

# Chapter 1

## A Computational, Cognitive, and Narratological Approach to Narrative Generation

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### ABSTRACT

*This chapter surveys and discusses interdisciplinary approaches to primarily artificial intelligence (AI)-based computational narrative or story generation systems by way of introducing cognitive science, and narratology and related literary theories. The first part of this chapter provides a general description (from the perspective of the research framework of the author) and the second part presents processes, theories, designs, and implementations of narrative generation by the author. In particular, the first part includes an overview of narratology and the relevant literary theories, computational and cognitive theories and techniques related to narratology and narrative generation, and narrative generation systems. The second part presents, in relative detail, components that constitute a systematic study for narrative generation by the author and an integrated narrative generation system of all of the previous attempts.*

### INTRODUCTION

This first chapter surveys and discusses interdisciplinary approaches primarily to artificial intelligence (AI)-based computational and cognitive narrative generation systems, including cognitive science as the scientific background, by way of introducing narratology and related literary theories. Narrative or story generation is a basic software technology for human-like communication or interaction using language or other media, including images and music. It is a challenging issue in AI and cognitive science. Research in narrative generation has great academic value in blending different genres, i.e., narratology as an area of the humanities, and information theories and techniques, such as AI and cognitive science, as parts of science proper. At the same time, it contributes content to the industry at the intersection of information technology and a variety of actual narratives, such as those in entertainment, art, and literature.

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Although they are not explicitly titled, this chapter is divided into PART I, which comprises the next section, and PART II, which includes the following two sections.

PART I surveys aspects of computational and cognitive approaches to narratology from the author's perspective of narrative generation, but with a general viewpoint. The content is structured as follows. The author devotes the first portion of PART I to a presentation of the fundamental framework of narrative generation research that the interdisciplinary computational narrative generation researchers should survey from the macroscopic perspective. The core of PART I is formed from Narratology and Literary Theories and Computational Theories and Techniques Related to Narratological Knowledge. The next section, Narratology and Literary Theories, explains computational theories and techniques related to narrative generation that are employed in AI and cognitive science studies. The following section, Computational Theories and Techniques Related to Narratological Knowledge, is dedicated to an overview of several important narratological and literary theories, and their relationships to AI and cognitive science. Then, Narrative Generation Systems introduces a few narrative generation systems that borrow techniques and methods from AI and cognitive science. Finally, Future Research Directions in this section suggests future research issues related to the topics in PART I.

PART II subsequently presents a history, concepts, and implementations of the author's narrative generation research. It consists of two large sections, A synthetic approach to narrative generation and AN INTEGRATED NARRATIVE GENERATION SYSTEM: INGS. In the former, some topics from the narrative generation research by the author are described in Two Basic Narrative Generation Architectures, Development of Each Mechanism of Narrative Generation and the Integration, and other subsections, while Theoretical Concepts details the design and development of the author's narrative generation systems. The latter section introduces an attempt at a synthesized narrative generation system called the "Integrated Narrative Generation System: INGS" through the subsections: An Overview of INGS, INGS as ELT: Narrative Generation Mechanisms Using Three Literary Theories, Theoretical Concepts in the Expanded ELT and INGS, and Future Plans for INGS. The descriptions of the previous subsections result in the presentation of INGS. The final section of this chapter offers the CONCLUSION.

PART I of this chapter is an extended version of (Ogata, 2011) and the survey portion of (Akimoto & Ogata, 2014a). PART II of this chapter partially utilizes the description of the INGS system implementation in (Akimoto & Ogata, 2014a), as well as the theoretical concepts of narrative generation in (Ogata, 2014). Furthermore, a systematic and comprehensive description of the author's conceptions and plans concerning narrative generation is provided in (Ogata & Kanai, 2010).

Additionally, this chapter is an enhanced version of Chapter 1 (Ogata, 2016a) in Ogata and Akimoto (2016) and the following parts are mainly revised and extended: first, the author inserted two sub-sections, *Motifs in Folktales* and *Cultural Approaches*, in TOWARD A NARRATOLOGY FOR/FROM NARRATIVE GENERATION. Similarly, Recent Narrative Generation Systems was also added to TOWARD A NARRATOLOGY FOR/FROM NARRATIVE GENERATION. Next, the content of Part II, AN INTEGRATED NARRATIVE GENERATION SYSTEM: INGS, was partially expanded reflecting the situation of the current system implementation including module extension, a new figure, and adding several generation examples. Furthermore, partial change and expansion were also executed according to the above revisions.

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