Seeking the Ideal Narrative Model for Computer-Generated Narratives

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Abstract

The aim of this paper is to discuss and sketch an ideal narrative model based on post-classical narratology approaches, namely Cognitive Narratology to help to improve the interestingness of the output in computer-generated narratives. This model will be further tested in a prototype of a generative system in the Portuguese language that will be based on Brazilian urban novels.

1 Introduction

Generative Literature is not novel in Literary nor Computer Science experiments, but there has been an increase of studies focused on this matter lately, both by artists and scientists. For the last few decades, Literary Studies and Computer Science have been crossing paths, which led to the development of the Digital Humanities.

Among other applications, Computational Creativity has been focusing on the issues of creativity and the possibility of programming a computer to produce art or learn how to produce it. In the scope of language, there are various works in collaboration with Linguistics, Stylistics and Literary Studies, especially when analyzing several textual aspects of large text corpora. More complex approaches are used in CC for the development of automatic text generation systems (Kybartas and Bidarra, 2017; Goncalo Oliveira, 2017)

This paper is part of a Ph.D. research that aims to foster the crossover between Literary Studies and Computer Science to contribute to the solution of linguistic, literary and aesthetic issues in computer-generated literary artifacts. To this end, it is necessary to find a more general narrative model to be applied in a prototype of a system that generates literary narratives in Portuguese.

Even though the research intends to use post-classical narratological theories[1], it is hard to work with narratives in Computational Creativity without using any formal model of literary narrative. Ergo this paper focuses on understanding how the systems develop and apply the narrative model, most commonly Propp's Morphology of the Folktale (or any other Formalist or Structuralist approach) and propose a new model that will be further tested on the prototype.

At the current stage of the research, most of the work is still theoretical and must be tested. Nevertheless, the aim of this paper is to present a few systems and show how their narrative is developed, dividing them into systems that use Propp's Morphology as a narrative model and systems that present their own narrative models. The following part of the paper intends to present the proposition of a new narrative model based on Brazilian Urban Novel with the background of the Cognitive Narratology (Herman, 2000).

2 Propp's Morphology of the Russian Folktale

In the introduction of the second edition of the Morphology of the Folktales, Alan Dundes shows the reader the importance of Propp's work and presents several different usages of this theory in multiple study fields. He first states that Propp inspired many formalists and structuralists into de-

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[1]Built upon the French Structuralism, Semiotics and Russian Formalism, classical narratology is composed by theories developed by renowned theorists such as Tzvetan Todorov, Gérard Genette, Roland Barthes, Vladimir Propp, Seymour Chatman, Gerald Prince, A.J. Greimas, among others, who tried to find the characteristics of the narrative text to generate a logical structural model of narratives. Post-classical narratology does not criticize the formal models directly, but they suggest the expansion of these models, mainly through the merge of narratology with different study fields to understand narrative beyond its own form. Among the post-classical theorists David Herman (cognitive science), Manfred Jan, Monika Fludernik (conversational narrative), Marie-Laure Ryan (digital), Susan Lanser (genre), among others stand out.

veloping their own theories (Propp, 1968).

Because Propp's morphology was the only work in literature to dissect a literary genre into its smallest parts, a great number of projects on narrative generation – especially the ones that use story grammars (Lakoff, 1972) as its basis – use Propp's model in some way. In fact, his work has always been very useful for the development of several systems that generate narratives automatically. However, its main criticism is in the fact that Propp has never related his model to the Russian social and cultural context[2]. Even though many literary texts and genres seem to be timeless their peculiarities in form and content come mainly from their social and cultural contexts.

Thus, one of the hypotheses this paper takes into consideration is the need to focus on the context of the narrative for the improvement of the narrative model. It does not mean to discard the formalist and structuralist models, but to approach them with the help of post-classical narratological approaches. In this paper, we try to observe the narrative model through the lens of the Cognitive Narratology (Herman, 2013).

3 Narrative Generators

This part of the papers is dedicated to the presentation of different linear narrative generators and their features in terms of literary inspiration. The systems were studied through the written materials found (Ph.D. thesis, papers, reports) once most of the systems are not available to the public.

It is interesting to notice that a considerable number of systems even when they do not present a direct link to Propp's morphology they are somehow related to the fantastic (Todorov, 1975) or in the realm of the folktales. This is an interesting fact that raises some questions about the choice of literary genre to be emulated.

The first obvious reason for the fantastic to be an option for the narrative generation is the fact that there are formal models of these narratives. Another possible reason might be that the fantastic does not need verisimilitude and strange, curious and atypical things are able to occur in the story. And finally, maybe because the creators of the systems simply liked this literary genre.

Regardless of the reason why the fantastic was

chosen, it is the most common choice among the most well-known narrative generators as it will be discussed next.

3.1 Systems based on Propp's Morphology

As its name suggests, ProtoPropp uses the Morphology of Folktales as its narratological background as "it provides a simple (and well-known in the field) formal system, something which is unusual to find in other post-structuralist or semiotic narrative theories" (Peinado and Gervás, 2005).

Imababuchi and Ogata (2014) developed a Propp-based story generator that can work independently, generating stories with the structure of Russian folktales, or work as part of an Integrated Narrative System. They pointed out that most Propp-based systems focus on the function while they intend to include "many productive and theoretical ideas to contribute to story generation in various sides" (Imabuchi and Ogata, 2014).

In the introduction of his Ph.D., Turner (1993) tells the reader that he stumbled upon Propp's morphology and thought it was fascinating that he could reduce the folktale into grammar. Although it was his first inspiration, his final computer program barely resembled Propp's grammar. Minstrel (Turner, 1993) is a case-based problem solver system that generates short stories about King Arthur and the Knights of the Round Table, also in the realm of the fantastic and fairy tales.

Brandon Tearse, Noah Wardrip-Fruin and Michael Mateas (2010) studied Turner's Minstrel in order to identify the crucial elements of the system (once it is not available in any format), explore possible new usages of the system, and develop and make available a new version of the system. As there are few theoretical materials about the classical systems as well as few or no access to the systems (or their code) for a deeper analysis, Minstrel Remixed is an important tool for practical analysis of story generation even though it presents a few challenges in terms of usage, especially for those not familiarized with programming. As a development of Minstrel, Minstrel Remixed (renamed Skald) (Tearse et al., 2010) has the same theoretical background.

Even though BRUTUS (Bringsjord and Ferrucci, 1999) generates short narratives with the theme of betrayal, Propp's grammar has some influence in its development once this system produces its stories using story grammars "moving

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[2]Different from Propp, Lèvi-Strauss (1955) developed a study on the structure of the myth where he took into consideration their social and cultural context. (Propp, 1968).

from general descriptions of narrative and simple folktales to generating fully realized narratives" (Kybartas and Bidarra, 2017).

3.2 Other narrative models

There are however systems that developed their own narrative model based on different types of literary texts as it follows.

GESTER (Pemberton, 1984) is a plot generator whose grammar is based on Old French epic narratives. Even though it is not based on Propp, epic narratives also present fantastic events and might be somehow similar to folktales (once their origin is from oral tradition). Her work is interesting because she states that "[a] full story generating system would need access to many different kinds of separate but interacting knowledge" (Pemberton, 1989), such as the story structure, the audience, the author, the cultural context and the rules of the sub-genre.

Although MEXICA (Pérez y Pérez, 1999) does not use Propp's morphology or any kind of story grammars, and it tells the story of the Mexicas — old inhabitants of Mexico City. Its output may be classified as fantasy once it presents the love of the princess and the knight, kings and queens, gods and magical ceremonies. Different from other systems, MEXICA worries about characteristics outside the textual form. Among the postconditions (the effects of the primitive actions) there are the emotional links between characters, their tensions and their positions.

Mark Owen Riedl (2004) developed an architecture for the creation of automatic stories that divides the generation process of a narrative into three layers: (1) fabula generation, (2) discourse generation and (3) media representation. The stories are based in fables and fairy tales, as its name suggests and it is indirectly inspired by Propp's morphology and directly by Genette's narrative discourse and Gerald Prince's (1987) dictionary of narrative. It is interesting to notice that his work starts to merge a more contemporary narratological approach by the use of David Herman's and Marie-Laure Ryan's works (both postclassical theorists) with classical narratology.

These are just a few examples out a vast field where it is possible to find many different systems that generate linear or interactive narratives that might use Propp's morphology or not. The systems presented previously meet the purpose of illustrating that there is the predominance use of the proppian model both in story grammars or literary genre (even though there are other systems that do not use folktales as their main literary genre, such as Brutus, Author, Universe, nn, among others).

4 Ideal Narratological Approach

The presentation of the systems shows us that the formalization of the folktales seems to be the first step in the development of new narrative models to be applied in computer-generated narrative systems. From the literary point of view, there seems not to be any other way for us to analyze a literary text of any kind this thoroughly. But it is known, both in computer science and in literature, that the formalist approach has its weaknesses and the main criticism is the reduction of the importance of the historical, biographical, social and cultural context of the text.

In fact, at first, any kind of pure formalization sounds like the best option in terms of developing narratives using a computer. But the need for more humanistic approaches in order to improve the creativity in artistic artifacts automatically generated is also noticed in the field of Computational Creativity (Pérez y Pérez, 2018).

So, this section of the paper intends to present an alternative to the approaches available.

5 Cognitive Narratology

To some degree, formalist and structuralist models were very useful tools in the early stages of Artificial Intelligence and Computational Creativity. As suggested by Pérez y Pérez (2018), the field of Computational Creativity presents a continuum (CC-Continuum) that has two opposite sides: on one side there is the Engineering-Mathematical Approach were scientists work on technical tasks of optimization while on the other side there is the Cognitive-Social Approach where scientist study the human behavior as basis for the development of creative computer artifacts. Their major work is "to find ways of representing in computer terms relevant cognitive, cultural and social behaviours" (Pérez y Pérez, 2018).

As Literary Theories are too subjective to be implemented in a computer system, it is important to maintain a certain level of formality learnt from Propp's morphology. So, we propose to merge the propian approach to the Cognitive Narratology, once it supports the structure of a story world and

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the characteristics of a text for it to be considered a narrative. It also helps the study of specific story-telling strategies to foster emotional responses of the reader which helps to measure the degree of interestingness of the text.

Herman's work on the basic elements of narrative presents us four main elements divided into: (1) situatednes, (2) event sequencing, (3) world making/ world disruption and (4) what it's like. What makes his approach to stand out is the focus given on the fourth element: for him, narratives are stories about things that happened to particular people and what it was like for the to experience that. Thus, he uses Monika Fludernik's concept of experientiality in which narrativity is based on the evocation of a human-like consciousness (Herman, 2013).

So, the main focus of this approach is to perceive the strategies used in narratives to affect the reader somehow, through triggering unconscious feelings. Another aspect of this approach is the exploration of characters and characterization techniques, especially the ones that deal with the relationships among the characters.

As the approach does not discard formalization, it helps to understand or even develop a model of narrative worldmaking using: who, what, when, where, how, why (Herman, 2013). It is worth highlighting that all these analyses take into consideration all the social and cultural aspects of the texts.

The search for a new approach in Narratology is to propose the experimentation of the language using a more contemporary and natural model of narrative (Fludernik, 1996).

6 Literary Corpora

Because most narrative generation systems are in the realm of the fantastic or fairy tales, this work proposes the experimentation with a different kind of narrative text. To try a more natural approach with a more social appeal, the urban novel was the choice for an ontology because they tend to observe people and understand/ describe social relations in the urban environment. This kind of novel has a direct correspondence between text and reality. It is realist not because it represents real life, but because of the way reality is represented through a great variety of human experiences.

Although Brazilian Romantic Urban Novel is not such a breakthrough in terms of literary genre,

WHO	WHAT
The mistress	Stays with married man
The single strong woman	Reads, discusses politics, empowers other women
The wife	Stays home, suffers, conspires against mistress
The rich single man	Tries to get strong woman
The romantic single man	Tries to get strong woman
The husband	Works, goes to bar, goes to brothel
The priest/ Family members	Interfere in the other characters choices

Table 1: Characters (Who) & Action (What)

WHERE	WHEN
Street/Bar/Brothel	The married man is at the brothel/ street
Street/Café/Home	Whenever she is provoked
Home/Church	Most of the time
Street/ Work/ Bar/ Brothel	Whenever he feels like
Street/ Home/ Bar/ Café	Whenever he meets woman
Street/ Home/ work	When he needs to feel powerful
Church/ Home	Most of the time

Table 2: Place (Where) & Time (When)

it serves our purposes to try to develop a different narrative model for a prototype of a narrative generator once it presents a fixed structure and a certain number of characters. The plot is also well organized in terms of time and space. There is a large number of texts available in public domain.

Mainly focused on the female audience from the beginning of Brazilian modernization, by the end of the 19th century, these novels presented fixed structures and simple language. Most of the plots were steady – even when they presented different sub-plots that merged. The characters used to depict social groups and could be less complex than the characters of the following literary schools. Love is the main motif and it is always related to the social values of the time. They are usually (impossible) love stories told with some humor in a linear time and space.

The following tables show a first attempt to obtain a general model of the Brazilian Urban Novel through the personal analysis of the following books: A Moreninha (Macedo, 1844), Senhora (Alencar, 1875), Diva (Alencar, 1864), Lucíola (Alencar, 1862). The model was based on Herman's Basic Elements of Narative (2009).

7 Final Remarks

The main objective of this paper was not to find answers but mainly raise questions to be further

HOW	WHY
Destroying the man's marriage	Wants money/ wants better life
Arguing with men/ helping other women	Wants to be free from society
With the help of strong woman or rich man	Wants revenge
Flirting with strong woman	Wants to get strong woman
Flirting with strong woman	Wants to marry strong woman
Staying with mistress/ fighting rich man	Wants revenge from rich man
Giving their opinion/ confounding the characters	No main objective

Table 3: Plot (How) & Objective (Why)

answered throughout the development of the research.

At this point, the study of Cognitive Narratology applied to the generation of narrative seems to be a good path for the development of systems more cognitive-social oriented. Compared to the previous approaches, it helps us to understand narratives as human experiences and try to replicate it in order to improve the interestingness of the output focusing on affecting the reader.

Even if this approach cannot be used to develop a system from scratch, it would be helpful to be applied in existing systems to test its applicability, even though it is still a first draft of the model.

Since urban novels are very distinct from folktales it is necessary to observe its own characteristics and find the paradigms to formalize this kind of text. At this point, some particularities were already found as showed in the tables.The next step would be the formalization of the narrative genre – work in progress – to be further tested in the prototype.

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