

## Chapter 4

# Consideration of Fundamental Methods and Principles for Human–Computer Co–Creation of Narratives

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### ABSTRACT

*The authors propose the conceptual design of a co-creative narrative generation system that co-creates a collection of diverse narratives from a narrative generation program and people. The long-term goal of this study is to vitalize humans' narrative creation by developing generative narrative technology. The key idea is to connect and unify individual narrative productions by many agents, including one or more computer programs and humans, via a collection of narratives produced and accumulated by these agents. Simultaneously, a co-creative narrative generation system is the practice of a computational approach to narratology as a model for the social system of narrative production. This chapter describes the basic concepts of the co-creative narrative generation system.*

### INTRODUCTION

Narrative is a universal form of human knowledge and memory and a strong way for people to communicate knowledge and information in their society. The computational modeling of narrative generation and understanding is a key topic for the next information society. Such modeling will contribute to the creation of human-friendly information technology and culture development.

The long-term goal of this study is to vitalize humans' narrative creation by developing generative narrative technology. In the previous version of this chapter (Akimoto & Ogata, 2016), the authors proposed an initial concept of a computer-driven system for human–computer co-creation of narratives.

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Subsequently, the authors explored computational principles for narrative co-creation, i.e., the central issue of the proposed concept. This enhanced chapter primarily updates that point. In particular, the section entitled “Principles of Narrative-based Narrative Generation” is entirely updated from the 2016 version. In addition, revisions and improvements have been incorporated throughout the chapter, including changes in terminologies and thoughts. The proposed system was referred to as a socially open narrative generation system (SONGS) in the 2016 version. In this enhanced chapter, the system is referred to as a co-creative narrative generation system. This is because the key point of the proposed concept is to model the generation of narratives as a co-creative system.

The remainder of the chapter is organized as follows. First, the authors provide background information of this study. Second, the authors propose the basic design of the co-creative narrative generation system. Third, in the subsequent two sections, the authors describe the conceptual frameworks for the two main components, i.e., the narrative generation and interface parts. Finally, the authors discuss future works and conclude the chapter.

## **BACKGROUND**

This section considers two perspectives for providing background information. The first subsection reviews the history of studies on narrative generation systems. The second subsection discusses the significance of narrative and narrativity for artificial intelligence (AI) and informatics.

### **Narrative Generation System**

Narrative generation systems, or the computational modeling of narrative creativity, are challenging AI topics. The fundamental objectives include the computer implementation of narrative creativity and elucidation of the human narrative ability or narrative nature. In the early stage, approximately between the 1970s and the 1990s, researchers attempted to develop narrative generation models based on AI methods. These studies were broadly divided into three approaches. First, several researchers attempted to model the story generation process as the planning of character actions directed by goals, desires, or other bases (Meehan, 1980; Okada & Endo, 1992; Riedl & Young, 2010). Second, the formulation of generative rules or schematic knowledge for narrative structures was addressed (Pemberton, 1989; Lang, 1999; Bringsjord & Ferrucci, 1999). These were mainly rooted in a cognitive model of the story schema (Rumelhart, 1975). The third approach was derived from the framework of case-based reasoning (Riesbeck & Schank, 1989). In this approach, narrative generation was formalized as the transformation or adaptation of a previous narrative to fit the current problem (Turner, 1994; Peinado & Gervás, 2005; Swanson & Gordon, 2012).

Since approximately the 2000s, several researchers have introduced narratology—the theory of narrative mainly inspired by structuralism and semiology—to narrative generation studies. Ogata (2002, 2004a) proposed a research methodology called “expanded literary theory” that aims to create synergy between narrative generation technologies and narratology. Gervás, Lönneker-Rodman, Meister, and Peinado (2006) also discussed the importance of interdisciplinary approaches for the disciplines of both AI and narratology. In this movement, the morphology of the folktale by Propp (1968) was applied to several studies as a model or schematic knowledge of story composition (Ogata & Terano, 1991; Peinado & Gervás, 2005; Imabuchi & Ogata, 2012; Gervás, 2015). In addition, narratology provided a distinc-

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