires recalculations and affects also the inventory, the physiology of characters, and the events.

The inventory functions not only as decoration but also as materialization of the aforementioned boundaries[48], as habitations or possessions of characters (c.f. chapter 3.3.2), and as obstacles in the action zone of characters that are discussed in the next steps. Accumulations of related inventory sometimes builds new, finer-grained areas, like a settlement or a wood, on that will be from now on refer to as "places" and that often establish additional semantics, like city/country, outside/inside, and so on. Moreover, the frames in this and other vertical organizations, like in the theories of Zoran[49], Ronen[50], Piatti[51], or Ryan, are also connected: "Spatial frames [...] are hierarchically organized by relations of containment (a room is a subspace of a house)". [100, ğ9] The hierarchical structure resembles the heteroregional TAW-system so far as the subspaces adapt relations of the higher leveled automatically, like the references to the external world or internal qualities, like possession specifications or semantic oppositions, if not explicitly stated.

To automatically create fictive landscapes, one can add algorithms that define the living conditions of an area, the inventory, and characters, for instance: An area with x

[48] Architecturally as well as plot-functionally, narrative space can be described in terms of the partitions, both natural and cultural, that organize it into thematically relevant subspaces: walls, hallways, political boundaries, rivers and mountains, as well as in terms of the openings and passageways that allow these subspaces to communicate: doors, windows, bridges, highways, tunnels and passes. Besides horizontal partitions, narrative can also present vertical ones, corresponding to what Pavel (1986) calls "salient ontologies": these ontologies can oppose the world of everyday life to a world of magic, dreams to reality, images to existents or, in narratives with embedded stories, the different levels of fictionality. Whereas horizontal partitions divide the geography of the narrative world, vertical partitions create ontological layers within the narrative universe. [100, ğ32]

[49] Zoran subdivided "total space", "spatial complex" and "basic units". [118]

[50] Ronen classifies literary space in primary, secondary, inaccessible, spatio-temporally distant frames and generalized space according to the degree of immediacy. cf. [95]

[51] Die Schauplätze schlieSSlich sind innerhalb dieses Ordnungsgefüges die jeweils kleinsten Raumeinheiten: ein Haus, [...] etc. [85, p. 129]

resources and y climate provides z-kind of fauna and flora. This is a good/bad living condition for humans. (1) A good environment supports certain jobs, inventory (e.g., mill), places (e.g., harbor), and cultures. (2) A hostile environment for humans supports other species, alternative use (Las Vegas, Area 51), or negates any life form at all. Furthermore, places and inventory are contextualized by social functions, like inns, and often represent finer-grained regions, where different frames act on the characters, like a palace or a kitchen.

How detailed the information of the environment and the inventory has to be to provide a coherent narration, is one of the core challenges of automatic story generation. While some epic works manage to tell stories without describing any spatial details, other stories are fundamentally spatial like that of travel literature or fantasy genres. Nevertheless also in the latter narrations, not every detail has to be accumulated. Zoran identifies the cause of this selective process in the linguistic mediation:

> A spatial object is characterized by its being complete, full, and existing simultaneously. In the attempt to give verbal expression to the structure of such an object, the object must first lose some of its 'completeness,' since it is impossible to give an identical expression to all its parts and aspects: some of them may be described explicitly, some of them implicitly, and some bypassed altogether". [118, p. 313]

Which aspects have to be described or not, is traditionally the often intuitive work of the author. The case is different for automatic story generation in which everything has to be explicit and computable. One has to separate interesting information from the expected or the general knowledge of the reader[52]. The expectations and general knowledge vary from one reader to another depending on his or her background, reading habits, constitution, and much more. Putting aside the manifold difficulties of identifying the actual reader and all possible historical, cultural, or epistemic misunderstandings, one can generally assume an ideal reader. In literary practice, the author orientates on himself or herself or on an average person of his or her social surrounding. The distribution via the Internet and the globalization of the book market challenge this

[52] The Cognitive Science is concerned with the questions of the reader's general knowledge and the reconstruction of mental maps from literary space. For instance, Catherine Emmott [31] investigates the narrative comprehension and the creation of mental models of fictional worlds and contexts. More specific is the article of Nicola Alter [1] on the creation of a literary space from the perspective of Reader-Response Theory.

narrow target audience. There are three solutions to this opacity: The actual reader has to approach the horizon of the author. The author writes for a global audience by avoiding specific allusions and reduce presuppositions. The text is adjusted to the reader[53]. Compared to the former, the third way is more complicated to realize because it requires a complete adjustment of the (temporal,) spatial and social setting. On the other hand, the second production method increases the data capacity or requires a non-specific space realized by skipping the naming process.

Generally, there are priorities for which data need to be accumulated: deviating information, action zones of the main characters (cf. chronotopic step), semantically enhanced areas (cf. semantizing step), and sensational information. The first means a negative reference to the AW, that serves as the general knowledge repertoire of an ideal reader[54]. Furthermore, the classification in a certain genre by the paratext activates a conventional knowledge[55] and softens or maintains deviations due to the familiar genre context. For instance, the introduction of a hovering house would require more description and justification in a historical novel, than in a Science Fiction story. However, these deviations are often only exceptions of an amount of positive references. This coinciding information can be applied, identical, or similar information can be compressed into schemata, and spatial conventions are stored under "topoi"[56] in a general knowledge base.

Finally and prospectively, one has to consider that the description of the setting is presented by the narrator or subjectively perceived by a character. In the case of the latter, "there are three senses which are especially involved in the perception of space:

[53] This is termed in the globalization discourse "glocalization", meaning in economics the "action, process, or fact of making something both global and local; spec. the adaptation of global influences or business strategies in accordance with local conditions" [75]. The former duality in producer-recipient relationship correlates with an older phenomenon well-known in Translation Theory as the two ideal poles of transparency and fidelity.

[54] While fantasy writers create unfamiliar settings, characters, and narratives, they always make use of the reader's knowledge of the real world in doing so. If they did not their novels would be incomprehensible. It is the unusual combinations of familiar ideas that make the worlds of fantasy novels seem new. Iser dubbed this bank of contextual knowledge that the reader draws on "the repertoire". [1]

[55] Textual information about stereotyped situation is always incomplete and only relevant elements will be denoted in the text. [95, p. 432]

[56] Such a fixed combination is called a *topos*. In the literature of later periods [than medieval], too, certain combinations occur which are sometimes characteristic of a writer, sometimes of a movement, and sometimes even of novel. The expectation that a clearly marked space will function as the frame of a suitable event may also be disappointed. [7, p. 97]

sight, hearing and *touch*". [7, p. 94] Hence, information beyond perception are not relevant for characterization in general.

The result of the mapping, bordering and locating process is a detailed map of all the spatial elements in a diegesis and in a concluding step or simultaneously with the creative process all its elements are named. The names, again, can simply coincide with the real ones or are invented due to a negative linguistic relation, that associates often the negation of the ontological relation.

Semantizing Step

The semantization of the map is not a distinct process but needs to be reworked and expanded afterwards in other diegetic constituents. On the contrary to the former aspects of the literary map, the semantics can vary and depend on the perspective. For example, the unfamiliarity of a place depends on the origin of the subject. Although this step could also be executed after the populating step, some general semantics influence the populating and chronotopic process and, therefore, have to be fixed in advance. The significance of semantizing enhancement is stressed by Ryan:

> An important aspect of the cognitive mapping of narrative texts is the attribution of symbolic meaning to the various regions and landmarks of the narrative world. [...] In the cosmology of archaic societies, space is ontologically divided into a profane world, the realm of everyday life, and a sacred world, inhabited by supernatural beings, with holy sites functioning as portals between the two. The narrative response to these cosmologies and topologies is a symbolic geography diversified into regions where different events and experiences take place—where life, in other words, is governed by different physical, psychological, social or cultural rules. In fairy tales or computer games, for instance, the symbolic map of the narrative world may associate the castle with power, mountain tops with confrontations between the forces of good and evil, open areas with danger, closed areas with security, etc. [100, ğ31]

Hence, the space of many narrations is organized according to oppositions of spatial qualities or themes, such as secure/dangerous, bad/good, or profane/holy[57]. These op-

[57] Jurij M. Lotman specifies this further in his theory of spatial semantic, that Martínez and Scheffel summarize concisely: "Der komplementäre Gegensatz der Teilräume entfaltet sich auf drei Ebenen: (a) *Topologisch* ist der Raum der erzählten Welt durch Oppositionen wie <hoch vs. tief>, <links vs. rechts> oder <innen vs auSSen> differenziert. (b) Diese topologischen Unterscheidungen werden im literarischen Text mit ursprünglich nicht-topologischen *semantischen* Gegensatzpaaren verbunden, die häufig wertend sind oder zumindest mit Wertungen einhergehen, wie z. B. <gut vs. böse>, <vertraut vs. fremd>, <natürlich vs. künstlich>. (c) SchlieSSlich wird die semantisch aufgeladene

positions can be constant or altering throughout the story, like political boundaries, and general or dependent on the point of view (e.g., familiar/strange). Personal connotations have to be defined in the databases of the single characters. In her discussion of location as a fabula element, Bal stresses that "[o]ppositions are constructions; it is important not to forget that and 'naturalize' them" [8, p. 222]. The naturalization can be realized by concretization into objects, such as the former cited oppositions mountain/valley or heaven/hell, and by relativization. The latter requires a range of values, resulting in degrees of intensity for every object or location. The structure of the oppositions according to Zoran are defined by the author and her or "his personal outlook, tradition, culture, individual qualities, etc"[58].

The direct intervening of the reader is not reasonable because the spatial semantics reflect the bigger concept of themes and are depending on the characters. Therefore, the reader can influence them only through the themes of the presettings or characters (chapter 3.3). In consequence, this semantic definitions of the map switch to their opposite due to a change in perspective or by events. The influence is, however, bidirectional because the semantic connotations of an area affect all the following generating steps and constituents.

Populating Step

The next two steps are only generally specified for the setting and further defined in the connected chapters. What is specified in advance is the general popularization by criteria like nationality, species, or social groups. These groups can be situated in geographical areas, political territories, and places. This allocation has to be differentiated from the

topologische Ordnung durch *topographische* Gegensätze der dargestellten Welt konkretisiert, z. B. <Berg vs. Tal>, <Stadt vs. Wald> oder <Himmel vs. Hölle>". [63, p. 140]

[58] Unlike topographical maps in reality, this map can structure space on the basis of ontological principles as well; that is, space can be divided up according to the modes of existence of its units. These "modes of existence" sometimes overlap with the factor of topographical location: for example, the world of the gods – up; the world of man – down. Yet they may relate to one another in relationships in themselves completely unspatial, such as the relationship between the space of a dream and that of reality within the narrative. Again, the ontological levels may be completely differentiated from one another, or they may be mingled, appearing together in one continuous space, such as in fantastic tales. It is difficult to define beforehand all the different possibilities of patterns in the topographical world, for these are not dependent on the logic of the verbal text – on the contrary, as far as language is concerned, every structure is possible. The possibilities open to the writer are, instead, dependent on his personal outlook, tradition, culture, individual qualities, etc. [118, p. 316ff]

locating of inventory for many reason, as Zoran stresses:

> Only one aspect of the structure of topographical space is dependent on the logic of the narrative text: the special spatial existence of the characters. The characters are generally perceived as belonging to a separate narrative level with its own particular problems. It should not be forgotten, however, that they also exist as physical bodies in space, but the fact that they have many important functions in other areas of the text makes them, spatially, a distinct and exceptional entity. The formation of a character's external appearance constitutes a special problem, different from the formation of an inanimate object – although every text expresses this difference in a different way. Imagine the grotesque effect that would be created if a character was handled as a physical object. In principle, therefore, one may state that the differentiation between subject and object determines a basic differentiation within space – between the external appearance of the characters and the environmental objects. [118, p. 317]

Although the characters are not necessarily bound to a specific space and can cross boundaries, the spatial connection influences the identity and initial frame for the characters of this group. In the chapter 3.3 concerning the creation of the characters, the individuals are positioned on the map, their habitations and possessions are defined. Ronen concludes concerning their qualities: "Frames are either *personal* or *impersonal*, properties that relate the frame to objects in it. A personal frame carries a mark or imprint of a character; it carries the concrete physical indication (usually in the form of an object or a more general quality or atmosphere) of a private domain" [95, p. 431]. Therefore, each character is designated to an area or place and then they are redesigned or personalized. The "Figurenraum" termed by Piatti is hierarchically divided in zones of action and settings—or more specific spatial frames:

> Innerhalb des Figurenraums bewegen sich, wie der Name sagt, die Figuren – dieser Kreis enthält die eigentlichen Orte der Handlung. Er ist nocheinmal unterteilt in Handlungszonen und Schauplätze. Handlungszonen machen die *Makrostruktur* eines Handlungsraumen sichtbar. Sie zeichnen sich dadurch aus, dass sie sich nicht in einem räumlichen Kontinuum befinden. Zwischen ihnen tun sich unter Umständen weiSSe Flächen auf, möglicherweise sind auch die Relationen zwischen ihnen (etwa die Distanzverhältnisse) unbestimmt. [85, p. 129]

The two spatial units, scope of figures and places of action, are discussed in detail in the chronotopic step. Furthermore, the semantic perspective of each person on local

areas or oppositional spaces are established and accordingly the featured inventory and landscapes are characterized.

Chronotopic Step

According to Zoran, the chronotopic structure is constructed "by an integration of spatial and temporal categories as movement and change"[59]. To analyze this structure, Zoran differentiates the synchronic and diachronic relationship: The synchronic includes the dichotomy of motion and rest that characterizes characters and environmental objects. Whether an object or subject moves is defined by its capacity and the scope of movement[60]. The capacity to move is simply added to the profile of every character (cf. section 3.3.6) or inventory and is determined by the physiological features. The scopes are designated for each moving subject on the map and are often limited by the already established physical borders, like the walls of a house, the borders of a nation, or coasts. Although both conditions can change while the story enfolds, this would be the rare result of inner overcoming or external occurrences, such as the opening of political borders or a passing ship for rescue. The areas outside this scope are termed "inaccessible frames" by Ruth Ronen[61] and for the narrative central feelings like fears or hopes are projected on them. The diachronic relation defines the movements by their axes, the subject, and the causing powers:

[59] This Einsteinian term was introduced into literary criticism by Bakhtin (1978), who uses it to signify the entire complex of space and time together, including physical objects, events, psychology, history, etc. I, however, have not used the term to signify the totality of space and time, but rather to describe a specific aspect; i.e., not to signify all things that may be found in space or in time, but only what may be defined by an integration of spatial and temporal categories as movement and change. One may thus speak of the effect of the "chronotopos" on the structure of space. [118, p. 318]

[60] [R]est is the state of being bound to a given spatial context, while movement is the ability to cut oneself off from spatial context and to switch over to different contexts. As to the nature of the spatial context itself, this is determined by the narrative. For example, the Cyclops in the Odyssey can move about freely on his island, but the structure of the work – based on Odysseus's movement from place to place – determines the Cyclops's island as a single context, and the Cyclops as a character at rest. [118, p. 318]

[61] *Inaccessible frames* are those frames which, at a certain textual context or throughout the narrative, are not actualized as immediate surroundings because they cannot be, or are not entered by characters whose actions the narrative follows. The inaccessible part of the fictional space forms part of the same spatial continuum as the the setting, yet it consists of closed frames which cannot be entered or about which information is inaccessible to characters in another frame. Frames may be only provisionally inaccessible, their semantic status changing later in the text. [95, p. 426]

> [O]ne place is defined as the point of departure, another as the target, and others as stations on the way, deviations, etc. Thus, *axes of movement* in space are determined; one may state that space, on the chronotopic level, is structured as a network of axes having definite directions and a definite character. Axes may or may not be determined by motions which actually take place in the world of the text. An actual movement is a result of several powers: will, obstructions, ideal, characters' intention, and so forth. These powers can also act in space when there is no real movement. [...] Chronotopic structure of space does not mean an occasional movement on a neutral scene, but rather a conception of the entire space in terms of a *field of powers*. [118, p. 319]

These three entities of movement need not be specified in the setting as they emerge in the course of the story. However, a sketch of the main movements is useful for narrations of genres with spatial focus to decrease the required data for the spatial setting. While the point of departure has already been fixed in the populating step, the locations of the target and main stations establish an axis that can be corrected or specified by the events. The various axes of movement provide a potential for stories, as Lotman explains:

> Wenn wir uns eine geographische Karte vorstellen, erhalten wir ein gutes Beispiel für einen klassifikatorischen (sujetlosen) Text. [...] Sobald man jedoch einen Pfeil auf der Karte einzeichnet, der z.B. die Route einer regelmäSSigen Schiffsverbindung zur See oder einer möglichen Luftlinie angibt, wird der Text sujethaltig: Es wird eine Aktion eingeführt, welche die (in diesem Fall geographische) Struktur überwindet. Im Verhältnis zur Grenze des (semantischen) Sujetfeldes tritt der Handlungsträger als ihr Überwinder auf, und die Grenze im Verhältnis zu ihm als Hindernis. Deshalb sind alle Arten von Hindernissen im Text in der Regel im Bereich der Grenze konzentriert und stellen strukturell immer einen Teil von ihr dar. In struktureller Hinsicht tragen sie alle ein und dieselbe Funktion – sie machen den Übergang von einem semantischen Feld in das andere in höchstem MaSSe beschwerlich, ja sogar unmöglich für alle auSSer dem Handlungsträger im vorliegenden einmaligen Fall (möglich ist auch ein anderer, besonderer Fall des Sujets: Der Träger der Handlung kommt um oder >scheidet aus dem Spiel aus< wegen irgendwelcher anderer Gründe, ohne die Grenze überwunden zu haben). Die Helfer des Handlungsträgers sind in einigen Texten das Ergebnis einer Differenzierung der einheitlichen Funktion der Grenzüberwindung. Hat er die Grenze überwunden, so tritt der Handlungsträger in das Verhältnis zum Ausgangsfeld semantisch >Antifeld<. Um nun die Bewegung zum Stillstand kommen zu lassen, muSS er mit dem Antifeld verschmelzen, muSS sich aus einer beweglichen Figur in eine unbewegliche verwandeln. [28]

Lotman mentions two essential aspects. Firstly to increase the tellability, the point of departure and the goal are in two different semantic areas. Secondly, physical or

geographical obstacles are positioned near the borders of the two areas. As the obstacles and the former mentioned access regulations of areas influence the movements of the characters, this correlates with the environments of games in which the game design controls the navigation of the playable characters in the same way. Wei et al. present a typology of interaction in game space[62] that is applicable for interactive or automatic character navigation in literary space too. The designer of spaces can set conditions to regulate or even prohibit the access to certain areas: the boarders of inaccessible areas determine the scope and obstacles or means of transportation increase/decrease the speed of journey. Consequently (if the regulations are connected to certain groups), the map provides a variety of routes depending on the character, his or her actions and achievements, and/or external events that influence the limitations.

Apart from movements, there are many actions that are spatially related (e.g., swimming is only possible in areas consisting of water), because they require certain inventory or props. Certain places provide and exclude a set of actions according to the deontic relations (eg., it is accepted to dance in a ballroom but not in a mall in the western culture). Heather Barber integrated the chronotopic feature of space into her GADIN system as follows: "Each location has associated: a name, and a series of Boolean values which determine its nature. These may include whether the location is: appropriate for a party; a prison; a place where it is possible to steal; a place where it is possible to drink; or a place where drinks can be bought (for others)" [9, p. 57]. In literature, actions, like swimming in the grass, only have to correlate with the logic of the world, like the alethic predefinitions, to be acceptable for the reader. In Cognitive Science, these actions are schematized as part of "scenarios" in "plans" and temporally-ordered into a "script", as Catherine Emmott illustrates:

> The term "scenario" is also sometimes used for situational knowledge (Sanford & Gar-

[62] The study of space has always involved typologies of spatial models based on topographical features. This is important because "[e]ven if players gain access to the space-generation process, some structure has to be provided either from the player or the system" [16]. Indeed, for interactive narratives and games, the discussion and classification of spatial models is always related to spatial navigation. For example, Murray discusses two structures of spatial navigation for interactive narrative: the maze and the rhizome [33]. Nitsche also proposes several distinct spatial forms: tracks and rails, labyrinths and mazes, and arenas. Since these forms define the spatial logic in their own way, their structures shape paths, edges, and regions, which in turn determine the ways of player navigation [16]. [114, p. 8]

> rod1981). A “script” (Schank & Abelson 1977) is a temporally-ordered schema; it describes a reader’s knowledge of stereotypical goal-oriented event sequences “that define a well-known situation” (422) [...] In addition to a sequence of events, most scripts have further “slots” to describe the “roles” (customers, waiters, chefs, etc.), “props” (menu, table, food, money, bill, etc.), “entry conditions” (customer is hungry, restaurant has food, etc.) and “results” (customer is no longer hungry, restaurant has less food, etc.) within the script. A “plan” (Schank & Abelson 1977) consists of knowledge about sets of actions needed to accomplish objectives and is used in non-stereotypical situations where there is no adequate script available. [32, ğ4]

These spatial frames with their sets and scripts are not always clearly defined and can in rare cases change, as Ryan points out: “[T]heir boundaries may be either clear-cut (the bedroom is separated from the salon by a hallway) or fuzzy (e.g. a landscape may slowly change as a character moves through it)” [100, ğ9]. For instance, one location functions at the beginning of the story as a church and then becomes a military hospital.

All the six steps together create a literary map which is geographically defined, semantically enriched, populated, projected movements, and provides sets of possible actions. These spatial specifications can be determined based on the author’s style, the reader’s preferences (or his or her recent location), or be generated randomly by the system. Furthermore, the three entities can work interdependently or only one decides autonomously. While the definition by the author is the simplest and conventional mode, the latter two increase the variety of stories and the complexity of the system. However, the random and the interactive configuration are determined by all preceding decision concerning the preset genre and the fictivity of diegesis which has to be defined in advance, excluding or preferring specific places. Within this genre, there are two ways to involve the reader into this process:

The primary interaction concerns the creation of literary space and is applicable only for fictive spaces of certain genres like fantastic literature. It gives the recipient the possibility to determine the degree of fictivity of the integrated relations (cf. chapter 3.1) or to edit the map and its data. There are already quite advanced editors integrated within level editors for designers of computer games. However, the core difference between literary and game space is obvious: the complete, three dimensional, and full sensory space is created in the reader’s mind and is only triggered by textual cues whereas in

computer games every detail has to be visualized[63]. For the editing of a literary space a sketchy map is sufficient. However, for the generative process a coordinate specific data set enriched with local sensitive information is required.

According to the already discussed steps, the interactor can change geographical borders, define political territories, places, inventory, and natural qualities, populate the areas with characters and, finally, give everything names. While the latter is feasible by a simple search and replace technique, the other elements can be integrated by preset modules or defined by chosen parameters. For instance, he or she can choose directly between woods, meadow, desert, marsh, and so on, or determine indirectly the climatic conditions, that influence the automatic generation of the landscape. The automatic or procedural mapping is a recent issue in computer game design (cf. [117]) and there are implementations, like *CityGen* that automatically generate three dimensional cities with the possibility to interactively manipulate this process [54].

The secondary operation is the definition of the setting or the scope of figures on an already constructed map depending on the genre. For instance, the British "Golden Age" detective stories can be situated in any European or western country side but it cannot take place in an unrestricted, urban area or in Middle-Earth. Staying with this example, the reader (or computer) can now choose from a catalog of countries and subsequently from rural regions. Furthermore, they are set only in closed areas like a university campus, a library, or a train which can be preset or decided on by the reader (or by coincidence). In general, it does not make a difference for the definition if the map represents a fictive or real world. A story world that claims verisimilitude, however, offers a special way to involve the reader because the system can set the story in the reader's current surrounding. Digitalized maps, like Google Maps or the non-commercial crowd-sourcing project OpenStreetMap, in connection with localization services via GSM or W-LAN are able to identify the location of the reader's cell phone or reading device. This could be adapted as the spatial setting and the reader's recent environment could

[63] There are only rare exceptions in literature of spatial visualization: "When topography is of prime importance for the logic of the plot, as it may be in detective fiction, the limitations of language as a medium of spatial representation can be remediated by a graphic map of the narrative world. Another function of graphic maps, particularly prominent in children's narratives, travel stories and fantastic literature, is to spare the reader the effort of building a cognitive map, thereby facilitating the mental visualizations that produce immersion". [100, ğ29]

be integrated into the story via the information of these web mapping applications. Like Location Based Services (LBS), the system could extract the required data from the topographic and social data and links to Wikipedia or other databases provided by these online maps.

The integration of the recipient's location into an esthetic work is not new[64] and better known under the term "Augmented Reality" (AR). Less famous but more relevant for this concept is those "converse case on the virtuality continuum", that Paul Milgram and Fumio Kishino have explained at the etymological beginning of this nowadays well known phenomenon of AR: "Probably the best known of these is Augmented Reality (AR), which refers to all cases in which the display of an otherwise real environment is augmented by means of virtual (computer graphic) objects. The converse case on the virtuality continuum is therefore Augmented Virtuality (AV)" [69].

Despite the challenges of implementation (extraction of data, semantic understanding, and integration) as well as the complete uncertainty of the reader's location is only suitable in certain genres. For instance, the setting of a detective story could range from the vibrant Tokyo to the rural Littleport in the United Kingdom to—if it is connected to the internet—an isolated ranch in Texas. This high contrast indicates the immense influence of the setting on all the other elements of the diegesis and that the system needs to have an open structure to avoid inconsistencies. Anyway, the reader can define the starting point from which the characters move on and their movements determine the setting with the unfolding of the story.

[64] More recently, GPS and wireless technology have made it possible to create stories on mobile phones, attach them to particular geographic locations, upload them on the Internet, and make them accessible only to people who happen to be in the right place (Ryan 2003a). While ordinary print narratives are nomadic texts that can be taken anywhere because they describe absent objects, the new digital technologies reconnect stories with physical space by creating texts that must be read in the presence of their referent. [100, ğ19]
Location-Based Games offer a focused, rule-based, and goal-oriented experience using the real world as a game board and story elements to facilitate play. Mobile Narrative Experiences offer a more comprehensive narrative structure than Location-Based Games, weaving together fiction and locale, real world and storyworld. [97, p. 103]

3.2.3 Social Setting

The last constituent of the narrative setting includes all aspects of society like culture, religion, economy, politics, social stratification, and hierarchies. In general, they are depending on the spatio-temporal specifications. The presettings on genre and style, further, define the relevance of the setting and the focused domains. For instance, horror fiction does not need a detailed social setting, whereas early utopian texts present a (nearly) exhaustive panorama of society.

To create or reconstruct society, the core aspects from Pierre Bourdieu's Field Theory[65] are extracted and connected with Doležel's modal relations that were already sketched in chapter 3.1. First of all the society is segregated in its basic fields[66]: economy, politics, science, culture and the arts, sports and leisure activities, and religion. Literary representations of society are focused on one or two main fields according to the genre. For instance, Bildungsromane are more concerned with the inner conflicts concerning a certain ideology, culture, religion, or social norms and, contrary, novels à la Tom Clancy are focused on political aspects. By definition, a field consists of ...

> [...] a network, or configuration, of objective relations between positions. These positions are objectively defined, in their existence and in the determinations they impose upon their occupants, agents or institutions, by their present and potential situation (situs) in the structure of the distribution of species of power (or capital) whose possession commands access to the specific profits that are at stake in the field, as well as by their objective relation to other positions (domination, subordination, homology, etc.). [13, p. 97]

Basically, there are "deux états du capital, objectivé et incorporé" [12, p. 95] and the three forms, economic, cultural[67], and social capital[68]. Capital can be transformed into

[65] I favored the Field Theory to Niklas Luhmann's System Theory due to the integration of power struggles, historicity, and interrelations between and within the various fields (cf. [13, p. 102]).

[66] In highly differentiated societies, the social cosmos is made up of a number of such relatively autonomous social microcosms, i.e., spaces of objective relations that are the site of a logic and a necessity that are *specific* and *irreducible* to those that regulate other fields. For instance, the artistic field, or the religious field, or the economic field all follow specific logics[.] [13, p. 97]

[67] The cultural capital can be subdivided into "materialized" (e.g., books, etc.), "incorporated" (knowledge), and "institutionalized" (e.g., title, award, etc.).

[68] "*[C]apital presents itself under three fundamental species* (each with its own subtypes), namely, economic capital, cultural capital, and social capital, which is the form that one or another of these species takes when it is grasped through categories of perception that *recognize* its specific logic

another form, for instance, the investment/financial support of an artist heightens the cultural and social capital. Furthermore, the valuation of a sort of capital is not only depending on the field, but also subject to historical change, like inflation or devaluation of art or a scientific domain. The volume, structure, and valuation of the accumulated capital determines the position and power of the agent or institution in a specific field. This can be transformed into the simple equation 3.1 in which the symbolic capital (Csym) indicating power and prestige is the sum of the volume (V) and worth (W) of each capital form.

$$V_e \cdot W_e + V_c \cdot W_c + V_s \cdot W_s = Csym \tag{3.1}$$

Applied to narratives, the agents are characters and by positioning them the hierarchy of power is established. This is essential for the assignment of functional roles, like antagonist and protagonist (cf. chapter 3.3.1), and for the emergence of conflict because "the field is also a *field of struggles* aimed at preserving or transforming the configuration of these forces" [13, p. 101]. In other words, the powerless or lower positioned try to accumulate capital, search for niches and undermine hierarchies or system. When they have become powerful agents, they have to defend their capital and their hierarchical system against the next generation. The hierarchies and regularities can be ubiquitous or in certain cases only spatially effective like political territories[69], and need to be added to the certain area or region.

A group of equally powerful persons forms a class or milieu. Each class is related to another and simultaneously establish their own rules, norms, and characteristics. The resulting stratification of the society reproduces itself by the passing of capital like by inheritance, education, and so on. On the other hand, individuals are determined by

or, if you prefer, misrecognize the arbitrariness of its possession and accumulation". [13, p. 119] Bourdieu names various other subforms or combinations of capital like symbolic, linguistic, etc. but for this concept the basic forms are sufficient and can be specified according to the requirements of the single implementation.

[69] The state, then, if you insist on keeping this designation, would be the ensemble of fields that are the site of struggles in which what is at stake is—to build on Max Weber's famed formulation—the *monopoly of legitimate symbolic violence*, i.e., the power to constitute and to impose as *universal* and *universally applicable* within a given "nation," that is, within the boundaries of a given territory, a common set of coercive norms. [13, pp. 111-2]

their class and their status is incorporated in the "habitus"[70]. According to Bourdieu, the habitus affects and determines unconsciously an individual's perception, valuation, and thinking as a schema and indirectly his or her life style, appearance, language, etc.[71].

For a finer-grain structuring of the focused field or the general social frame, I adapt the four relations of Doležel: the historical, epistemic, deontic, and axiological relations to another world. Hence, every field can be broken down into these four and each of them provides hierarchically ordered propositions that are true or false according to the degree of fictivity. Like for the spatial setting, the historical reference determines whether the represented society is/was real, or is fictive. The sum of the presented fields and their sets of propositions establish the social frame of the TAW. All other TAWs or cPWs can be constructed by applying or deviating certain propositions or sets.

Deviations between worlds or violation against the current frame lead to conflict and are determined by the genre as Doležel concludes:

> [T]he manipulation of the categories of the epistemic system produces mystery stories, narratives of learning (the Bildungsroman), comedies of errors, and the all-important function of deceit. [27, p. 126ff]
>
> [T]he *predicament* (conflict of obligations), stories retold again and again, from myths and fairy tales to contemporary fiction. [27, p. 120ff]
>
> [T]he axiological system underlies stories of quest and moral dilemma. [27, p. 126]

Beside the historical dimension, the epistemic modalities determine the knowledge of a society. The representation and organization of knowledge has become a recent core issue of the research subsumed under the domain of the Semantic Web. The interactive story generator Makebelieve uses commonsense database for input and causal connections, that "turned out to be much more interesting and dramatic from the user's perspective" [56]. The context of diegetic generation expands the challenges of digital knowledge, as

[70] Les conditionnement associés à une classe particulière de conditions d'existence produisent des *habitus*, systèmes de *dispositions* durables et transposables, structures structurantes, c'est-à-dire en tant que principes générateurs et organisateurs de pratitiques et de représentations qui peuvent être objectivement adaptées à leur but sans supposer la visée consciente de fins ... [12, p. 88]

[71] [I]l [l'habitus] assure la présence active des expériences passées qui, déposées en chaque organisme sous la forme de schèmes de perception, de pensée et d'action, tendent plus sûrement que toutes les règles formelles et toutes les normes explicites, à garantir la conformité des pratiques et leur constance à travers le temps. [12, p. 91]

it requires also fictive knowledge, such as the genetics of Bioroids in *Ghost in a Shell*. Therefore, the preset defaults should limit the social knowledge to a very specified domain in a certain society at a certain period of history. Whether the knowledge is derived from an external source or need to be provided by the system, depends on the availability of online sources. To extract epistemic knowledge, Wikis are the most applicable due to its clear structure, links to detailed information, and the search function. Its disadvantage lies in the subjectivity of content, though, this could lead to surprising and in fiction accepted deviations of reality.

The deontic relation requires a catalog of rules which are formalized with variables:

The instance i allows the state/event s/a (by the relevance of 0 to 4).

States and events are further discussed in the final chapter 3.4. The legislating instance is especially relevant when there are coexistent regulation systems. For instance, the inhabitants of a country have to orientate on the laws of the state, the religion, the society, and finally their own. The interdictions are negated rules. The positive or negative rule can be further defined from 0 meaning "not worth to mention" to 4 meaning "very strong, indiscussable with high potential for conflict".

A similar formula is applied for a catalog of values:

The instance i values the state/event/character positive (by the relevance of 0 to 4).

Characters are added to the state and event in the axiological variables. The valuation of characters can be social, but mostly it is personal and affects the relationships of characters and their conflicts (cf. section 3.3.2).

The main difficulty of these catalogs is the automatization which is necessary as the manual establishment would be not effective, flexible, and recent enough. One possibility are Social Web projects, like the APP Amen for "creating and sharing opinions about the extra ordinary things in life. Take a stand about the best and worst people, places, things and ideas" [48]. Social Web and crowd sourcing projects are a recent and, according to the theory of James Surowiecki [108], accurate source of information (cf. [30]). Despite various useful projects, there are still essential challenges of data processing with online databases.

3.3 Characters

> *It is worlds with persons or, better, persons within worlds that generate stories.*
> – Ludomir Doležel, 1998 [27, p. 33]

There are numerous, different approaches to structure the generation of characters[72]. Applicable approaches in the context of interactive or automatic generation are discussed and integrated into a sketchy, procedural model (figure 3.5).

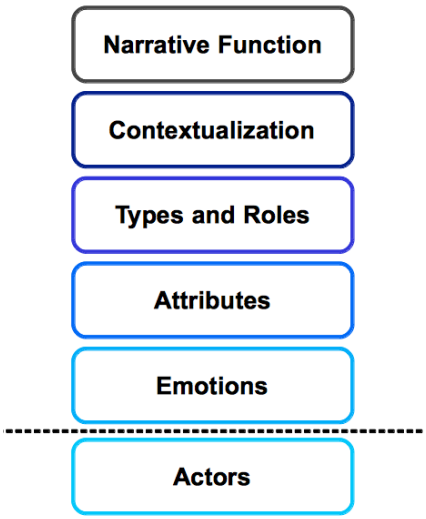

Figure 3.5: Model of character generation.

Uri Margolin applies the Possible World Theory on characters treating them as autonomous constituents of diegesis. Fundamentally, he distinguishes the individual (short IND) from the actant and the instance with its function in the narrative[73]. The functional aspect (cf. section 3.3.1) is the first and basic step of generation and is followed

[72] Character is used here as a neutral term and not in the connotation of Bal, who differentiates the character (and actor) from the agent by its "distinctive characteristics": "I use the term *character* for the anthrophomorphic figures provided with specifying features the narrator tells us about. Their distinctive characteristics together create the effect of character". [8, p. 112]

[73] All three theoretical objects (actant, narrative instance, non-actual IND) are warranted explications of the intuitive cultural notion of "character." However, I believe the last one is superior to the first two in terms of (a) conceptual comprehensiveness, (b) theoretical depth and explanatory power, and (c) diversity of types of texts to which it is applicable. [62, p. 845]

by the other characteristics of the IND, because a hero requires other propositions than a villain (cf. section 3.3.4), as an example. By definition the IND consists of various aspects described by Margolin:

> The IND is a member of some domain(s) of this possible world, and in it/them, it can be uniquely identified, located in a space/time region, and endowed with a variety of physical and mental attributes and relations, including social, locutionary, epistemic, cognitive, emotive, volitional, and perceptual. The IND may possess inner states, knowledge and belief sets, traits, intentions, wishes, dispositions, memories, and attitudes, that is, an interiority or personhood. [62, p. 844]

The first component mentioned in this quotation concerns the integration of the INDs into the referential and temporal-spatio-social frame and their belongings to the TAW(s). Furthermore, its knowledge, wishes, and so on create or are part of the already mentioned cPWs (cf. section 3.3.2)[74]. The following mental (cf. section 3.3.5) and physical (cf. section 3.3.4) propositions depend on the frame and references (cf. section 3.3.2). In an earlier article, Margolin adds the aspects of a character as a referred "entity of discourse" [61, p. 2] and "as thematic element" [61, p. 3] (cf. section 3.3.3). The last part of character generation based on the preceding operations concerns their actions and interactions, that already leads to the chapter on events.

Like the general incompleteness of the diegesis discussed at the beginning of this chapter, the character cannot and need not be entirely designed. According to Margolin, this is the main difference between real and "non-actual INDs"[75]: "Unlike actual INDs, they are schematic, radically incomplete, and only partially determinate so that, for most properties, we cannot say whether they have them or not" [62, p. 847]. Concerning only characters, E. M. Forster made the well-known differentiation of completeness and convincibility:

[74] These internal states of characters correspond with Fotis Jannidis' concept of the basis type: "The concept of basis type adopts recent insights from developmental psychology. From early on, humans distinguish between objects and sentient beings. They apply to the perception of the latter a theory of mind which ascribes to them mental states such as intentions, wishes, and beliefs. Once an entity in the storyworld is identified as a character, this framework is applied to that entity, the basis type thus providing the basic outline of a character: there is an invisible 'inside' which is the source of all intentions, wishes, etc., and a visible 'outside' which can be perceived". [51, ğ20]

[75] Margolin uses the adjective non-actual in the connotation of not real or no part of the from us actualized world. This differs from the other definition of fictitious worlds as actual and cPWs as non-actual. The differentiation between real and fictitious characters is continued in section 3.3.2.

> We may divide characters into flat and round. [...] In their purest form, [flat characters] are constructed round a single idea or quality; when there is more than one factor in them, we get the beginning of the curve towards the round. [p. 73]
>
> The test of a round character is whether it is capable of surprising in a convincing way. If it never surprises, it is flat. If it does not convince, it is flat pretending to be round. [35, p. 81]

Applied to the model (see figure 3.5), the round and the flat character are constructed in the first four steps. Hence, both perform a narrative function, are contextualized, (especially the flat one) personify a traditional type, role, or theme, and are related to other characters. But only the round character has advanced, complex, and contradicting attributes and emotions and develops in the course of the story. Forster stresses "a novel that is at all complex often requires flat people as well as round" [35, p. 75]. The flat/round differentiation corresponds with hierarchies like the one of Linda Seger[76] or Doležel: "[P]rotagonists (principal agents), secondary characters, and background characters are distinguished by the different degrees of participation in the story" [27, p. 97]. These distinctions are actually part of the story and discourse but not the diegesis because the degree of participation and characterization are depending on arrangement and presentation modes. For instance in Bret Eastan Ellis' *The Rules of Attraction*, the character Patrick Bateman is a secondary character and, in *American Psycho*, he is the main character without even affecting the diegesis. Nevertheless, this distinction is helpful due to its reduction of data for marginal characters. Hence, a system like in Role Playing Games is suggested in which there is a set of playable and many various non-playable characters. The former are also in some degree "playable" in the interactive generation because the reader can chose one of them as focalizer or protagonist and edit it whereas the "non-playable" characters are default.

Furthermore, the "playable", "principle", "round" characters graduate by various dimensions; Margolin proposes a typology based on four conditions:

> [T]hree logically necessary conditions and one optional one. These are: existence, individuality, distinctness or singularity, and paradigmatic or simultaneous unity of traits. For each putative IND in the narrated domain, we ask how many of the conditions does

[76] Seger distinguishes the main characters from the supporting roles, characters adding other dimensions, thematic characters, and mass-and-weight characters which "demonstrate the prestige, power, or stature of the protagonist". [106, p. 208]

> it satisfy, in what mode, to what degree, and in which specific manner. The number of conditions satisfied can range from 0 to 4; the mode of fulfillment of each, from certain to problematic; the degree, from highly schematic to highly saturated. The specific manner of satisfaction has to do with the nature of the properties and relations the IND possesses, which, in its turn, depends on the type of world the IND inhabits. [...] INDs in realistic literature are but one extreme pole of the spectrum, where all four conditions are satisfied in a mode of certainty, to a high degree, and in a manner which is consonant with nineteenth-century models of reality and of the human psyche. [62, p. 849ff]

While the condition of existence, the belonging to one or more TAWs, is determined in the step of contextualization, the other three concern the properties and relation to other characters. The single dimensions are integrated in the sections below and support one option of variation, that the user or the system can design characters of the set as principal and secondary characters.

A graduation by believability, as a guideline for main character design, is presented by the Oz group of the CMU in the perspective of Interactive Fiction[77]. The believability of a character is broken down by the following dimensions:

- Personality – Rich personality should infuse everything that a character does, from they [sic!] way they talk and move to the way they think. What makes characters interesting are [sic!] their unique ways of doing things. Personality is about the unique and specific, not the general.
- Emotion – Characters exhibit their own emotions and respond to the emotions of others in personality-specific ways.
- Self-motivation – Characters don't just react to the activity of others. They have their own internal drives and desires, which they pursue whether or not others are interacting with them.
- Change – Characters grow and change with time, in a manner consistent with their personality.
- Social relationships – Characters engage in detailed interactions with others in a manner consistent with their relationship. In turn, these relationships change as a result of the interaction.

[77] "Believability" is a term used by character artists to describe a property of compelling characters, namely, that of engaging in internally consistent, lifelike and readable behavior in such a manner as to support an audience in suspending disbelief and entering the internal world of the character. [65, p. 8]

- Illusion of life – This is a collection of requirements such as: pursuing multiple, simultaneous goals and actions, having broad capabilities (e.g. movement, perception, memory, language), and reacting quickly to stimuli in the environment. Traditional character artists do not mention these requirements explicitly, because they often get them for free (from a human actor, or as a deep assumption in animation). But builders of interactive characters must concern themselves explicitly with building agent architectures that support these requirements. [65, p. 8] (cf. [58, p. 27])

The first dimension correlates with Margolin's conditions of individuality[78] and distinctness[79] that are created in the steps of attributes and emotions. Seger proposes in her guide for screenplays [106, pp. 32ff, 41ff] to work in contradictory elements and special peculiarities (cf. sections 3.3.4 and 3.3.5), to achieve uniqueness or personality. Self-motivation is discussed as part of the emotional and action related steps and the social relations are integrated into the functional procedure (cf. section 3.3.1). The "illusion of life" sums up all the steps and the inherited data and relations.

Similar to the construction of the spatial setting, these steps are interdependent and sequential. Seger presents a tripartite "figure-sequence:" the mental properties (philosophy, attitudes, and values) and the backstory influence actions which are followed by emotion as reaction [106, p. 185ff]. Allan Palmer compartmentalizes the detailed inner states of desires and beliefs causing intentions and motives that result in decisions. Finally, they lead to action and behavior concluding long term plans and goals[80]. Both sequential models are especially relevant for story generation and reveal the diegetic requirements for autonomous characters. In the following sections however, the focus lies on the structure, the generation of these requirements and not on the interrelation

[78] Two major kinds of individuating features can be distinguished: extensional and intensional. The first consists of individual constants, such as proper name, spatiotemporal location, and world mates (co-agents). The second covers universalia, that is properties, both physical and mental, and relations. [62, p. 852]

[79] For an IND to be unique again, names and descriptions play this role. For an IND to be unique at any state of affairs means that there is at least one definite description satisfied uniquely by it at this state. [62, p. 852]

[80] It is possible to construct a greatly simplified teleological model for the information that is used by the reader during this process, which summarizes the material explained in the previous chapters as follows:
desires and beliefs → intentions and motives → inner speech and self-regulation → decisions → action and behavior → long term plans and goals → embedded narratives → character → plot [79, p. 192]

of the single components and the algorithmic elaboration of story lines.

3.3.1 Function, Relations, and Semantic Axes

Despite the close relation to the story and discourse level[81], the function of characters within a narrative is determined at the beginning because it fundamentally simplifies their diegetic generation due to the reduction in complexity and data quantity. Furthermore, the specification of a functional role, such as the helper, requires or excludes certain types and physical or mental attributes than other roles. To categorize characters and their function within the narration, a five dimensional model—(1) semantics, (2) power, (3) function, (4) relations, and (5) truth—is suggested by integrating various structural and narratological systems (visualized in figure 3.6).

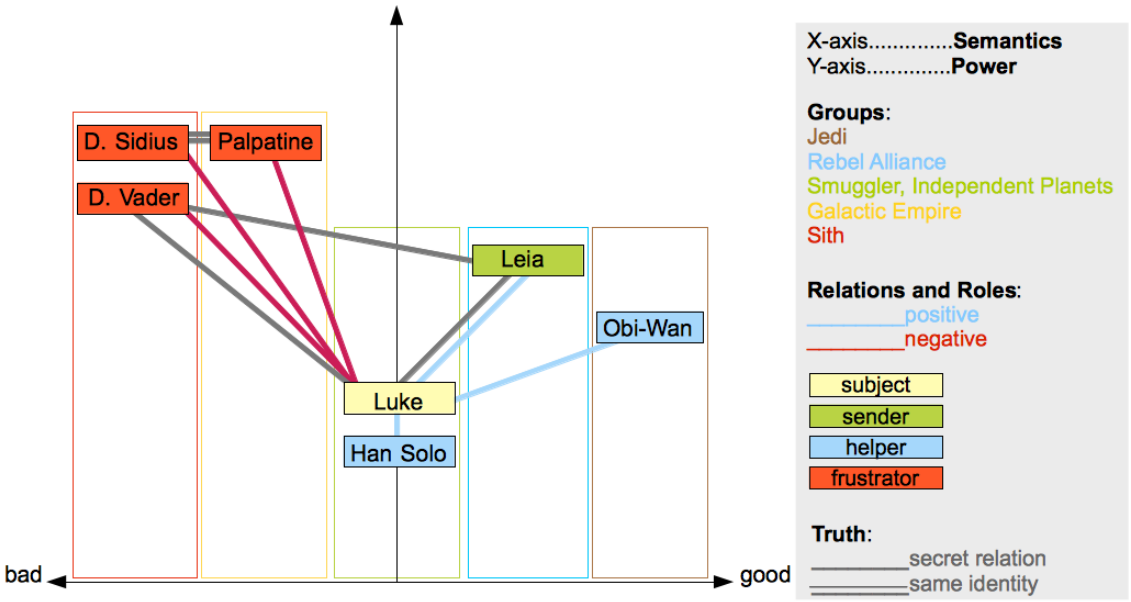

Figure 3.6: Five dimensional model visualized on *Star Wars*' main characters.

The first level represents the axis of main semantic of the diegesis[82]. The most frequent semantic pair is the good/bad opposition, that can be found in fairy tales (e.g., *Schnee-*

[81] Characters can also be generated without specifying the functional role of them and these roles can be assigned to every character later in the process of story generation.

[82] "One method is the selection of relevant semantic axes. Semantic axes are pairs of contrary meanings". [8, p. 127] Despite Bal's inspirational use of semantic axes, she applies them for more detailed

wittchen), fantasy (e.g., *Harry Potter*), comics (e.g., *Superman*), or Science Fiction (e.g., *Star Wars*). The semantic axis provides a relative graduation, which is situating the characters in groups relative to its poles. For instance, the characters of *Star Wars* (especially in the later episodes) can be arranged in the following groups: The Jedi Knights, the "good", are opposed by the Sith, the "bad". The Galactic Empire, the Rebel Alliance, and the independent planets range between the two poles and the neutral position. The semantic duality serves not only for categorization of characters after the main theme, but also to provide potential conflict. Nevertheless, there are certain—especially less popular[83]—genres or diegesis, that follow more than one semantic opposition or reflect any at all because the esthetics dominate the story elements.

Within these semantic groupings, there are hierarchies of power[84]. The calculation of the position on this second level was discussed in the former chapter 3.2.3. The power is not only social but also physical or mental (cf. [27, p. 103]). Furthermore, there can be different power areas with oppositional positions of the conflicting characters, like David and Goliath, Odysseus and the Cyclops Polyphemus, and so on[85].

The social position as an indication of possessed power and resources inherits certain functional roles. For instance, Luke Skywalker's social position is very low at the beginning of the fourth episode. He helps the rebels, of whom Leia is the leader and consequently possesses the highest position, against the totalitarian regime, which is lead by the Emperor Palpatine. By destroying the Death Star, Luke raises in his position within the Rebel Alliance. This constellation of positions is traditional: The hero begins at a low status, his or her motivator is above him or her like the opponent and the helpers need only to be lower than the main villain.

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qualification like large/small opposition than the application in this level. However, the semantic axis serves here for a general grouping that reflects the fundamental, thematic opposition of the diegisis.

[83] The term "popular genres" is used here in the connotation of "trivial literature" or "low culture" as the opposite of "high culture" or "avant-garde".

[84] Power. Interpersonal relations and social representations correspond to the motivational systems of the one-person world. In contrast, power has no such correlate; it is a motivational factor emerging only in the multiperson world. Power is a means whereby one person–the power holder–controls the intentions and acting of another–the subordinate. The introduction of power brings about a rearrangement of the agential constellation, transforming it into an asymmetrical hierarchy. [27, p. 103]

[85] "In general, *the villain should appear to be stronger than the hero.* This strength could be physical, mental, moral, financial, or come from any other source". [42, p. 75]

The semiological relationship between power and functional roles goes back to the studies of Algirdas Julien Greimas. Based on Vladimir Yakovlevich Propp's [91] pioneer work on the structure of functions and types of characters, Greimas developed his "modèle actantiel" from the perspective of narrative grammar. According to this model, characters can be classified in oppositional pairs of actants[86] on three axis: (1) On the "axe du désir" the subject (hero) and the object (goal) are situated. (2) The "axe du pouvoir" groups the helpers and opponents around the hero and (3) the "axe du communication" includes a sender and a receiver of the desired object (cf. [45]). Bal simplifies the first axis into the following schema: "actor/actant-subject function actor/actant-object" [8, p. 202]. The subject is the starting point of the teleological model, but is not necessarily the hero. Moreover, the teleological model needs to be applied to all main characters because the goal, for instance, of the opponent is equally relevant[87]. The function and the object define the core goal of the story, where the object can be a character or group, but more often it is an item or a state[88]. The realization of the goal, further, provides two actants according to Greimas. However, the receiver is normally identical with the subject and the sender again cannot only be "a person but an abstraction: e.g. society, fate, time, human self-centredness, cleverness" [8, p. 204]. The helpers and opponents of the second axis can be defined in two ways. The first possibility is the determination by the conflicting and congruent goals and the second is by the relations between characters. Nevertheless, the two ways are interdependent because if, for instance, conflicting goals define a character like the opponent of the subject, it simultaneously leads to a negative relation—and vice-versa[89]. Due to the minimal distinctiveness between subject/receiver

[86] In Bal's discussion of Greimas' model, she defines actants as follows: "The verbs to wish and to fear indicate this teleological relation and are, therefore, used as abstractions of the intentional connections between elements. In this model, the classes of actors we call *actants*. An actant is a class of actors that shares a certain characteristic quality, [that] is related to the teleology of the fabula as a whole. [...] That relation we call the function". [8, p. 202]

[87] The importance of a flexible term for the subject is exemplified by Glassner: "Like all characters, villains see themselves as the heroes of their own stories. They believe that they possess special insight or knowledge that compels them to act as they do in order to ultimately help other". [42, p. 89]

[88] An example for an object as a state is "becoming rich". In this case, the object is identical with the subject and the function is "becoming rich".

[89] Bal indicates this interdependence: "[T]he model distinguishes a third relation which determines the circumstances under which the enterprise is brought to an end. [...] These actants are in many respects different from the others. They are not in direct relation to the object, but to the function that connects subject with object". [8, p. 207]

and object/sender, the terms subject and motivator are preferred for the main functional roles.

One decade later, Claude Bremond expands this model to a more detailed system of roles[90], that is relevant to establish subclasses of the main roles. In contrast to Greimas, Bremond uses—like Bal does too [8]—not the terms "hero" and "opponent" but "active/-passive subject" and "frustrater". The advantage of this terminology is that it does not value the characters and is flexible for an exchange of figural perspective.

David Herman separates the subject even further and analyzed preferred role assignments in popular genres, such as the "actor > behaver > sayer > experiencer" for epics [47, p. 147]. However, these roles do not affect the constellation, types or properties of the subject or related characters and, therefore, they are more useful in generating a story than a character.

Thus, the functional roles of this model are the **subject**, its **motivator**, its **helper**, and its **frustrater**. An implementation of these models is the story generator RoleModel [21], which is based on the functional character roles.

Finally, there are some remarks in the debate on actant models: Characters exist with more than one role, one role is shared by many[91], and there are even characters without any function at all[92].

The forth level sketches the figural relations and constellations. The relationships are basically distinguished in negative and positive correlations with the functional roles, helper and opponent. Barber refines this duality further:

Furthermore, she relativizes their functions for the subject to achieve its goal: "From these examples it becomes clear that each helper forms a necessary but in itself insufficient condition to reach the aim. Opponents must be overcome one by one, but such an act of overcoming does not guarantee a favourable ending: any moment a new opponent may loom. It is the presence of helpers and opponents which makes a fabula suspenseful and readable". [8, p. 208]

[90] The main roles are classified in "patient", "agent", "influenceur", "protecteur" and "frustrateur", "acquéreur", and "retributeur" (cf. [14]).

[91] Each actant is not necessarily realized in one single character, since one character may perform more than one role, and one role may be distributed among several characters. [51, ğ23]

[92] In some fabulas there are actors who have no functional part in the structures of that fabula because they do not cause or undergo functional events. [...] [This] does not mean that this actor is without significance. [...] Such actors act, they open the door, and thus they fit in the definition of actor but their action does not belong to the category of functional events. [8, p. 201]

> Characters will have storyworld relationships with one another. Depending on the domain these may include friendship, love and familial relationships. When involving feelings these relationships are unidirectional and have an associated strength, although feelings of one character for another can affect the reciprocity if it is appropriate for the domain. In the current system such relationships are only able to have an associated strength of 1 or -1. [9, p. 57]

Of course, it is difficult and insufficient to determine a relationship between humans with numbers and domains and they do not explain phenomena like love-hate. Therefore, Doležel distinguishes further between cognitive and emotional relations[93]. The multifarious emotions are integrated in the later procedure (cf. 3.3.5).

To establish character constellations of higher narrativity, there are various suggestions of Creative Writing guides. Glassner advises "unusual and unexpected allegiances and rivalries"[94] and Seger recommends pairs of subjects (cf. [105, p. 91ff]). Another important aspect of character relations concerns the propositions. The physical and mental attributes can contrast or correspond between two characters. The first is ascribed by Margolin under the term "uniqueness":

> Uniqueness implies that adequate criteria exist for the numerical distinction of INDs coexisting in any state of affairs [...]. For an IND to be unique again, names and descriptions play this role. For an IND to be unique at any state of affairs means that there is at least one definite description satisfied uniquely by it at this state. [62, p. 849]

Similarly, characters share certain qualities, that mark them as members of one semantic or social group[95]. These two relational characterizations lead to the effect termed by Manfred Jahn a "foil character" whose function is to stress the features of the subject[96].

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[93] 1. Interpersonal relations. Cognitive relations–the knowledge and beliefs of each person about the other members of the agential constellation–play a major role in the agents' decision making, plans, and strategies. Emotional relations, the diverse and changing reciprocal or nonreciprocal emotional links between persons, claim their place in the set of basic emotions [...]: love/hatred, antipaty/empathy, spite/beneficence, envy/magnanimity, and so on [...] coupled often with drives, a few interpersonal passions, such as love, hatred, and envy, dominate interaction in many fictional worlds. [27, p. 101]

[94] Unusual and unexpected allegiances and rivalries permeate many human relationships, and people compete and cooperate in webs of connections much denser than simple hierarchies. [42, p. 116]

[95] For any two INDs in the same narrative state, there will accordingly be one or more differences between them, along one or more shared semantic dimensions, making it possible to relate them to one another in a relative-contrastive manner. [62, p. 849]

[96] A foil is, literally, "a sheet of bright metal that is placed under a piece of jewelry to increase its brilliancy" (Holman 1972); one meaning of to foil is 'to enhance by contrast'. In literature, a minor

> The final factor leading to further specification of actants is that of truth value. By truth value we mean the 'reality' of the actants within the actantial structure. [p. 211]
>
> Often they are only *in appearance* what they seem to be; in reality they prove the opposite. [8, p. 35]

The level of truth reveals the hidden functional roles, semantic position, and relations, that explain intrigues, betrayals, secret identities, or changes of identity. The intrigue and betrayal change the role, position, and relations of one character, whereas the latter reveals that two characters are actually one or the real identity of the characters. These two identities can also be situated in oppositional semantics, like Chancellor Palpetine and Dark Lord Darth Sidious in *Star Wars*, leading also to the betrayal of one party[97]. In certain examples, like the familial bonds between Luke Skywalker, Leia, and Darth Vader, the secret relationships are not caused by intrigue but by positive intention. Thus, there is additional information for every secret relation and role: the distribution of knowledge, dividing characters in knowing and unknowing, and the intention of the knowing to keep it hidden.

3.3.2 Referential Frames and cPWs

The afore-established world models with their relations affect the character generation on the frame of setting, the fictivity or reference, the personal frame, and the characters' Possible Worlds (cPWs).

The temporal setting affects the character's development, age, and physical appearance by the calendar and time span. Deviations in chronological reference lead to other entities of age[98] or the aging process of different species. The time span defines the extent of the characters' mental and physical changes.

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character highlighting certain features of a major character, usually through contrast. – In Weldon's "Weekend", Janet is a foil for Katie and Katie is a foil for Martha. Sherlock Holmes's cleverness is highlighted by Dr. Watson's dullness. [50, N7.8.]

[97] Furthermore, the characters involved in a betrayal are divided in a passive and active role: "Schank's concept of story skeletons also starts from the idea that stories have an underlying structure, but in his model there are many such structures and therefore many different roles for actors, e.g. the story of a divorce using the story skeleton 'betrayal' with the two actors: the betrayer and the betrayed (Schank 1995: chap. 6)". [51, ğ23]

[98] For instance, in the animation film *Arthur et les Minimoys*, Sélénia's age is 1000 (counted in the blossoming seasons of the royal flower), which corresponds with Arthur's ten years.

The spatial frame defines the character's location, home, or starting point on the map. This is often combined with possessions and habitation, as Barber explains:

> Objects can be attached to an owner, after which they will belong to that owner and move with them. Objects which can be stolen will have a "true owner". For instance a shopkeeper may have a range of objects of which he is the true owner, if another character steals one such object then they become the owner, and can treat the object as such, but the object may be required to be returned to the true owner. If the object is given away or sold then the true ownership will change. [9, p. 58]

Furthermore, spatial semantics specified for playable characters and the scope are located around the starting point. The scopes vary generally with the participation in the story. Consequently, minor characters are more restricted than playable characters who can expand there scope to the totality of the narrated space in the course of the story. The inaccessibility of areas are divided in three types. In most diegesis, they are accessible for certain characters, preferably the set of playable, due to their peculiar qualities or achieved resources (item, power, permission, or developed qualities). Furthermore, these areas are inaccessible for certain social or semantic groups, but populated by the other groups. Thirdly, there are totally inaccessible regions, that are only accessible in other worlds, like embedded TAWs or cPWs, or perceivable by their boarders. The semantic specification of the other characters can be automatized when the members of its social or semantic group share its semantics and the opposite semantics are adopted for the groups of the other semantic pole or the opponents.

The social setting is the most influencing frame for the character generation because it affects various levels, like the cPWs, roles, attributes, used language in dialog, and the decisions leading to activities.

Beside the already in the frame of setting integrated relations, there are also not yet specified relations directly affecting the characters:

> Generic properties of aliens or hobbits not explicitly described in a given story will be inferred on the basis of other story worlds whose laws make such creatures possible, but, once more, on the condition that they are compatible with what is explicitly stated in the given text. Moreover, the properties ascribed to the other INDs who inhabit the same world [...] may also belong to the same mental or physical dimensions, thereby

> ensuring semantic relevance or homogeneity of the portrayed world and enabling a relative-contrastive characterization of each IND. Finally, INDs in one narrative world may have namesakes in other narrative worlds created by the same or by different authors. If the different namesakes are mutually compatible in terms of their property sets, one could possibly further individuate each one of them by a process of property transfer from the others, especially if they can be regarded as different versions of the same prototype. [62, p. 849]

The transfer of properties or referential frame is not only applicable for intertextual or other worlds parallels (AW-TAW, TAW-TAW, and TAW-cPW), but also for diverse character groupings (semantic, social, biological, etc.).

The general distinction in fictitious and actual characters is described by various academics using different terms[99]. This classification is achieved by the definition of the belonging to a world according to the ontological relation, that Margolin named the "operation of existence" [62, p. 850]. While an actual character exists in the AW and TAW(s) or/and cPW(s), the fictitious exists only in the latter two worlds. The two differ also in the "frame of reference" and the in/dependence of it, according to Margolin[100], Forster[101], and Bal:

> I shall treat that section of 'reality' or 'the outside world' to which the information about the person refers as a *frame of reference*. [p. 120]
>
> This frame is never entirely the same for each reader, or for reader and writer. By frame of reference I here mean information that may with some certainty be called communal. Historical characters are more strongly determined than legendary ones. On the contrary, legendary characters are expected to exhibit a certain stereotypical behaviour and set attributes; if the story were to depart too far from these set characteristics, they would

[99] Margolin distinguishes supernumerary and actual characters: "Following Rescher (1947), one could and probably should distinguish between two basic types of possible INDs; the actuality-variant and the supernumerary. The first includes counterfactual properties, situations, or courses of events for actual INDs; alternative versions, revisions, or unrealized modifications of actual things. All actuality-variants possess actual-world singular prototypes, of which they form a class of conceivable variations. Supernumerary INDs, to which most literary characters belong, are, on the other hand, purely conceptual constructs". [62, p. 847] Bal differentiates "historical" and "legendary characters" (cf. [8]).

[100] Semiotically constructed INDs need not conform to any pattern of ontological regularity, coherence, or even consistency formulated in scientific or everyday descriptions of the actual world. [62, pp. 847-8]

[101] And it is the function of the novelist to reveal the hidden life at its source: to tell us more about Queen Victoria than could be known, and thus to produce a character who is not the Queen Victoria of history. [35, pp. 55-6]

> no longer be recognizable. If presented in opposition to the referential characteristics, however, such 'deviant' characters can be a powerful trigger of surprise, suspense or humour. [p. 121]
>
> All these characters, which we could label referential characters because of their obvious slots in a frame of reference, act according to the pattern that we are familiar with from other sources. Or not. In both cases, the image we receive of them is determined to a large extent by the confrontation between, on the one hand, our previous knowledge and the expectations it produces, and on the other, the realization of the character in the narrative. [8, p. 122]

This "frame of reference" can be seen as a character specified frame related to the worlds, in which the character or its pattern also exists. Doležel [27] names this "personal" or "subjective relations" and it is here termed "personal frame" to avoid confusions. It is similar to the frame of the setting established in the former chapter which has integrated the relations between the TAW and AW. The difference is that the setting affects all characters, whereas the personal frame is applied only to a single characters or a group. For instance in historical novels, fictitious characters and real characters orientate on the referential frame of the setting, but only the latter have also their personal frame with all historical determinations. Beside the references to the AW, the frame of the TAW is specified for characters and individualized into the personal frame. Furthermore, the personal frame is established by positive or negative relations to the global frame of the TAW. The personal frame includes more than the historical and ontological references providing all the reported "facts" around a character, but also all the other relations. Commonly, they correlate with the general frame of reference, and sometimes there are groups or single characters that contrast the "normality" of the other characters[102]. It is suggested to copy the positive relations and rework only the negative ones for the deviating frames. The reason for this misfit is mostly the transgression of one character into another TAW, like Harry Potter in the non-magical world or Orpheus in the underworld.

To further structure the personal frame, Doležel distinguishes four subjective modes: the alethic, deontic, axiological, and epistemic relations. The alethic deviation of certain groups or characters concerns their biological and physiological qualities, their physical,

[102] This can occur bidirectional: There are characters with positive relations, so to speak realistic, among fictitious people, like Bastian Balthasar Bux in Phantásien (Michael Ende's *Unendliche Geschichte*). More frequent, there are fictitious characters in realistic worlds, like all the superheroes.

instrumental, and mental capacities[103], and consequently the possibilities of performed actions[104].

> [The] alethic modalities [...] create the foundations, both global and personal, on which fictional worlds are erected and their stories enacted. The intertwining of codexal and subjective possibilities, impossibilities, and necessities means that the existence and acting of fictional persons is doubly restricted: by the world's global alethic makeup and by their individual alethic endowment. [27, p. 120]

The epistemic constraints of Doležel represent the perception and knowledge on the TAW[105]. If the perceived or known aspects deviate from the TAW, they build, according to Ryan's theory, a part of the cPW named K-world[106]. "K-world of characters includes a prospective domain, representing their apprehension of the tree of possible developments out of the present situation" [98, p. 116]. While the perception of the TAW is relevant for psychological novels (especially presented in stream of consciousness or internal focalization), the different distribution of knowledge is essential in crime fiction or comedies of errors. Palmer states that "personal scripts" "determine which aspects of the story world are perceived by those actors" [79, p. 179].

The deontic and axiological catalogs of the social setting can be individualized for every character or groups of them. According to Ryan, the rules establish also a part of the cPW, the world of obligations including moral principles of the character[107]. The personal values lead to a whole world of wishes which can include a "good, bad, and neutral of desired state (=possession) or action (rewarding activity)" [98, p. 116].

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[103] Modal deprivation and enhancement set the limits of subjective capacity: from total disabling to amazing physical prowess, from primitive instruments to utopian technology, from idiocracy and insensibility to creativity and "paranormal" powers. The person's alethic structure is not fixed once and for all. It is affected by two kinds of change, the development of new capacities and the loss of existing ones. Capacities are acquired primarily through learning (teaching) and lost due to forgetting or disabling. [27, pp. 118-9]

[104] A subjective M-operator determines which actions it is possible for a person to perform. [27, p. 118]

[105] The subjective, epistemic modalities represent "an individual's knowledge of and beliefs about self and the world". [27, p. 126]

[106] [N]arrative universes–whether fictional or not–as modal systems in which the external (i.e., physical) facts asserted by the narrator play the role of "textual actual world." Surrounding this ontological center are the little solar systems formed by the private universes of the characters. Each of these subsystems is centered around an epistemic world, or K (for knowledge) world, which contains the character's representation of the entire system. [99, ğ26]

[107] These regulations specify actions as allowed (possible), obligatory (necessary), and prohibited (impossible). [98, p. 116]

Deviations between the personal and the global catalogs—especially if violated rules have a high relevance—lead to inner conflict and when the actions are orientated on the deviating, personal frame, they lead to conflicts with other characters. The social conflict affects the social capital and, consequently, the power position of this character. However, a conflict with one group can also lead to appreciation by another group or the personal appraisal with oppositional values. The de/increase of esteem and reputation depends on the relevance of the value or law.

Ryan sums up the various, connected parts of a cPW as follows:

> The epistemic system determines a knowledge-world (K-world), cut out from the general realm of perceptions; the axiological system determines a wish-world (W-world), extracted from subjective value judgements; and the axiological system determines what I shall call an obligation-world (O-world), dictated by social rules of behaviour. In addition to these constructs, which are conceived as either images of TAW (K-world) or as models of what it should be (W-world, O-world), the human builds possible worlds as escapes from AW, as true alternatives: dreams, hallucinations, fantasies, and fictions. [98, p. 111]

The possible, alternative worlds can be created also by characters and later realized in the discourse as embedded TAWs. The cPWs are required only for the set of playable characters because the others' inner conflicts will not be presented.

The epistemic, deontic, and axiological relations are relevant for the motivations, goals, and decisions (cf. section 3.3.6 and chapter 3.4). Consequently, the cPWs are bonded to each other and to the TAW in a crucial, affective relation:

> A narrative, however, cannot be reduced to a static snapshot of a certain state of a modal system. During the course of the story, the distance between the various worlds of the system undergoes constant fluctuations. Whenever a proposition in a model world is not satisfied in the actual word, the narrative universe falls into a state of conflict. The motor that operates the narrative machine is the attempt by characters to eliminate conflict by reducing the distance between their model worlds and the actual world. Conflict can also exist between the model worlds of different characters. For instance, the hero and the villain are antagonists because they have incompatible W-worlds and work toward incompatible states. Or a character may experience conflict between her W-world and her O-world and have to choose which one to try to satisfy. [...] This movement does not end when all conflicts are resolved, for conflict is a permanent state of any universe, but

> when all the remaining conflicts cease to be productive because their experiencer is no longer willing or able to take steps toward their resolution. [99, ğ27]
>
> [However, f]rom the viewpoint of its participants, the goal of the narrative game–which is for them the game of life–is to make TAW coincide with as many as possible of their private worlds (F-universes excepted). [98, p. 119]

3.3.3 Types and Themes

Especially subsidiary—or in this context, non-playable—characters represent traditional types or roles exaggerating one human quality, like the superhero being supernaturally strong and the femme fatale being dangerously seductive. Richard Dyer defines these types with their sub-categories as follows:

> [T]ypes, at this level of generality, are primarily defined by their aestetic function, namely, as a mode of characterization in fiction. The type is any character constructed through the use of a few immediately recognizable and defining traits, which do not change or 'develop' through the course of the narrative and which point to general, recurrent features of the human world (whether these features are conceptualized as universal and eternal, the 'archetype', or historically and culturally specific, 'social types' and 'stereotypes' [...]. The opposite of the type is the novelistic character, defined by a multiplicity of traits that are only gradually revealed to us [...]. [29, p. 13]

Although the definition of a type is adapted for this context, the opposition of the novelistic character is not that absolute. This follows Northrop Frye's suggestion that the types are a basic structure for all characters and only the main characters are enriched by the features of the next procedural steps[108]. These types have a long tradition and reach back to the archetypes, already mentioned by Dyer, in myths and legends[109]. From the psychoanalytical perspective, Carl Gustav Jung analyzed and categorized the archetypes (e.g., the old sage) as constituents of the collective unconsciousness (cf. [52]).

[108] Hence when we speak of typical characters, we are not trying to reduce lifelike characters to stock types, though we certainly are suggesting that the sentimental notion of an antithesis between the lifelike character and the stock type is a vulgar error. All lifelike characters, whether in drama or fiction, owe their consistency to the appropriateness of the stock type which belongs to their dramatic function. That stock type is not the character but it is as necessary to the character as a skeleton is to the actor who plays it. [38, p. 172]

[109] Frye classifies the human archetypes into the apocalyptic, demonic, and analogical imagery (cf. [38]).

In literature and other arts, the types have led to stock characters who are genre-dependent and follow more specific and less flexible patterns, such as the innamorati of the Commedia dell'arte. These patterns are often closely related to the narrative function and less to the archetypical psychology. Even more determined are the purely functional types like confidant, chorus character, or foil character[110].

Dyer (cf. [29, p. 14ff]), Seger[111], and others differentiate the stereotype culturally and geographically: The stereotype describes in a generalizing way a foreign group outside the "own" culture. Based on Orrin E. Klapp, Dyer further distinguishes the social type which, in contrast to the stereotype, reduces and generalizes character facets of "our" familiar society, like the dumb, vain model (cf. [29, p. 14ff]). The social types are the most contextual and time-related types, as they "draw upon general habitus knowledge in a society like the formal and laborious accountant, the old-maid teacher or the 19th-century laborer" [51, ğ20]. A broad panorama of social types is presented in Matt Groening's *The Simpsons*, in which one can find the personified clichés of a nerd, a comic reader, a bully, and so on.

All these types have a gender dimension and the social types represent or criticize the gender and family roles of the actual society. These roles vary historically, geographically, and within the social groups.

> In many forms of narrative, however, action is not the organizing principle, but a theme or an idea, and the characters in these texts are determined by that theme or idea. An extreme example is personification, i.e. the representation of an abstract principle such as freedom or justice as a character, as found in allegorical literature. [51, ğ34]

[110] Here is a brief list of functionally determined character types (to be expanded):
confidant (fem., confidante) Somebody the protagonist can speak to, exchange views with, confide in – usually a close friend. – Dr. Watson is Sherlock Holmes' confidant (and also his 'foil', see below). Sam is Frodo's confidant in Tolkien's Lord of the Rings.
chorus character Originally a convention in drama, an uninvolved character ("man in the street") commenting on characters or events, typically speaking philosophically, sententiously, or in clichés. [50, N7.8.]

[111] We might define a stereotype as the continual portrayal of a group of people with the same narrow set of characteristics. Usually a stereotype is negative. It shows a cultural bias toward the characteristics of one's own culture, painting characters outside that culture in limiting, and sometimes, dehumanizing ways. [105, p. 196]

Similar to Margolin [62, p. 3], James Phelan expands the thematic dimension—beside the mimetic and synthetic—to "the fundamental unit of character"[112]. The integration of ideal concepts like love, vanity, etc. correlates with the semantics of the diegesis. The theme provides the core semantic axis[113]. It is personified in an allegorical character or realized by typical characteristics of the majority of characters, which leads to the already discussed constellations.

In the context of generation, every character represents one or more types (archetype, stock character, stereotype, or social type) and is positioned on the semantic axes, which are all requiring certain pattern of attributes, emotions, and actional behavior. These defaults can be expanded, contrasted, or negated by later configuration for playable characters.

3.3.4 Adtributae Personis

This and the next section are concerned with the qualities of the playable characters. Bal even proposes a change in terms for "anthrophomorphic figures provided with specifying features"[114]. Before the mental disposition is discussed, the physiological, social, and physical features need to be defined. Therefore, Barber distinguishes mental traits, called "characteristics", from the physical, named "attributes"[115]. This term correlates

[112] [T]he fundamental unit of character is neither the trait, the idea, nor the predicate but rather what I will call the attribute, something that has mimetic, thematic, and synthetic dimensions simultaneously. That is, any sign of a character participates in a mimetic sphere (the attribute can be viewed as a trait), a thematic sphere (the attribute can be viewed as typical of a class of people or representative of some idea), and a synthetic sphere (the attribute can be viewed as the material out of which the character is made and it can be seen to have such and such a role in the making of the artificial object that is the narrative). [84, p. 285]

[113] Bal remarks that there is an hierarchy of semantic axes for the characters: "Characteristics like 'large' and 'small' could be a relevant semantic axis [...]. The selection of the relevant semantic axes involves focusing, out of all the characteristics mentioned – usually an unmanageably large number – only on those axes that determine the image of the largest possible number of characters, positively or negatively. Of the axes which involve only a few or even one character, only those are analysed which are 'strong' (striking or exceptional) or which are related to an important event. [8, pp. 127-8]

[114] I use the term "character" for the anthrophomorphic figures provided with specifying features the narrator tells us about. Their distinctive characteristics together create the effect of character. [8, p. 112]

[115] Each character's potentially associated traits include: attributes, characteristics, personalities, aspirations, skills and dispositions. [9, p. 56]

with Cicero's term "adtributae personis", that will be discussed in the second part of this section. First, the question of selection and structure of data needs to be answered.

In his comparison of actual and fictional characters, Forster concludes that ...

> [...] Homo Fictus [...] is generally born off, he is capable of dying on, he wants little food or sleep, he is tirelessly occupied with human relationships. And – most important – we can know more about him than we can know about any of our fellow creatures, because his creator and narrator are one. [35, p. 63]

Shortly, daily life and banal information is irrelevant, but the inner and extraordinary one needs to be gathered. Beside this general exclusion of banal information, there are influences of the preceding frames and patterns. A special selection criterion is the distribution of attributes by the relation of characters. On the one hand, there is the afore discussed "property transfer" [61, p. 849] of semantic, social, biological, and other groupings (cf. section 3.3.1) and Jahn's "foil characters" [50, N7.8.] or Seger's "mass-and-weight characters" [106, p. 208]. A special case is presented by Glassner on the villain: "Just as the villain can embody a repressed or unknown quality of the hero, so can the other characters embody explicit aspects of the hero" [42, p. 90]. On the other hand, there are negative relations that are subsumed under distinctiveness and individuality that Seger (cf. [105, p. 41ff]) and Margolin see as essential criterion of character generation.

> I propose four corresponding comprehender operations: identification of an IND in the sense of determining its membership in a narrated (sub)domain; ascription of properties and relation to this IND; its differentiation from all its world mates; and the networking or hierarchization of these properties into an integrated global pattern. [61, p. 849]

This distinctive attributes are extra-ordinary in the TAW but also in AW, like Glassner[116] emphasizes. The duality of similarity and individuality are parts of Seger's suggestion of character generation containing of observation, broad strokes, consistent core, paradoxical complexity, emotions, and unique details (cf. [105, p. 23]). The observation can be compared to the references in an automatic procedure or integrated by the designer. The broad strokes are already sketched in the defaults, patterns and frames. What is more relevant, is the distinction of a consistent core and additional paradoxes or details.

[116] Many of the most famous and popular characters share one or more unusual qualities. [42, p. 39]

This basis can be a type or an individual set of attributes (or characteristics) that are not changing in the course of the story without an explicit, comprehensible character development. Concerning the paradoxical inconsistencies, Glassner adds for consideration that they must not disturb or negate the core completely[117]. Generally, one can distinguish non-altering attributes from changing mental characteristics. Furthermore, Seger mentions chains of qualities: "A consistent character has certain qualities that in turn imply other qualities" [105, p. 30], like the patterns of types. Bal mentions in the context of this predictability the example that the attribute male excludes the state being pregnant[118]. Additionally, Margolin enumerates the following main operations:

- Naming and accumulation of properties,
- Classification of p into semantic dimensions,
- Second-order properties (inconsistency),
- Intensity of traits (cf. [62, p. 856]).

The third operation correlates with Seger's paradoxes. What is also important, is the "intensity of traits". Barber supposes a graduation:

> The specific details and instantiations of the character information will be domain dependent. For example: in some domains it will not matter if the character is male or female, in others this will be an essential feature. [...] Where required it is possible to specify domain specific character personality descriptions which are not fully deducible from other traits held by that character, such as being a fundamentally evil character. [9, p. 56].

This graduation of attributions (and characteristics) can be realized by values of intensity, for example from 0 to 4.

[117] When a character is comprehensible, that doesn't mean that he is entirely predictable. But it does mean that we understand the large outlines of what makes that person tick, what his values are, and how much he's willing to sacrifice for the people and things he believes in. He can constantly surprise us, and he often does, but these surprises are the result of pieces of his makeup that we didn't see before, or that have more or less importance than we realized. [42, p. 109]

[118] But, in fact, every character is more or less predictable, from the very first time it is presented onwards. Every mention of the identity of the character contains information that limits other possibilities. [8, p. 124]

A classical categorization of domains is established by Cicero in his *De inventione adtributae personis* that is summarized by Thomas Schirren:

> Zu den *adtributa personis* gehören *nomen* (Name), *natura* (allgemeine Eigenschaften wie Mann, Nationalität, Verwandte), *virtus* (Erziehung und berufliche Laufbahn), *fortuna* (Freier oder Sklave, reich, Macht etc.), *habitus* (erworbene Eigenschaften, gewolltes Erscheinungsbild), *affection* (psychische Disposition), *studia* (philosophische oder literarische Interessen), *consilia* (Handlungsplanung), *facta, casus, orationes* (auSSerhalb der Verhandlung stehende Taten, Ereignisse und Reden, die einbezogen werden können) (*De inv.* I,34-36). Cicero schlieSSt mit einem Resümee diese Kurztopik des Gerichtsgenus ab: Jede Argumentation, die aus diesen *loci* bestehe, sei entweder wahrscheinlich oder notwendig. [34, p. 1452]

Although some "loci" cannot be adopted for the structuring of attributes due to various reasons[119], the "nomen", "natura", "virtus", "habitus", and "studia" are basic categories for character information. The denomination can be influenced by stylistic strategies and requires referential options, like names, synonyms, or pronouns[120]. The "natura" includes not only formal features like age, nationality, sex and so on, but also the anatomical and alethical qualities that are determined by the alethic relation and the belonging specie. The "virtus", "habitus", and "studia" influence the social position via the capitals—and vice-versa. Furthermore, the economic capital needs specification and the appearance is an additional domain. The former is relational, thus, not the possessions and exact amount of capital are required but the specification of being poor or rich, which can be graduated if required. Meister refers to the attributes as predicates, which are hierarchically categorized into predicate classes, like cognitive or biological [67, p. 119ff].

[119] The "fortuna" can be equated with the social position and "affection", and "consilia" concern mental characteristics. The "facta", "casus", and "orationes" are discussed in the section of actors.

[120] A text's **system of denomination** or **naming conventions** is the specific set of naming strategies used to identify and subsequently to refer to its characters. Since naming patterns often dovetail with characterization, point of view or focalization, they merit close stylistic analysis. Key questions are:
How (with what sequence of expressions) does a text establish a character's identity? (Cf. block characterization, N7.4, above.)
Are the characters mainly referred to by first name, nickname, last name, with or without a (honorific) form of address (Mr, Mrs, Dr, Father, Senator, Colonel, ...), or by a descriptive referring expression? (For instance, in Joyce's Ulysses, the younger protagonist is "Stephen", while the older protagonist is "Mr Bloom"; Dickens often uses descriptive expressions such as "his eminently practical friend" etc.)
When and with what implications or presuppositions does the text use personal pronouns? (Cf. use of referentless pronoun', N3.3.10). [50, N7.9.]

There are various possibilities of reader's interventions. The name can be simply inserted, the attributes of other domains can be chosen out of a range of possibilities, and the appearance can be edited. All these interactions are already well implemented in Role Playing Games, where the character creator engines designs characters from the interactive choices of the players (figure 3.7). The only challenges are the influences of the design on the story world and the story. For instance, if a character has a disturbing appearance, the other characters should react on this in dialog or behavior. While simpler systems used static variables, advanced systems solve this problem with related, optional primitives and algorithms.

Figure 3.7: Character creator interface from *Dragon Age: Origins* (2009).

For the later textualization, the data is connected to synonyms and stylistic variations. Theun A. van Dijk distinguishes consequently a macro and micro structure[121].

[121] Jedenfalls steht fest, daSS in der Makrostruktur lediglich die semantischen Elemente textuell gesehen relevant sind, die in den Sequenzen thematisch waren; die anderen (weniger funktionalen) semantischen Elemente (Lexeme) werden dabei als stilistische Variablen der Mikrostruktur empfunden [...]. DaSS nun gerade diese Variablen die ästethisch-literarischen Aspekte des Textes bestimmen, ist ein Hinweis darauf, daSS der gesamte KommunikationsprozeSS (und der Text als Teil davon) der Performanz in der Literatur sich wesentlich vom "alltäglichen" KommunikationsprozeSS unterscheidet. Manche literarischen Texte (wie z. B. Gedichte) werden vor allem die Aufmerksamkeit auf die (spezifischen) mikrotextuellen Transformationen lenken, während andere Texte (Romane) die makrotextuellen Transformationen betonen (die Beziehung zwischen Fabel und Sujet, flash-backs, die progressive Relation zwischen den "Handlungen" in den jeweiligen Sequenzen usw.). [26, pp. 108, 112]

3.3.5 Emotions and Development

Although Doležel mentions the functions of emotion in the context of interpersonal relations (cf. section 3.3.1) and formation of social groups[122], the emotions treated in this section concern exclusively the playable character.

From the cognitive perspective, Palmer categorizes the emotions temporally:

> Emotions last for varying periods of time. When they are short-term, they are emotional events, medium-term, they tend to be called *moods*; as long-term states, they are closer in nature to dispositions. [...] Emotions can be explicitly labeled or inferred from mental events that appear to embody an emotion such as anger. [p. 114]
> Cognition causes emotion. Emma's emotions arise from her beliefs about what she has done. [...] Here, the emotions arise out of cognitions (the belief that the shark will eat me), physiological reaction (increased blood pressure), feelings (say, of terror), and action (getting away from the shark). The emotion of fear is playing a cognitive role: it is a rational and appropriate response to the situation. Emotions can be a mode of vision or recognition. [79, p. 116]

For a general typology of characters' disposition, the Jungian typology is adequate. The Swiss psychologist separates the types of "Denken", "Fühlen", "Empfinden", and "Intuition". They are further distinguished into extroverted and introverted (cf. [53]). These eight types—beside other psychological typologies[123]—provide sets of certain, static traits and retroactively attributes. The dispositional set is added by personal characteristics or traits and influences the character's behavior, actions, and emotional reactions.

Moods are temporary, altering parts of the dispositional frame that are less individual

[122] The existence of groups and social organization gives rise to collective consciousness. Its cognitive form is socially based knowledge, variously labeled as collective representations (Durkheim), cultural codes (Barthes), semantic or semiotic environment (Rapoport), symbolic universes (Berger and Luckmann), ontological systems (Pavel). Cognitive systems as language, cultural archetypes, racial and ethnic beliefs, religious creeds, ideologies, and scientific knowledge. [...] Its effect is strengthened by attendant collective emotions, such as national, political, or religious fervor, racial and ethnic hatred, and so on. Social representations and collective emotions are essential for group cohesion, splitting the world into "us" and "them" and, consequently, motivating interacting between groups. [27, p. 101]

[123] Seger, for instance, suggests psychological disorders for categorization. Each of the various types (manic, paranoid, psychopathic, depressive, schizophrenic, and anxious) provide suitable opponents and conflicts. (cf. [105, p. 80ff])

and oppositional, such as good/bad or anxious/secure. Compared to emotions, the moods are not object- or event-dependent. Moreover, the mood can be affected by internal events (thoughts, etc.) and emotions and the axis is graduated, like the semantic axes, from -4 over 0 to +4.

Finally, they determine certain emotional reactions and affect their intensity. The intensity of emotions is expressed by values from 0 to 4. Although Mariët Theune et al. supposes a -100 to 100 scale[124] and Murray an 1 to 10 scale[125], this is sufficient to express no feeling at all, a slight, normal, and intense feeling. Doležel opposes "euphoric (pleasurable, positive) and dysphoric (unpleasurable, negative) emotions"[126], leading to contrary pairs:

> The dichotomy turns into a triad if we include the absence of emotion, a "zero" emotion– apathy. Arranging emotions into oppositions should not obscure the ambivalence of emotions, a coalescence of opposites (love + hatred). This puzzling property extends into their motivational potential: on different occasions, one and the same emotion may bring about different, even contradictory, actions. The law of the excluded middle does not apply to emotional life. [...] In the quantitative aspect, intensity, emotions range from ardor to apathy. [...] Emotions are often accompanied by spontaneous physiological events, such as increased pulse rate, palpitations, twitches, and so on. When the events are observable (blushing, sparkling eyes, gestures) or audible (laughing, crying, exclamation of pain, tone of voice). [27, pp. 67-8]

Andrew Ortony, Gerald L. Clore, and Allan Collins propose a structure of emotions as

[124] In the Virtual Storyteller, the emotional state of an agent is represented by pairs of corresponding positive and negative emotions and their intensities. Emotions that are directed at the agent itself are hope-fear, joy-distress, and pride-shame. Emotions directed at other agents include admiration-reproach, hope-fear, and love-hate. Each emotion pair has an intensity value, represented by a natural number on a scale from -100 to 100. For example, a value of 20 for hope-fear means that the character experiences hope with an intensity of 20 (and no fear); a value of -20 means exactly the opposite. [110, p. 96]

[125] This framework is both elegant and absurd. It is elegant in that one can account for a wide range of emotions (including composite emotions like anger, which in represented as a combination of reproach and sadness) using a limited set of building blocks and for a range of emotional intensity that is expressed quantitatively [...]. But the cognitive model of emotions quickly becomes absurd when we try to apply it to the emotional states of actual human beings (dislike of Barney = 1; dislike of Hitler = 10), and it seems the very antithesis of what we value in literature, which is the careful examination of ambiguous situations open to multiple interpretations. [72, p. 231]

[126] These and similar classificatory attempts assume that emotions form a system of correlations. The most venerable pairs are those of euphoric (pleasurable, positive) and dysphoric (unpleasurable, negative) emotions: joy/sadness, love/hatred, admiration/contempt, excitement/fear, mirth/anger, and so on. [27, p. 67]

reactions on events, agents, or objects (cf. figure 3.8). This model has been applied in

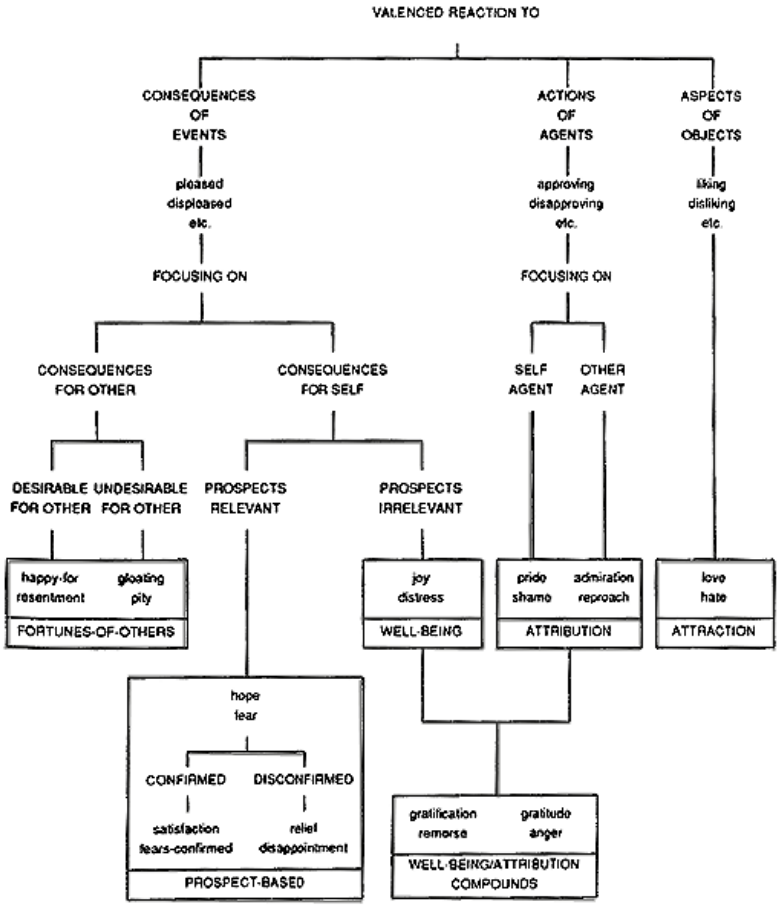

Figure 2.1. Global structure of emotion types.

Figure 3.8: Structure of emotions by Ortony, Clore, and Collins. From [78, p. 19].

interactive systems, like FearNot! [4] or Façade [65]. As a last point, Doležel considers the dynamics of emotions due to their fluctuation[127].

This leads to a hierarchical model with dispositional traits as a static, high-priority set on the top, followed by mood phases that intensify/decrease the reactive, emotional events.

[127] Emotions show remarkable dynamism: they appear and disappear, and their intensity might fluctuate wildly. Changes in the objects and in the intensity of emotions are crucial events in a person's life history, leading to substantial shifts in the course of his or her acting. Obviously, less intense emotions are more prone to change, whereas passions tend to become ingrained. [27, p. 69]

The initial, mental mood depends on the disposition. Then, the character reacts with emotions on occurring, external elements that affect the mood. Mental events which are changes from one mental state (e.g., attitude, etc.) to another[128] are the second influence on the mood. These progresses are visualized in figure 3.9 representing an exemplary character who has at the beginning a positive mood, becomes bad tempered, and is finally happy again. To simulate this emotional reaction on the surroundings, it is

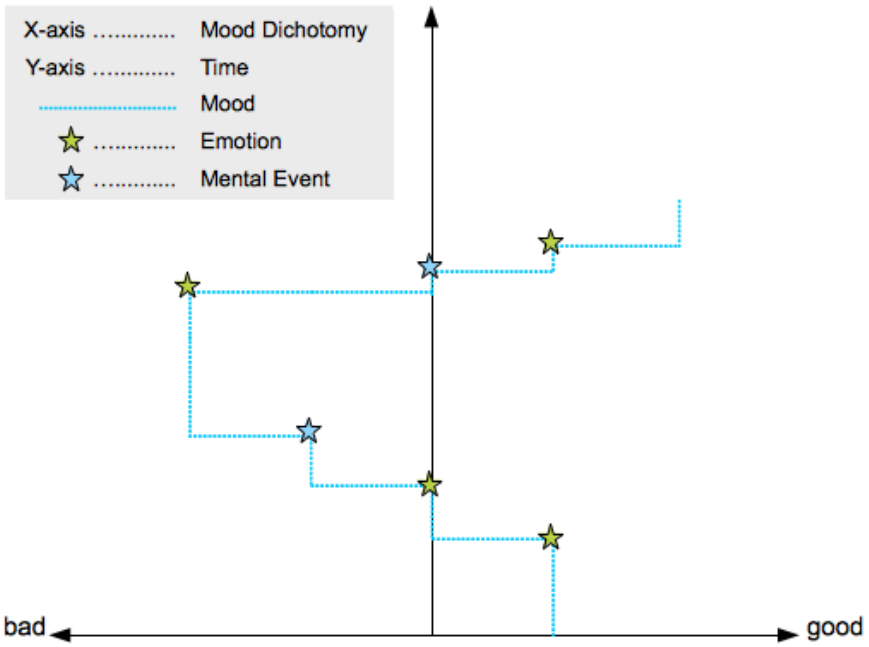

Figure 3.9: Visualization of character's mood development.

suggested to link the poles of moods and the set of reactive emotions to an inner valuation system, that values the external stimuli. This system is a hierarchically structured world representation, like the one of the epistemic representation of the TAW. The valuation of the included elements (e.g., monster = fear) can be changed in the course of the story, but mostly they remain the same.

[128] There are two causes to trigger these events. The first is intentional and conscious motivation and the second is unconscious and spontaneous, as Doležel describes: "There are, however, mental operations that have no connection with acting–the 'inward-looking' workings of the contemplative mind. The spontaneous generation of mental events appears as a work of intentionless mental force that overwhelms the person's mind with obsessive thought, automatic mental images and associations, fantastic daydreams, stream of consciousness displays". [27, pp. 72-3]

Additionally, the underlying semantics determine the reactional emotion likewise, as Margolin states: "We should note that where mental properties are concerned, INDs can be differentiated not only by difference in the nature of the traits they possess, but also by a different configuration or hierarchy of the same traits, such as, say, rationality and passion". [62, pp. 854-5]

All mental faculties are intentionally or spontaneously generated, according to Doležel [27, p. 73]. Palmer elaborates on this the following distinction: "It is the latter pole, which embraces such phenomena as contemplation, daydreams, fantasies, and free associative thinking, that has been the focus of attention within traditional narratology" [79, p. 88]. The intention and motives are further elaborated in the step of actors (cf. section 3.3.6).

Beside these cognitive approaches, David Pizzi suggests synthesis of basic and literary emotions[129]. In this context, he presents the following typology:

> We could regroup them according to their nature into different categories such as behaviours/attitudes [...], emotional states [...] or literary feelings [...] and are either oriented towards some else [...] or personal [...]. They can either be consequences of past events [...] or origin of future behaviours, which will lead to new events [...]. [86, pp. 29-30]

This is implemented in the character-based Interactive Storytelling system, that extracts emotional sets of Gustave Flaubert's *Madame Bovary* and affects the generation process: "For instance, the action selection process is influenced by the literary feelings present in the operators' preconditions and this mechanism ensures an expression of the discourse acts that present communicative actions semantically related to the character's psychology and mental state" [86, p. 123].

The development of characters is the core of many character centered genres such as the Bildungsroman and essential for "believable" ([65] and [58]), "round" [35], and complex characters. The change results from conflict, as Glassner summarizes:

[129] "If basic (or primitive) emotions have been largely studied [Ekman, 1982, Scherer and Ekman, 1984, Frijda, 1987, Lazarus, 1991] thanks to their universal and cognitive properties, they remain however mainly used by affective computing for communicative purposes and present no aesthetic properties. Indeed, stories, and more generally narratives, often involve complex emotions, such as embarrassment or remorse, which are less cognitive and present more cultural/social aspect" [86, p. 26].

> [I]nteresting characters often find themselves in situation where their external and internal worlds are in conflict. This stress forces them to ultimately resolve the conflict by confronting their own nature. [p. 42]
> Characters don't change randomly. The strongest changes are those that bring forth what has been inside the character all along, either undiscovered or suppressed. [p. 46]
> Whatever structure the plot follows, certain elements are always present. There is an *inciting incident* that starts the events off. The hero must then take action to restore the balance of forces, passing through a series of struggles, each one more difficult and with higher risks than the one before. As the issues become more complex the character's understanding of his inner and outer worlds deepens. He often develops in several ways at once: physically, intellectually, emotionally, and spiritually. [42, p. 66]

The various developments can concern all domains of the character. Changes of basic components, like the type or semantic position, affect all the other parts, whereas altering attributes affect only the connected elements. Generally, Margolin distinguishes only changes of mental and physical attributes[130]. The physical development is a result of training and the personality develops by inner or social conflicts, catharsis, new environments or roles, or learning from experiences.

Margolin categorizes changes in three types: "those in which a single entity is followed across a series of states (A); those in which the same number of entities, usually two, are followed in conjunction across states (B); and those in which the number of conjoined entities changes in the course of time (C)" [62, p. 858]. He further differentiates change of intensity and gradual or abrupt transformation. The latter is even more effective when the property is "most central" (in this concept the first steps, such as semantics, frames, etc.) and changed into its opposite[131], such as Annikin Skywalker's change of semantic belonging even altered his identity into Darth Vader. Beside the transformations or replacement, properties can also be added or erased. This is realized in the course of the

[130] We must also discuss separately changes in mental and in physical attributes since quite often the whole point of a narrative may consist in a juxtaposition of radical changes in one with no change in the other. [62, p. 858]

[131] Beginning with the sphere of mental attributes, the simplest group of cases includes no change ("static" characters), intensification or diminution of properties present in the initial stage(s), and gradual change in non central properties (minor variation). [...] Next comes the singular progressive change, where many or even most central initial properties of the IND are removed or turned into their opposites by the end of the process.
A third variety is provided by abrupt change, especially of properties into their opposites, affecting many of the IND's central traits and occurring between two successive states of affairs. At this point, the IND seems to be falling apart into two macro-phases or types of person which are incompatible in their property sets. [62, pp. 858-9]

story like the upgrade of qualities and skills or receiving items in computer games. This progress affects also the story line, because if attributes/props are achieved in earlier story line the story goes another way. Seymour Chatman formalizes the variation of traits into a diagram (figure 3.10), "where C = the character, T^n = a given trait, and the brace detaches existents from the temporal sequence of story but does not interfere with their parametric reference to it. This diagram makes it clear that traits are both paradigmatic *and* parametric" [20, p. 130].

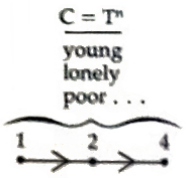

Figure 3.10: Chatman's diagram of the variation of traits. From [20, p. 130].

Margolin discusses two other, more unusual changes. The exchange of mind between bodies and the fusion from two into one or the splitting of one [62, p. 862ff].

"What is now needed is both a motivation for the change and some second-order model of personality to confer coherence on the sequence as a whole" [62, p. 859]. Furthermore, the changing states are causally connected to guarantee coherence[132].

[132] Cohesion is intrinsically satisfied here since change is gradual (incremental), continuous, directed, and semantically related. Each stage closely resembles its predecessor, with which it may also be causally connected. Overall coherence is provided by cultural models like maturing, finding one's vocation, or disillusionment and disintegration. Motivation for the change may reside in the IND's own accumulation of life experiences or in changes in his social environment. [62, p. 859]

3.3.6 Actors

Actions and behavior are according to Bal[133], Seger[134], Barber[135], Margolin [62, p. 852], and others an indirect characterization. This last step of character generation prepares the conditions for the diegetic component of action.

The actions of actors[136] are goal orientated and frustrated by difficulties, like "overambitious goals, erroneous beliefs, unpredicted obstacles, conflicting plans hatched by other participants, mutually inconsistent desires, or other problems" [47, p. 90]. "Emotions are important in guiding our goal management, and this fact has important teleological implications for fictional minds. We obtain our goals through action and Jon Elster considers emotions as 'action tendencies' (1999, 60-61, 28a-83)" [79, p. 117]. Beside the implementations of the Oz group, Theune et al. integrated "action tendencies, such as friendly or unfriendly, aggressive or passive behaviour" [110, p. 97] in their Virtual Storyteller. Envy is one example of the rare goal generating emotions. In addition to intention, emotions describe the manner of acting, that are textualized with adverbs. Seger categorizes conflicts into inner, relational, societal, situational, and cosmic conflicts[137].

There are two reasons for acting. The first is the reaction on occurring events, actions, or situations and the second results from a motif. Doležel distinguishes static and dynamic motifs and considers a range of motivation types [27, p. 35] out of which power[138] and

[133] When a character is presented by means of its actions, we deduce from these certain implicit qualification. Such an implicit, indirect qualification may be labelled a qualification by function. [8, p. 131]

[134] Behavior—the way people do things—marks the difference between two people who might be similar in physical appearance or outlook. People have individual characteristics, small details that make them singular and special. [105, p. 41]

[135] Characters have an associated disposition, which is defined along each of a number of dimensions. A character's disposition determines how they act – both in the actions available to them and the manner in which they perform them. Some of the possible disposition dimensions are: happiness, outgoingness and agility (in its relation to a character's energy levels). [9, p. 57]

[136] *Actors* are agents that perform actions. They are not necessarily human. *To act* is defined here as to cause or experience an event. [8, p. 6]

[137] The relational conflict concerns the goals of characters—mostly two characters or groups have the same, mutually exclusive goals, such as proposing the same woman in a monogamy culture. Conflicting situations are mostly catastrophes and other dangerous situations, and the latter describes the rare conflict of or with gods. [106, p. 166ff.]

[138] "Interpersonal relations and social representations correspond to the motivational systems of the one-person world. In contrast, power has no such correlate; it is a motivational factor emerging only in the multiperson world.

the "erotic cluster" [27, p. 104] are the most essential. He suggests to organize motifs in "the 'nucleus' of the extensional motif-structure, [that] will be surrounded by quantifiers, modal operators, modifiers, space and time indexes, and so on" [27, p. 34]. Glassner suggests Abraham Maslow's hierarchy of needs for motif generation [42, p. 79] like Seger adapts it for the "stakes". The stakes define what the character risks to achieve his or her goal and range from basic survival and safety over belonging, esteem, knowledge to sophisticated esthetics and self-actualization[139]. The stakes and goals often correspond with genres, such as action focused genres orientate on the basic, romances on belonging, crime fiction on knowledge, and so on. Bremond categorizes motivations according to their result in "hédonique, pragmatique, éthique" [14][140] that is illustrated by Cavazza and Pizzi in a matrix (cf. figure 3.11).

Table 1. Influence matrix

Motivation	Incentives	Inhibition
Hedonistic	Seduction	Intimidation
Ethical	Obligation	Interdiction
Pragmatic	Advice	Negative Advice

Figure 3.11: Claude Bremond's categorization of motivations. From [19, p. 80].

The character's motivations and goals are especially relevant in "emergent narratives" or "autonomous agent approach", that are generated by the characters decisions and not by a story grammar. Yun Gyung Cheong reasons the arguments for and against the autonomy:

> The advantages of this approach are that a) the process is fairly simple because the

Power is a means whereby one person–the power holder–controls the intentions and acting of another–the subordinate. The introduction of power brings about a rearrangement of the agential constellation, transforming it into an asymmetrical hierarchy" [27, p. 103ff]. Dolezel distinguishes physical, mental, and social power.

[139] Seger sees the stakes as an essential criterion for reader's emergence (on stakes cf. [106, p. 125ff])

[140] Cavazza and Pizzi summarized this model concisely: "A refined description of influences relies on a categorisation of a character's motives. These are defined by considering the temporal relations between an action and its reward. Pragmatic motivations correspond to actions that will result in a subsequent reward (Socrates drinking a remedy to be cured of an illness). Hedonistic motivations refer to actions whose reward is concomitant to their execution (Socrates drinking wine at a banquet). Finally, Ethical motivations are those for which the reward actually precedes the undertaking of the action (Socrates drinking hemlock rather than going into exile)". [19, p. 79]

> system's job is to distribute goals to each individual agent and b) the process is likely to generate believable stories, since each agent plans its own actions in order to achieve its own goals. However, it is less likely that the generated story would be interesting without a story manager that is in charge of creating dramatic situation such as posing a global goal that needs the collaboration between the agents or arranging goals for agents that conflict each other. On the other hand, the author-centric approach provides plot coherency, since a global planning process is used to construct the actions of all characters in a story over the story's entire duration. In this approach, however, it is difficult to ensure that each character acts according to its own internal nature, since actions are prescribed by a central planning system. [22, pp. 20-1]

For instance in the Virtual Storyteller, the selection of short term goals out of a range of potential goals is affected by emotions[141].

The possibility of concrete action is determined by the already defined competence that is the result of "power/possibility" and "knowledge/skill" (cf. [8, p. 204] and [45]). The ability is a crucial argument in decision making. This, however, presupposes that the characters are autonomous:

> Most work in believable agents has been organized around the metaphor of strong autonomy. Such an agent chooses its next action based on local perception of its environment plus the internal state corresponding to the goals and possibly the emotional state of the agent. All decision making is organized around the accomplishment of the individual, private, goals of the agent. Characters in a story world are not there to believably convey their personalities, but rather to have the right characteristics to take the actions required to move the story forward. That is, knowing which action to take at any given time depends not just on the private internal state of the agent plus current world state, but also on the current story state. And the current story state includes information about all the characters involved in the story, plus the entire past history of the interaction considered as a story, that is, as a sequence of actions building on each other and moving towards some end. The global nature of story state is inconsistent with the notion of an autonomous character, which makes decisions based only on private goals, emotion states, and local sensing of the environment.
> One can imagine a spectrum of character autonomy, ranging from an extreme at which the characters maintain strong autonomy (call this the strong autonomy position), with only occasional guidance from the drama manager, to an extreme at which the drama

[141] In the Virtual Storyteller, each character agent has a fixed set of potential goals. The importance that a character attaches to these goals varies depending on its action tendencies (see section 2). In addition, one of its goals may have the status of "episodic goal", in which case it has a very high importance (90 out of 100) throughout the episode. Instead of having a character simply adopt the goal with the highest importance, we use a probabilistic approach to goal selection, where a goal's importance corresponds to the probability that it will be adopted. [110, p. 98] (cf. [74], [109])

> manager continuously intervenes in every character decision (call this the strong story position). [65, pp. 40-1]

In Mateas and Stern's Façade, this is implemented through an emotion system called Em[142]. Which actions are required and in which order they are performed to achieve a certain goal in a specific context, are default in personal scripts, according to Schank and Abelson[143]. These personal scripts can be extracted from previously experienced situations during the story's course or be designed in advance. The "memorization" of already experienced situations or solutions is formalized by Case Based Reasoning. To handle inexperienced situations, the actor draws on general knowledge and integrates this into a plan[144].

In conclusion, the intervention into the process of character generation is preferred in the domains of the types and attributes. The emotions are influenced indirectly by the character types. It is suggested to confine the interaction on the "playable" characters, whereas the minor characters are generated automatically. The automatized or interactive generation is for the most part already implemented, like in computer games or Interactive Fiction systems. The main challenges remain the cPWs as exhaustive, subjective representations of the TAW from epistemic, deontic, and axiological point of view.

Beside this direct intervention, there is also the possibility of indirect personalizations through Social Networks (e.g., Facebook). Through the permitted synchronization with the reader's, for instance, Facebook account, the data of his or her friends serve as a data source for the characters of the generated narrative. The advantage of social networks is the tagged and structured information, that can be simply transferred into the characters'

[142] Scott Neal Reilly [Neal Reilly 1996; Bates, Loyall & Reilly 1992a; Bates, Loyall & Reilly 1992b] developed Em, an emotion system integrated with Hap's goal processing and based on the OCC cognitive appraisal model of emotion [Ortony, Clore & Collins 1988]. [65, p. 9]

[143] Personal scripts are usually but not always goal-oriented. A personal script also might be followed as a matter of ritual (e.g., **$PRAYER**), or as an elaborated emotional and behavioral reaction following a situational outcome. [102, p. 63]

[144] A plan is intended to be the repository for general information that will connect events that cannot be connected by use of an available script or by standard causal chain expansion. A plan is made up of general information about how actors achieve goals. A plan explains how a given state or event was prerequisite for, or derivative from, another state or events. [...] This plan is the reasoning by which an individual decides upon one or more actions, each of which can then lead to chains of results and enablements. [102, p. 70]

databases and complemented with random data generated by the system. The addition of the random data will lead to effects of deviation and surprise for the reader. There are already several applications that extract data from Facebook and integrate it into their systems, such as the APP Flipboard. However, no story generation system has used this source of information yet.

3.4 Events

The basic definition of "diegesis" is a series of events "caused or experienced by actors"[145]. In narratology, the arrangement of events differentiates the diegesis and story from the discourse, because the events (termed by Meister "object event"[146]) of the former are chronologically, whereas stories are teleologically and causally arranged and follow presentation modes, such as suspense or analepses, on the discourse level. "An *event* is the transition from one state to another state" [8, p. 6][147]. Nevertheless, Rimmon-Kenan mitigates the ...

> ... opposition between state and event (or stasis and process), because it seems to me that an account of an event may be broken down into an infinite number of intermediary states. This is why a narrative text or a story-paraphrase need not include any sentence denoting a dynamic event; a succession of states would imply a succession of events, as it does in 'He was rich, then he was poor, then he was rich again.' Just as any single event may be decomposed into a series of mini-events and intermediary states, so-conversely – a vast number of events may be subsumed under a single event-label (e.g. 'The Fall of

[145] "A *fabula* is a series of logically and chronologically related events that are caused or experienced by actors.
The fabula, understood as material that is worked into a story, has been defined as a series of events. This series is constructed according to certain rules. We call this the *logic of events*". [8, pp. 7, 5] This basic definition correlates with the ones of Jahn [50, N2.12], Prince [90, p. 20], Rimmon-Kenan [94, p. 15], and Chatman [20, p. 43]. Meister discusses the multifarious definitions of event in detail and with the focus on formalization and implementation in *Computational Action* [67].

[146] OBJECT EVENTS would be those EVENTS in which the chronological sequence of changing properties follows the fictional world's internal chronology (i.e. the narrated time of the fictional world). For example, a hero could be *rich* at point t in time, but *poor* at point $t + 1$, where the sequence of all possible points $t_1 ... t_n$ in time is congruent with the natural course of time in fictional world. [67, p. 114]

[147] Bal's definition corresponds with others, such as the one of the OED [77]. Prince uses solely a different terminology: "From now on, I shall call *stative* event any event which describes a state and *active* event any event which describes an action" [89, p. 29].

> the Roman Empire'). This is why it may be difficult at times to maintain an absolute distinction between the notion of 'event' and that of 'succession of events'. [94, pp. 15-6]

For the generation, every event requires an initial and final state and a coherent transformation verb, that Prince refers to as a minimal story[148]. Furthermore, there is the top-down structure of event-label, mini-events, and so on (cf. section 3.4.3). According to Meister, the initial and final state—or expositional and dispositional statements—consist of predicates and predicate classes of the object (cf. [67, p. 135ff]). These relations and all the following information build event databases, like the ones of the single characters. Doležel[149] and Ryan add to this basic definition the dimension of time:

> One of the least controversial claims of contemporary narratology is that a narrative text is the representation of a number of events in a time sequence. [p. 58]
>
> [Some] events create clear-cut transitions between discrete narrative states. But other events, like the firing of a time-bomb, are time-consuming processes. The temporal range between their initiation and completion leaves time for the initiation and completion of numerous other processes [...]. Events of this second type are not fully deterministic but stochastic processes, and it may be to record the stages of their progression as different states in the history of the narrative universe. [...]
> The progressive coding expresses the parallelism of the narrative machine: more often than not, a plot is not a single line of action, but the interaction of concurrent processes. In a narrative, as in a multitasking computer, a process may start another process, interrupt it, terminate it, slow it down, or speed it up. [98, p. 127-8]

The consumed time of an event is directly entered into the databases. Meister integrates all these aspects into the following formalization:

> (a) $x(P_1, t_1)$—read: 'there is an x with property P_1 at point t_1 in time.'
> (b) $y(P_2, t_2)$—read: 'there is an y with property P_2 at point t_2 in time.'
> These two statements of predication can be synthesized to form an EVENT under certain conditions, namely:
> (α) Order: the temporal index (chronological position) of t_2 must succeed that of t_1.

[148] A minimal story consists of three conjoined events. The first and third events are stative, the second is active. Furthermore, the third event is the inverse of the first. Finally, the three events are conjoined by three conjunctive features in such a way that (a) the first event precedes the second in time and the second precedes the third, and (b) the second event causes the third. [89, p. 31].

[149] Acting occurs in time, and we can make a distinction between momentary actions requiring a minimal interval of time [...] and durative actions occupying a shorter or longer period. [27, p. 57.]

(β) Identity of EVENT FOCUS: the variables x and y must be instantiated by an identical hypothetical event object.
(γ) Non-identity of predicates: P_1 and P_2 must be different. [p. 117]
(δ) Predicate mapping: P_1 must be translatable into P_2 according to a rule F. [67, p. 119]

Further information added into the databases are determinations of the setting, such as the spatial relation or social conventions. Beside the effects of the setting, there are also direct influences of the relations on the actions, as Doležel stresses: "Modalities are the main formative factors of this kind. They play this role because they have a direct impact on acting; they are rudimentary and inescapable constraints, which each person acting in the world faces" [27, p. 113]. This concerns especially the alethic relation enabling events, like beaming, in some worlds and in others not.

Similar to Jahn [50, N2.12], Chatman [20, p. 44], Doležel [27, p. 59ff], and others, Ryan distinguishes between "actions and happenings [...]. The difference between the two categories resides in the intention or lack of thereof inhering in the event: actions are deliberately aimed toward a goal, happenings occur accidentally" [98, p. 129]. Additionally to the two physical types, she differentiates the mental events including the in the previous chapter mentioned transformation of mental states or thoughts which are in narratives textual representations of the inner worlds. However, the thoughts are concreted on the story and discourse level and the mental states are part of the character generation.

The "non-intentional event" is further categorized by Doležel:

> Actions are flanked, on one side, by nature events and nature processes caused by the intentionless nature force, on the other side, by accidents where intentionality is frustrated. [...] Nature event. Persons do not act in a static environment; they have to cope with a multitude of occurring or potential nature events.
> Accident. [...] If, however, the agent finds himself or herself in an end state different for the one intended, an accident has happened.
> "Accident" is one of the special categories that cluster around the notion of acting, the others being "trying," "omission" ("forbearing"), "letting happen," "failing," and so on. Trying can be defined as truncated action: the agent stops the performance, for whatever reason, before reaching the intended end state. We cannot speak about trying if the action is canceled because of shift in intention. [27, p. 59ff]

This results in three types of events according to the intention: the action, the accident, and the happening:

1. **action:** state + intention > act > intended state
2. **accident:** state + intention > act > non-intended state
3. **happening:** state > effect > state

The happenings are simply default and located in the spatio-temporal setting (e.g., Monsoon) or in a set provided for their later need as a catalyst in the story.

3.4.1 Actions

Accidents and actions as the intentional events are connected to the actor(s). The first condition is the inner constitution containing of his or her goals[150] and mental state (mood). The second condition is the competence (physical ability, power, etc.). According to Doležel, the goal is generated by the motivation including drives, practical reasoning, and emotions (cf. [27, p. 63ff]).

Despite in a one-person-world[151], the interaction of characters—whether conflicting or collaborating—is essential in popular narratives. According to Doležel, interaction is either physical[152] or mental in the form of communication. These two modes of interaction are specified in symmetrical and asymmetrical[153]. For physical interaction the participants have to be in the same location at the same time whereas the telecommunication allows spatial and temporal distanced mental interaction. The interaction results for one party in an interactional accident: "Due to the diversity of the interacting persons' intentions, the potential for actional failures grows proportionately with the size of agential constellation" [27, p. 99].

[150] Intention in and for acting orients the agent toward the future, directs him or her to proceed from a given initial state to an anticipated end state. Because it is future oriented, intentionality makes acting goal oriented (purposeful). [27, p. 58]

[151] If a person exists in the solitude of the one-person world, either his or her acting is a response to events in the natural environment or it originates in his or her mind. [27, p. 96]

[152] The elementary form of interacting is direct physical contact. [27, p. 98]

[153] Asymmetrical interaction occurs if the persons perform different acts (slapping/turning the other cheek) or if one of them responds with an omission. [27, p. 98]

Structuralists, like Greimas, Bremond, and others, compared the action sequences of a narration to the syntax and concluded the distinctive criterion, what Ryan sums up: "Actions have a voluntary human or human-like agent, happenings have a patient but no animated agent" [98, p. 129]. Following this approach, Doležel distinguishes transitive and intransitive actions[154]. The typology, shown in figure 3.12, links the actors (S), objects (O) or patients (P) functionally to the actions (A). These participants are not concretely specified in the event database, moreover there are conditions that need to be fulfilled by the character to activate them, as Barber points out in the quotation below. The last data required for actions—especially movements and durative actions—is the spatio-temporal specification.

EVENT TYPE	PARTICIPANTS
Happening	O + A + P
Action	S + A + O
Intransitive Action	S + A + S
Interaction	S + A + P

Figure 3.12: Typology of events according to their functional link of participants.

For the automatic generation, Barber exemplarily works out the requirements for each action:

> Each action will have associated: conditions which must be satisfied before execution (preconditions); and effects representing changes to the storyworld following successful execution. For example the action of a character moving between locations l and k has preconditions of the character being at location l and there existing a path between locations l and k. The effects of this action are that the character is at location k and is no longer at location l. [...] Before an action is made available to the system for use within a storyline an applicability check is performed on the involved character's traits and disposition. [...] This check is supplementary to the preconditions of an action and incorporates conditions which cannot be specified through use of STRIPS-style preconditions. This helps to ensure that each character acts in a manner which is

[154] Physical action is overt and observable. It is called intransitive if the bodily movement affects just the acting person, changes his or her state, properties, and so on [...]. The agent performs transitive actions by bringing about changes in the world, by moving objects, altering their shape, transforming one object into another, and so on. [...] The most radical changes in the world result from productive and destructive acting. [27, p. 56]

> consistent with their traits and how they have acted previously, while at the same time avoiding predictability. [...]
> Adverbs are associated with character actions to give a clear impression of the character's disposition in the narrative. These are then presented in the output as a descriptor for actions – when and where it is appropriate. A range of possible adverbs reflecting the same disposition add more interest to this. The adverb selected as an action descriptor will be randomly chosen from those associated with the disposition dimension which has the greatest absolute value. [9, pp. 59-60]

3.4.2 Selection and Tellability

The next two sections concern issues that are closer to story generation than world construction as the diegesis provides the components, but the selection and arrangements are parts of the story. Despite that, it is suggested to generate events (like the other constituents) in foresight to the story extraction to avoid obsolete data.

The events are selected basically according to the aspect of tellability[155]. Barthes differentiates the "unités fonctionnelles" into "noyaux" and "catalyses"[156]. Later, Chatman [20, p. 53ff], Rimmon-Kenan, and others adopted this distinction under different terms to separate events that "advance the action by opening an alternative ('kernals') and those that expand, amplify, maintain or delay the former ('catalysts')" [94, p. 16]. Bal adds to the choice and change the confrontation, relationship, and narrative cycle as criteria of selection. Nevertheless, a narrative does not solely consist of functional events, as Ryan points out:

> [A] proposition moves the plot forward, and presents narrative functionality, when it expresses an event which affects either directly or indirectly the relations among the worlds of the textual universe. A related criterion applies to the selection of plot-functional units among stative elements. The facts retained in the characterization of states should either

[155] The tellability or narrativity of events is a crucial debate in narratology as it simultaneously defines what is a narrative or a pragmatical text.

[156] Pour reprendre la classe des Fonctions, ses unités n'ont pas toutes la même ń importance ż; certaines constituent de véritables charnières du récit (ou d'un fragment du récit); d'autres ne font que ń remplir ż l'espace narratif qui sépare les fonctions-charnières : appelons les premières des *fonctions cardinales* (ou *noyaux*) et les secondes, eu égard à leur nature complétive, des *catalyses*. Pour qu'une fonction soit cardinale, il suffit que l'action à laquelle elle se réfère ouvre (ou maintienne, ou *ferme*) une alternative conséquente pour la suite de l'histoire, bref qu'elle inaugure ou conclue une incertitude; [10, p. 9]

intrinsically matter to characters, or bear a causal relation to a plot-functional event. [98, p. 126]

Applied to the diegetic generation, this raises the question, whether the functionality or tellability is inherent in the events or the diegetic relations, or it gets the function in the context of the story. Certainly, there are ordinary events, like "brushing one's teeth", and tellable events, such as "firing a bomb". Accordingly, the information in the database of the event needs to be tagged with deontic and axiological constraints that separate the ordinary from the unconventional, immoral, conflicting, shortly the tellable events. However, the functionality or tellability is mostly not inherent in the events, but gets its function through the diegetic relations (the participants, location, etc.) or the context of the story. For instance, the act "kissing" has a higher tellability at the first date, after a long quarrel or involving a married boss and her secretary than the daily good morning kiss of a couple. The diegetic relations need to be specified directly in the concerned databases, for instance the chronotopic level of space.

3.4.3 Scripts, Plans, and Taxonomies

In the quote at the beginning of this chapter, Rimmon-Kenan [94, pp. 15-6] mentions the categories of "event", "mini-events", "succession of events", and "event-label". This refers to the arrangement of events, the second major operation of the story generation. Generally, narratologists differentiate the story consisting of the macro-sequences, and the smallest entity of micro-sequences[157]. This hierarchy of the discourse level is adopted for the fabula by summing up single events to sequences, like macro-sequences that are "in sich relativ abgeschlossene, in einen grösSeren narrativen Zusammenhang gehörende Teil- oder Nebenhandlung" [63, p. 110]. To formalize sequences of events, the Cognitive Science uses scripts. Situational scripts represent standardized, everyday event sequences in a specific situation[158] and instrumental scripts which are rigidly ordered

[157] The used terminology is that of Rimmon-Kenan [94, p. 16], but there are ambiguous variation of this hierarchy. The micro-sequences are also called "action-unit" [50, 4.1.] or "Ereignis" [63, p. 110] and the macro-sequences are homogeneously termed "episodes".

[158] A script is a structure that describes appropriate sequences of events in a particular context. A script is made up of slots and requirements about what can fill those slots. The structure is an interconnected whole, and what is in one slot affects what can be in another. Scripts handle stylized everyday situations. Thus, a script is a predetermined, stereotyped sequence of actions that defines

event sequences performed by one actor (cf. [102, p. 65]). The two script types and the afore-mentioned personal script occur mostly juxtaposed, as Schank and Abelson illustrate in an example:

> John could take Mary to dinner at a restaurant, doing various instrumental scripts along the way (lighting her cigarette, starting the car). However, during the meal he is affecting the personal script of **ROMANCER**. This affects his behavior every now and then, in what he says, how he walks, what wine he orders, but probably not in that he orders or pays the check (situational) or how he cuts his meat (instrumental). [102, p. 66]

Events are further classified into thematic or genre specific sets. Beside the typical macro-sequences which are more relevant for story generation[159], different events are required in different genres. For instance, typical events of a detective story (e.g., "interrogate", "investigate", "preserve traces", or "arrest") are quite disturbing and rare in a romance à la Rosamunde Pilcher.

The last classification is based on analogy and arranges events into taxonomic categories, such as the "primitive acts" of Conceptual Dependency presented by Schank and Abelson [102, p. 12ff] with "abstract and physical transfer", "move", "speak", and so on.

> The challenge of all such ambitious schemes is in giving the computer enough knowledge of the story elements to decide what constitutes an Aristotelian recognition scene or a suspense-generating event. One way of avoiding the arduous task of teaching the computer to understand the world enough to make such aesthetic judgements is to code very specific story elements in terms of their dramatic function. Michael Lebowitz has created a storytelling system along these lines with morphemic segments derived from the staples of daytime soap opera stories, namely, amnesia, murder threats, forced marriage, and adultery. In Lebowitz's Universe system, the automated author is assigned goals, and the system then looks for fragments that will achieve those goals. [72, p. 201]

a well-known situation. [p. 41]
An important function of scripts is to provide the background in which more planful activities are carried out. [102, p. 49]

[159] The structural schemes of macro-structure reach back to Aristotle who established a typology based on the dichotomy of downfall and fortunate. Chatman presented this in more detail [20, p. 84ff]. Furthermore, Joseph Campbell [18] and other comparative studies of global myths reconstructed the macro-structure of the "monomyth". Propp's narrative functions have been implemented most often for interactive storytelling and generative systems: Certain works, such as [82], [81], and *ProtoPropp*, of the Pablo Gervás and his colleagues at the Universidad Complutense de Madrid base on Propp's model. Knut Hartmann et al. developed an editor for interactive drama that focused on Propp's structure of macro-sequences [46]. Furthermore, there are the partial adaptions, for instance, of Malec [59] and Grasbon/Braun [43].

The intervention on the actions by the reader is the core of Interactive Fiction or computer games in which he or she acts via an avatar. However in generation systems, the actions are determined by autonomous characters and their decisions or by a document planner. The possibilities of interaction for a reader are, therefore, quite limited. He or she can indirectly affect them in three ways: Through the characters and their profile or goals, through the theme or genre in the presettings, or through the document planner, that opens narratorial choices like the degree of suspense, etc. These interactions concern more the story level than the diegesis. The insight or intervention in the provided sets of events is not suggested due to the disillusion and decrease of suspense if the reader already knows what will happen in the narrative.

Nevertheless, the automatization and formalization of events is important for further generative processes, because the database has to provide all relevant data for them: its type, the initial and final states, the transformation process, the participants and their intention and manner, the consumed time, and the spatial information. This single event entities are hierarchically structured and assembled to scripts, micro-sequences, and macro-sequences.

4 Conclusion

The concept of IndieBook provides various novel approaches for interactive and automatic generation of fictive worlds. Generally, the collaboration of author, reader, and automatization in creating a fictive world expands the recent approaches on computational creation of worlds and interactive story generation. Compared to Interactive Fiction, this concept supports the linear reception, the interactivity is more focused on (co)creating the diegisis than experiencing the story, and the content is personalized. To explore the possibilities and limits of this concept further will most likely yield an avenue to innovative, future research. The suggested five-layered structure of the IndieBook distinguishes clearly the operational processes, of which the presettings reduce the complexity of the system and the diegesis provides the data and structures that are required for further generation of stories and its presentation in different narrative media.

The main challenge of automatic generation of the diegesis is to structure data in order to avoid inconsistencies. Therefore, a detailed model of generative operations was presented in top down order. Considering the complexity and required quantity of data, interactivity was not suggested for the basic world models but for the constituents of the diegesis, such as the specification of the temporal and spatial setting or the character creation. While the setting and the characters offer various interaction, the events are only affected via the characters or presettings by the reader. The interaction on the temporal and social setting is also challenging due to the extensiveness of required data. Apart from the direct intervention, like character or map editing, there are also possibilities of indirect, automatic personalizations through Social Networks or Localization Services. Generally, the interaction with the diegetic level enhances the quality of generated text. It also increases the joy of the reader due to a stronger identification and the feeling of creative power over a whole world.

The formalization of the diegesis that supports the computational and interactive generation alike was discussed for each constituent in detail. Narratological, cognitive, and sociological models were applied, combined, and modified to build this structure. At the beginning, story models with their relations were presented. Each textual actual world is generated through its relation to the actual world. However for this automatization, templates of the actual world are required what yields new challenges and further work on gathering, formalizing, and structuring data of the actual world. The temporal setting consists of the specification of the period through the historical relation, the story time limitation, and the chronological fictivity. The generation of literary space was separated into six procedural steps to create a more complex and detailed spatial setting that supports advanced automatic or interactive story generation. The social setting, that has not been integrated into a generation system yet, was formalized by a equation of power based on Field Theory, a generated stratification of milieus, and catalogs of laws and values. The knowledge of a society is challenging because it has to include information on the reality but also on fictive worlds that can contradict logics. Furthermore, data extraction and processing of online sources or databases is not yet advanced enough to represent the exhaustive knowledge of a highly developed society. Similar to the spatial setting, the generation of characters is segregated into six operational levels. Based on all the previous constituents and specifications, the events were formalized providing a structure of required data and an ontology. These models present a novel way toward the goal of interactive and automatized narratives that can be fruitful for the generation of game worlds and story worlds alike. Furthermore, having systems able to generate individualized books introduce a multitude of new applications. Apart from this main purpose, the formalizations of fictive worlds can serve as analytical tools too.

The concept presented in this thesis opens future possibilities for philology and commerce to collaborate and benefit from the systems generating individualized books. Beside the theoretical basis of narratological formalizations, the author's style has to be analyzed and defined in stylistic and comparative research.

References

[1] Nicola Alter. Creating a Sense of Place in Fantasy Fiction. *Text Journal of Writing and Writing Courses*, 15(1), 2011.

[2] Poul Anderson. The Creation of Imaginary Worlds: The World Builders Handbook and Pocket Companion. In Gardner R. Dozois, Tina Lee, Stanley Schmidt, Ian Randal Strock, and Sheila Williams, editors, *Writing Science Fiction and Fantasy: 20 Dynamic Essays by The Field's Top Professionals*, pages 105–28. New York: St. Martin's Press, 1991.

[3] Karen Ang, Sherie Yu, and Ethel Ong. Theme-Based Cause-Effect Planning for Multiple-Scene Story Generation. *Creativity*, pages 48–53, 2004.

[4] Ruth S. Aylett, Sandy Louchart, Joao Dias, Ana Paiva, and Marco Vala. FearNot! – an Experiment in Emergent Narrative. *Intelligent Virtual Agents, 5th International Working Conference*, pages 305–16, 2005.

[5] Norbert Bachleitner. "Nicht jeder Tisch ist gross oder jedes Dorf ist alt". Dichtungsgeneratoren zwischen literarischer Avantgarde und kommerzieller Verwertung. In Ágoston Zénó Bernád, Márta Csire, and Andrea Seidler, editors, *Finno-Ugrian Studies in Austria. On the Road – Zwischen Kulturen unterwegs.* Wien: Lit-Verlag, 2009.

[6] Norbert Bachleitner. *Formen digitaler Literatur. (Vorlesung).* `http://complit.univie.ac.at/skripten/digitale-literatur-20/`, 2010.

[7] Mieke Bal. *Narratology (De theorie van vertellen en verhalen).* Toronto [a.o.]: Univ. of Toronto Press, 1. edition, 1985.

[8] Mieke Bal. *Narratology (De theorie van vertellen en verhalen).* Toronto [a.o.]: Univ. of Toronto Press, 3. edition, 2009.

[9] Heather Barber. *Generator of Adaptive Dilemma-Based Interactive Narratives.* Univ. of York: PhD thesis, 2008.

[10] Roland Barthes. Introduction à l'analyse structurale des récits. *Communications*, 8:1–27, 1966.

[11] Simon Biggs. *The Great Wall of China.* `http//www.littlepig.org.uk/wall/wall.htm`, 1995-9.

[12] Pierre Bourdieu. *Le Sens pratique.* Paris: Minuit, 1980.

[13] Pierre Bourdieu and Loïc J. D Wacquant. *An Invitation to Reflexive Sociology.* Cambridge: Polity Press, 1992.

[14] Claude Bremond. *Logique du récit.* Collection poétique. Paris: Seuil, 1973.

[15] Selmer Bringsjord and David Ferrucci. *Artificial Intelligence and Literary Creativity: Inside the Mind of Brutus, a Storytelling Machine.* Mahwah, London: Lawrence Erlbaum Associates, 2000.

[16] Charles B. Callaway. *Narrative Prose Generation.* North Carolina State Univ.: PhD thesis, 2000.

[17] Charles B. Callaway and James C. Lester. Narrative Prose Generation. *Artificial Intelligence*, 139(2), 2002.

[18] Joseph Campbell. *The Hero With a Thousand Faces.* Novato: New World Library, (1949), 3. edition, 2008.

[19] Marc Cavazza and David Pizzi. Narratology for Interactive Storytelling: A Critical Introduction. In Stefan Göbel, Rainer Malkewitz, and Ido Iurgel, editors, *Technologies for Interactive Digital Storytelling and Entertainment*, pages 72–83. TIDSE, Darmstadt, 2006.

[20] Seymour Benjamin Chatman. *Story and Discourse. Narrative Structure in Fiction and Film.* New York: Cornell, 1978.

[21] Sherol Chen, Adam M. Smith, Arnav Jhala, Noah Wardrip-Fruin, and Michael Mateas. RoleModel: Towards a Formal Model of Dramatic Roles for Story Generation. *Proceedings of the Intelligent Narrative Technologies III Workshop*, 2010.

[22] Yun Gyung Cheong. *A Computational Model of Narrative Generation for Suspense.* North Carolina State Univ.: PhD Thesis, 2007.

[23] Konstantinos Chorianopoulos and Diomidis Spinellis. Affective Usability Evaluation for an Interactive Music Television Channel. *Computers in Entertainment*, 2(3):1–11, 2004.

[24] Florian Cramer. *per.m/utations.* `http://permutations.pleintekst.nl/`, 2012.

[25] Chris Crawford. *Chris Crawford on Interactive Storytelling.* Berkeley: New Riders, 2005.

[26] Teun A. Dijk. *Beiträge zur generativen Poetik.* München: Bayerischer Schulbuch-Verl., 1972.

[27] Lubomír Doležel. *Heterocosmica.* Baltimore [a.o.]: Johns Hopkins Univ. Press, 1998.

[28] Jörg Dünne and Stephan Günzel, editors. *Raumtheorie. Grundlagentexte aus Philosophie und Kulturwissenschaften.* Frankfurt: Suhrkamp, 2006.

[29] Richard Dyer. *The Matter of Images.* London [a.o.]: Routledge, (1993), 2. edition, 2002.

[30] Anja Ebersbach, Markus Glaser, and Richard Heigl. *Social Web.* Konstanz: UVK, (2008), 2. edition, 2011.

[31] Catherine Emmott. *Narrative Comprehension. A Discourse Perspective.* Oxford: Clarendon Oxford Univ. Press, 1997.

[32] Catherine Emmott and Mark Alexander. *Schemata.* `hup.sub.uni-hamburg.de/lhn/index.php?title=Schemata&oldid=1075`, 2012.

[33] Nathanael Fillmore. *A* Romantic Poetry Generator.* `http://nate-fillmore.com/pub/astar-poetry-generation.pdf`.

[34] Ulla Fix, Andreas Gardt, and Joachim Kape, editors. *Rhetorik und Stilistik. Ein internationales Handbuch historischer und systematischer Forschung.* Berlin: De Gruyter, 2008.

[35] Edward Morgan Forster. *Aspects of the Novel.* London [a.o.]: Hodder & Stoughton, (1927), 1993.

[36] Virginia Francisco, Raquel Hervás, Federico Peinado, and Pablo Gervás. EmoTales: Creating a Corpus of Folk Tales with Emotional Annotations. *Language Resources and Evaluation*, 2, 2011.

[37] Gonzalo Frasca. Simulation versus Narrative. In J. P. Mark Wolf and Bernard Perron, editors, *The Video Game Theory Reader*, chapter 10, pages 221–36. New York: Routledge, 2003.

[38] Northrop Frye. *Anatomy of Criticism: Four Essays.* Princeton: Princeton Univ. Press, 1957.

[39] Chris T. Funkhouser. *Prehistoric Digital Poetry: an Archaelogy of Forms, 1959-1995.* Tuscaloosa: Univ. of Alabama Press, 2007.

[40] Peter Gendolla and Thomas Kamphusmann. *Die Künste des Zufalls.* Frankfurt: Suhrkamp, 1999.

[41] Peter Gendolla and Jörg Schäfer. *Playing with Signs in the Net: Upheavals in Literary Communication.* `http://dev.stg.brown.edu/projects/netart/readings/Gendolla-Schfer.pdf`, 2006.

[42] Andrew Glassner. *Interactive Storytelling: Techniques for 21st Century Fiction.* Natick: A. K. Peters, 2004.

[43] Dieter Grasbon and Norbert Braun. A Morphological Approach to Interactive Storytelling. In *Proceedings of on Artificial Intelligence and Interactive Entertainment*, pages 337–40. Cast'01, Living in Mixed Realities, Sankt Augustin, 2001.

[44] Paul Gravett. *Manga. Sixty Years of Japanese Comics.* London: Laurence King Publishing, 2004.

[45] Algirdas Julien Greimas. *Sémantique structurale: recherche et méthode*. Paris: Larousse, 1966.

[46] Knut Hartmann, Sandra Hartmann, and Matthias Feustel. Motif Definition and Classification to Structure Non-linear Plots and to Control the Narrative Flow in Interactive Dramas. In Gérard Subsol, editor, *Virtual Storytelling, Using Virtual Reality Technologies for Storytelling, ICVS 2005, Lecture Notes in Computer Science 3805*, pages 158–67. Berlin [a.o.]: Springer, 2005.

[47] David Herman. *Story Logic. Problems and Possibilities of Narrative*. Lincoln: Univ. of Nebraska Press, 2002.

[48] Amen Internet. Amen. `https://getamen.com/`, 2012.

[49] Manfred Jahn. "Speack, Friend, and Enter": Garden Paths, Artificial Intelligence, and Cognitive Narratology. In David Herman, editor, *Narratologies: New Perspectives on Narrative Analysis*, pages 167–94. Columbus: Ohio State Univ. Press, 1999.

[50] Manfred Jahn. *Narratology: A Guide to the Theory of Narrative*. `http://www.uni-koeln.de/~ame02/pppn.htm`, 2005.

[51] Fotis Jannidis. *Character*. `hup.sub.uni-hamburg.de/lhn/index.php?title=Character&oldid=1729`, 2012.

[52] Carl Gustav Jung. *Bewußtes und Unbewußtes: Beiträge zur Psychologie*. Frankfurt [a.o.]: Fischer, 1957.

[53] Carl Gustav Jung. Psychologische Typen. In Marianne Niehus-Jung, Lena Hurwitz-Eisner, and Franz Riklin, editors, *Gesammelte Werke: volume VI.* Zürich und Stuttgart: Rascher, (1921), 9 edition, 1960.

[54] George Kelly and Hugh McCabe. *Citygen: An Interactive System for Procedural City Generation*. `http://procedural.googlecode.com/svn-history/r108/trunk/articles_cities/citygen_gdtw07.pdf`, 2007.

[55] Michael Lebowitz. Planning Stories. In *Proceedings of the 9th Annual Conference of the Cognitive Science Society*. Seattle, 1987.

[56] Hugo Liu and Push Singh. Makebelieve: Using Commonsense Knowledge to Generate Stories. In *Proceedings of the 18th National Conference on Artificial Intelligence*, pages 957–8. AAAI Press, 2002.

[57] Birte Lönneker-Rodman. Modelle erzählender Texte Computerlinguistik und Computernarratologie. In *Abstracts of the 28th annual meeting of the German Society for Linguistics*, pages 246–7. (DGfS), Bielefeld, 2006.

[58] Bryan A. Loyall. *Believable Agents: Building Interactive Personalities*. `http://www.cs.cmu.edu/afs/cs/project/oz/web/papers/CMU-CS-97-123.pdf`, 1997.

[59] Scott A. Malec. Proppian Structural Analysis and XML Modeling. In *Proceedings of CLiP*, pages 6–9. Duisburg, 2004.

[60] Inderjeet Mani. *Computational Narratology*. `http://hup.sub.uni-hamburg.de/lhn/index.php?title=Computational_Narratology&oldid=1773`, 2012.

[61] Uri Margolin. Structuralist Approaches to Character in Narrative: The State of the Art. *Semiotica*, 75(1-2):1–24, 1989.

[62] Uri Margolin. Individuals in Narrative Worlds: An Ontological Perspective. *Poetics Today*, 11(4):843–71, 1990.

[63] Matías Martínez and Michael Scheffel. *Einführung in die Erzähltheorie*. München: Beck, 7. edition, 2007.

[64] Félix Martínez-Bonati. Towards a Formal Ontology of Fictional Worlds. *Philosophy and Literature*, 7(2):182–95, 1983.

[65] Michael Mateas. *Interactive Drama, Art and Artificial Intelligence*. Carnegie Mellon University: PhD thesis, 2002.

[66] James R. Meehan. *The Metanovel: Writing Stories by Computer*. Yale Univ.: PhD thesis, 1976.

[67] Jan Christoph Meister. *Computing Action. A Narratological Approach*. Berlin [a.o.]: De Gruyter, 2003.

[68] Jan Christoph Meister. Computational Narratology oder: Kann man das Erzählen berechenbar machen? In Corinna Müller and Irina Scheidgen, editors, *Mediale Ordnungen. Erzählen, Archivieren, Beschreiben. Schriftenreihe der Gesellschaft für Medienwissenschaften (GfM)*, pages 19–39. Marburg: Schüren Verlag, 2007.

[69] Paul Milgram and Fumio Kishino. A Taxonomy Of Mixed Reality Visual Displays. *IEICE Transactions on Information Systems*, E77-D(12), 1994.

[70] Patricia Minks. *Florigenium. Foreword.* `http://www.unet.univie.ac.at/~a0649517/vorwort.html`, 2011.

[71] Marvin Lee Minsky. A Framework for Representing Knowledge. In Patrick Henry Winston, editor, *The Psychology of Computer Vision*, pages 211–77. New York [a.o.]: McGraw-Hill, 1975.

[72] Janet H. Murray. *Hamlet on the Holodeck.* Cambridge: MIT Press, 1998.

[73] Lance Newman. *3by3by3.* `http://3by3by3.blogspot.com/`, 2010.

[74] Katri Oinonen, Mariët Theune, Anton Nijholt, and Jasper Uijlings. Designing a Story Database for Use in Automatic Story Generation. In *Entertainment Computing – ICEC*, pages 298–301. Berlin: Springer, 2006.

[75] OED Online. *Glocalization, n.* `http://www.oed.com/view/Entry/248938`, 2009.

[76] OED Online. *Diegesis, n.* `http://www.oed.com/view/Entry/52402`, 2012.

[77] OED Online. *Event, n.* `http://www.oed.com/view/Entry/65287`, 2012.

[78] Andrew Ortony, Gerald L. Clore, and Allan Collins. *The Cognitive Structure of Emotions.* Cambridge [a.o.]: Cambridge Univ. Press, (1988), 1990.

[79] Alan Palmer. Fictional Minds. Lincoln [a.o.]: Univ. of Nebraska Press, 2004.

[80] Thomas G. Pavel. *Fictional Worlds.* Cambridge [a.o]: Harvard Univ. Press, 1986.

[81] Federico Peinado and Pablo Gervás. Transferring Game Mastering Laws to Interactive Digital Storytelling. In *Technologies for Interactive Digital Storytelling and Entertainment*, pages 1–12. TIDSE, Darmstadt, 2004.

[82] Federico Peinado and Pablo Gervás. Evaluation of automatic generation of basic stories. *New Generation Computing*, 24(3):289–302, 2006.

[83] Federico Peinado, Pablo Gervás, Belén Diaz-Agudo, and Raquel Hervás. *ProtoPropp. The Fairy-Tale Generator.* `http://www.fdi.ucm.es/profesor/pgervas/projects.html`.

[84] James Phelan. Character, Progression, and the Mimetic-Didactic Distinction. *Modern Philology*, 84(3):282–99, 1987.

[85] Barbara Piatti. *Die Geographie der Literatur.* Göttingen: Wallstein Verlag, 2008.

[86] David Pizzi. *Emotional Planning for Character-Based Interactive Storytelling.* Teesside University: PhD thesis, 2011.

[87] Julie Porteous, M. Cavazza, and F. Charles. Applying Planning to Interactive Storytelling: Narrative Control Using State Constraints. *ACM Transaction on Intelligent Systems and Technology*, 1(2), 2010.

[88] Julie Porteous, M. Cavazza, and Fred Charles. Narrative Generation Through Characters' Point Of View. In *Proceedings of the 9th International Conference on Autonomous Agents and Multiagent Systems*, 2010.

[89] Gerald J. Prince. *Grammar of Stories.* The Hague [a.o.]: Mouton, 1973.

[90] Gerald J. Prince. *A Dictionary of Narratology.* Lincoln: Nebraska Univ. Press, 2003.

[91] Vladimir Yakovlevich Propp. *Morphologie des Märchens (Morfologija skazki).* Frankfurt: Suhrkamp, (1929), 1975.

[92] Raymond Queneau. *Cent mille milliards de poèmes.* Paris: Gallimard, 1961.

[93] Racter. *The Policeman's Beard is Half Constructed.* New York: Warner Books, 1984.

[94] Shlomith Rimmon-Kenan. *Narrative Fiction: Contemporary Poetics.* New York: Routledge, (1983), 2. edition, 2002.

[95] Ruth Ronen. Space in Fiction. *Poetics Today*, 7(3):421–38, 1986.

[96] Ruth Ronen. *Possible Worlds in Literary Theory.* Cambridge [a.o.]: Cambridge Univ. Press, 1994.

[97] Scott W. Ruston. Storyworlds on the Move: Mobile Media and Their Implications for Narrative. *StoryWorlds: A Journal of Narrative Studies*, 2(1):101–20, 2010.

[98] Marie Laure Ryan. *Possible Worlds, Artificial Intelligence, and Narrative Theory.* Bloomington: Indiana Univ. Press, 1991.

[99] Marie-Laure Ryan. *Possible Worlds.* `hup.sub.uni-hamburg.de/lhn/index.php?title=PossibleWorlds&oldid=1744`, 2012.

[100] Marie-Laure Ryan. *Space.* `hup.sub.uni-hamburg.de/lhn/index.php?title=Space&oldid=1708`, 2012.

[101] Jean-Marie Schaeffer. *Fictional vs. Factual narration.* `http://hup.sub.uni-hamburg.de/lhn/index.php?title=Fictional_vs._Factual_Narration&oldid=759`, 2012.

[102] Roger C. Schank and Robert P. Abelson. Scripts, Plans, Goals and Understanding. Hillsdale: Erlbaum, 1977.

[103] Wolf Schmid. *Elemente der Narratologie.* Berlin: De Gruyter, (2005), 2. edition, 2008.

[104] Erhard Schütz and Thomas Wegmann. Fiktionalität und Poetizität. In Heinz Ludwig Arnold and Heinrich Detering, editors, *Grundzüge der Literaturwissenschaft*, pages 25–52. München: dtv, (1973), 7. edition, 2005.

[105] Linda Seger. *Creating Unforgettable Characters.* New York: Holt, 1990.

[106] Linda Seger. *Making a Good Script Great.* Hollywood [a.o.]: French, 1994.

[107] Roberto Simanowski. *Digital Art and Meaning: Reading Kinetic Poetry, Text Machines, Mapping Art, and Interactive Installations.* Minneapolis: Minnesota Univ. Press, 2011.

[108] James Surowiecki. *The Wisdom of Crowds: Why the Many Are Smarter Than the Few and How Collective Wisdom Shapes Business, Economics, Societies and Nations.* New York: Doubleday, 2004.

[109] Ivo Swartjes and Mariët Theune. A Fabula Model for Emergent Narrative. In Stefan Göbel, Rainer Malkewitz, and Ido Iurgel, editors, *Technologies for Interactive Digital Storytelling and Entertainment*, pages 49–60. Third International Conference, TIDSE, Darmstadt, 2006.

[110] Mariët Theune, S. Rensen, R. op den Akker, D. Heylen, and A. Nijholt. Emotional Characters for Automatic Plot Creation. In Stefan Göbel, Ulrike Spierling, Anja Hoffmann, Ido Iurgel, Oliver Schneider, J. Dechau, and Axel Feix, editors, *Technologies for Interactive Digital Storytelling and Entertainment*, pages 95–100. Berlin a.o.: Springer, 2004.

[111] Mariët Theune, Nanda Slabbers, and Feikje Hielkema. The Automatic Generation of Narratives. *Fabula*, pages 1–15, 2007.

[112] Michael J. Toolan. *Narrative: A Critical Linguistic Introduction.* London [a.o.]: Routledge, (1988), 2. edition, 2001.

[113] Scott R. Turner. *The Creative Process: A Computer Model of Storytelling and Creativity.* Hillsdale a.o.: Lawrence Erlbaum Associates, 1994.

[114] Huaxin Wei, Jim Bizzocchi, and Tom Calvert. Time and Space in Digital Game Storytelling. *International Journal of Computer Games Technology*, 2010.

[115] Sigrid Weigel. Zum <topographical turn>. *KulturPoetik*, 2:151–165, 2002.

[116] Nanette Wylde. *Preneo. (Storyland).* `http://preneo.org/nwylde/`, 2004.

[117] G. N. Yannakakis. Experience-Driven Procedural Content Generation. *IEEE Transactions on Affective Computing*, 2(3):147–61, 2011.

[118] Gabriel Zoran. Towards a Theory of Space in Narrative. *Poetics Today*, 5(2):309–35, 1984.

Zusammenfassung

Ausgehend vom Wunsch als Leser und Leserin Geschichten mit zu gestalten, präsentiert diese Diplomarbeit das theoretische Konzept IndieBook für ein System zur Generierung fiktiver Welten für individualisierte Bücher. Die ideelle Basis von IndieBook bildet das kollaborative Einwirken von Autor, Leser und Computer in den Generationsprozess: Der einzigartige Stil des Autors bestimmt die statischen Voreinstellungen. Über interaktive Wahlmöglichkeiten und personalisierte Informationsquellen bringt sich der Leser ein. Das System fügt dies zusammen und generiert daraus Narrationen.
Voraussetzung dafür ist eine grundlegende Formalisierung fiktiver Welten. Dafür wurden Modelle aus der Narratologie, Kognitionswissenschaft und Soziologie herangezogen und mit Techniken der Informatik formalisiert.
Nach allgemeinen Voreinstellungen werden die Weltmodelle über die Realitätsrelationen und den daraus resultierenden Fiktivitätsgrad generiert. Die eigentlichen Bestandteile der Welt sind das Setting, die Charaktere und die Ereignisse. Das sozial-historisch-räumliche Setting konkretisiert die Relationen zu einem Rahmen für die Charaktere und Ereignisse. Die Charaktergeneration erfolgt in einem 6-stufigen Modell, das in einer detailierten, strukturierten Datenbank für jede einzelne Figur resultiert. Nach der Formalisierung der verschiedenen Formen von Ereignissen, wurde deren Narrativität und Struktur diskutiert.

Abstract

Based on the wish of many readers to co-create a story, this diploma thesis presents a theoretical concept called IndieBook to generate fictive worlds for individualized books. The idea behind IndieBook is the collaboration of author, reader, and computer in the generation process: The unique style of the author provides the static defaults. Then, the reader interacts through a range of possibilities and personalized information is integrated. Finally, the system merges these inputs and defaults and generates narrations.
One major condition for this concept is a fundamental formalization of fictive worlds. Therefore, models were adopted from Narratology, Cognitive Science, and Sociology, modified to meet the requirement, and formalized with techniques of Computer Science. After the general presettings, the world models are generated through their relations to the reality and the resulting degree of fictivity. On this foundation, the components of the world are established: the setting, the characters, and the events. The socio-historico-spatial setting concretizes the relations and works as a referential frame for the characters and events. The generation of characters proceeds in a 6-layered model, that results in a detailed, structured data base for each protagonist. After formalizing the modes of events, the tellability and structure of events were discussed.

Curriculum Vitae

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