

Chapter 6

Literary Psychology–Modeling Figure–Ground Structures in Narrative Stories: Towards a Narrative Content Generation

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ABSTRACT

Today more than ever, narrative content generation has become important. This is due to the advances and accessibility of computational devices. As these devices become more familiar to people and easier to handle, there will be greater expectations for autonomous functioning and desires for a natural communication with the users. To achieve such demands, computational devices need to process and generate higher levels of meanings such as context and abstraction of topics. This chapter gives a background on topics that have been developed so far in content analysis and content generation, but focuses mainly on the figure-ground impression model, for both analysis and generating narrative context. By focusing on the characters and their attributes in the text, not only is this model able to represent the figure-ground impressions qualitatively, but also quantitatively. Such a feature may be useful to execute in computational devices such as artificial intelligence.

INTRODUCTION

This chapter focuses on the method to model figure-ground impressions of characters on the readers based on the information provided in the text. Over the years, various methodologies for abstracting narrative text have been introduced. Today, such models and research are relevant more than ever due to the accelerating research, development, and industrial applications of artificial intelligence. For such applications to assimilate into society and into the lives of individuals smoothly, it is critical that they have capabilities for narrative communication that feel natural, ideally to the extent of autonomously generating meaningful contents. So far in academic research, there have been efforts made for creating

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systems for content generation, and text analysis techniques go further back. Yet their results rarely reach the levels of industrial applications. Various difficulties may be blocking the way, such as required computational power, the complexity of processing and generating natural languages, and the difficulty of computationally executing cognitive models. The objective of this chapter is to demonstrate the analysis of narrative story by using a figure-ground impression model, a mathematically developed model based on algebra and logic, then in turn, apply this in reverse for content generation.

BACKGROUND

Some of the early formal efforts of creating stories with computers are TALE-SPIN by Meehan (1976), MINSTREL by Turner (1993), and BRUTUS by Bringsjord and Ferrucci (2000). They were developed with different focus and approaches. TALE-SPIN generates its stories based on a character's goals and properties. A story unfolds as believable characters with unique traits interact with each other. Since the driving force of the story was the individual characters' traits and motives, it may realize short term events, but the overall story may not be coherent or dramatic. MINSTREL was designed based on the idea that story generation is a series of incidental problem solving. Solutions are created by combining already existing solutions that are stored in an already existing set or gained from past experiences. This program allows authors to include their intent, giving an overall theme or a moral message to the plot (Swartjes, Vromen, & Bloom, 2007; Kybartas & Bidarra, 2017). BRUTUS is a system that generates complex stories, but limited to plots based on a betrayal situation. The program is designed to follow the logic of betrayal events as it generates stories. Although the stories include figurative language and dialogues, this program is basically reverse-engineered from an already existing story. The creator's objective was to see how closely the original story can be regenerated (Gervás, 2012; Kybartas & Bidarra, 2017). Although the use of computer programs to generate stories has been around for a while, scholarly efforts of abstracting stories or the use of mathematical methods to model plots go back further. Propp published a book titled *Morphology of the Folktale* in 1928 (Propp, 1928). He analyzed a large number of Russian folktales and broke them down into smaller story units and organized these subunits according to two categories: *functions* and *characters*. There are 31 functions which are story patterns such as "absentation," "interdiction," etc. and 8 character types such as "villain," "hero," etc. This work is significant in that it abstracted stories into universal patterns that can be applied to construct other stories.

In the 1960's and 70's, the Romanian school produced logical-mathematical models to describe literary texts or theatrical works. Marcus (1970) and Dinu (1968, 1970, 1977) attempt to quantify characters' behaviors and relationships mainly, by using statistical methods, graph theory and game theory. Their methods were studied further by Brainerd and Neufeldt (1974) and Mihnea (1977). Marcus' models, initially applied to Romanian plays, have been applied to Shakespearian plays by Brainerd, to ancient Greek drama by Mihnea and to comparisons of Greek and Roman ancient comedies by Hubka (1984). To describe the presence of characters on stage, they use a matrix with the correspondence of characters and scenes in which they appear as seen in Figure 1 and Figure 2.

Based on this information of characters and scenes, they calculated the character density of the scenes, the scenic distance between two characters (the number of scenes between the scenes of encounter of the same two characters), the scenic diameter (the maximum scenic distance between the two characters), the encounter number (the number of scenes in which two characters appear together), character-scene frequency (the fraction of the number of scenes in which a character appears and the entire number of

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