Preface

Studying narratives is often the best way to gain a good understanding of how various aspects of human information are organized and integrated—the narrator employs specific informational methods to build the whole structure of a narrative through combining temporally constructed events in light of an array of relationships to the narratee and these methods reveal the interaction of the rational and the sensitive aspects of human information. Therefore, a wide variety of narrative contents has been created so far, along with many types of media. We are now in a position to expect that the concept and methods of narrative, which have been explored by narratology and literary theories, are to be connected in the future with contemporary information studies—including those in computational fields, such as artificial intelligence (AI), and in cognitive fields, such as cognitive science—which will then bring about the emergence of a significant conceptual and methodological foundation for various technologies of novel contents, media, human interface, and so on. This book explores new possibilities and directions of narrative-related technologies and theories and their implications for the innovative design, development, and creation of future media and contents, such as automatic narrative or story generation systems, through interdisciplinary approaches to narratology that are dependent on computational and cognitive studies, i.e., “computational and cognitive approaches to narratology.”

OBJECTIVE

Based on the abovementioned idea, this book simultaneously discusses issues of narrative-related information and computational technologies, cognitive mechanisms and analyses, and theories as the context of technology, particularly those from humanities and social sciences. This book especially focuses on the systems or analysis of narrative or story generation process and its applications to advertisement, management, welfare, literature, and art (movie, rakugo [a form of Japanese verbal entertainment], and kabuki [a form of traditional Japanese dance-drama]), which has within its scope narratology, literary theories, poetics, semiotics, rhetoric, philosophy, linguistics, psychology, marketing and advertisement, etc. Media and genres to be examined in the narrative analysis and the applications cover a very broad range. A significant characteristic of this book that distinguishes it from other books in similar fields is the introduction of narratological knowledge or theories into actual system design and development and actual text analysis through computational and cognitive methods.

The following groups will find this text useful in furthering their research exposure to pertinent and interdisciplinary topics in “computational and cognitive approaches to narratology” and also in furthering their own research efforts in this field.
1. Researchers and advanced-level students of information technologies and cognitive studies (including AI, cognitive science, narrative or story generation, natural language comprehension and generation, computational creativity, communication study, media study, neuroscience, etc.)

2. Researchers and advanced-level students of literary studies (including narratology, discourse theory, rhetoric, poetics, semiotics, linguistics, film theory, etc.)

3. Designers, creators, developers, researchers, and advanced-level students of advanced digital content design and development (including computer game, interactive storytelling, automated content generation, human interface, the Web design, etc.)

**BOOK ORGANIZATION**

The chapters compiled in this book involve a variety of studies based on diverse backgrounds, objectives, and methodologies and across the three phases of narrative phenomenon, i.e., generation, text, and reception. In the organizational level, they correspond to production, content, and consumption. They also examine various narrative genres including novel (classical and contemporary), poem, film, comic, advertising film, business communication, diary or personal narrative, rakugo, kabuki, emoji, etc. Moreover, they include various objectives and research approaches: technological studies including computational modeling and implementation of narrative processing, empirical studies on human narrative reception based on techniques of cognitive or psychological studies, conceptual thought, design, and criticism on narrative phenomenon, qualitative or quantitative analysis of narrative text, etc.

Although it is difficult to clearly categorize these studies, the editors organized them into the following four sections: (1) “Introduction”; (2) “Generation and Creation of Narratives”: Five chapters contain discussions centered on generative, creative, or productive aspects of narrative; (3) “Language and Narrative”: The book contains four papers primarily relevant to the fields of linguistics and natural language processing; (4) “Cognition, Culture, and Narrative”: This section explores topics about the aspects of reception and cultural nature of narrative (one of the characteristics in this book is that the sections occasionally also include Japanese cultural elements).

**Section 1: Introduction**

The first chapter by Takashi Ogata that comes before the start of the abovementioned sections serves as an introduction to the entire book. This chapter surveys and discusses interdisciplinary approaches to primarily AI-based computational narrative or story generation systems by way of introducing cognitive science and narratology and related literary theories. This is also an expansion of ideas, theories, and systems of the “Informatics of narratology” presented by Ogata and Kanai (2010). The first part of this chapter provides a general description of narrative or story generation from the perspective of the framework for narrative-related research and the second part presents the research process, theoretical concepts, designs, and implementations of narrative generation. The first part particularly seeks to provide a comprehensive overview of narratology and the relevant literary theories, computational and cognitive theories and techniques related to narratology and narrative generation, and narrative generation systems. Readers will be able to comprehensively understand the overview of computational and cognitive approaches to narratology and to aim at the extension of this novel research area in the
Preface

The second part presents an example of the practices of computational approach to narratology through narrative generation studies and also presents, in relative detail, the components that constitute a systematic study for narrative generation and an “Integrated Narrative Generation System: INGS” of all of the previous attempts by the author.

The remaining part overviews the background and the chapters contained in each section.

Section 2: Generation and Creation of Narratives

This section consists of studies centered on generative or creative aspects of narrative. The methodology and fundamental mechanism of narrative or narrative generation are major subjects in works from Aristotle’s (1895) “Poetics” to modern narratology or literary studies. The computational or cognitive modeling of narrative generation and narrative ability is also a major and crucial subject in the fields of AI and cognitive science, including the interdisciplinary studies with narratology and literary theories. For instance, Propp’s (1968) “Morphology of the fairytale” and Genette’s (1980) “Narrative discourse theory” have influenced the fields of AI and cognitive science. From the perspective of application, computational or formalized narrative generation technologies will enable the automation or support of human narrative creation processes or creative activities in the real world. The chapters contained in this section are outlined below.

Chapter 2 by Akinori Abe discusses the possibility of literary work generation by computer. The chapter introduces the literary concept of “intertextuality” proposed by Kristeva (1980) as a key idea for the computational modeling of literary work generation. After reviewing several related studies in the “language sense processing engineering,” which is an original idea of an AI-based research field by the author and the research group, and computational creativity of literature, the chapter discusses a new type of computational method for generating various literary works including waka and haiku [forms of Japanese traditional short poem], contemporary poem, and novel.

Chapter 3 by Taisuke Akimoto and Takashi Ogata proposes the design plan, partially and experimentally implemented as computer program, of a “Socially Open Narrative Generation System: SONGS” that co-creates a collection of diverse narratives from the interaction between a narrative generation program and people. This challenge aims at both a kind of social level application of narrative generation technology and a computational approach to narratology as a model for the social or collaborative process of narrative production.

Chapter 4 by Yoji Kawamura shows a generative technology of narrative for the field of advertising. In particular, the chapter presents the concepts and technologies behind a “Commercial Film Production Support System: CFPSS” in which image editing techniques and rhetorical knowledge based on structural analyses of TV commercial films are implemented. The chapter also presents the result of an experiment for investigating how an advertising story influences viewers, using commercial films generated by CFPSS.

Chapter 5 by Yoko Takeda provides an empirical discussion for exploring factors or methodologies of effective digital storytelling in the context of business planning. By using the data, including narrative or story texts, collected through a workshop on business planning using digital storytelling with six participants (creators) and thirty-five audience members (evaluators), the chapter analyzes the relationship between the structure and content of each work and the evaluation by the human audience.
Chapter 6 by Miki Ueno, Kiyohito Fukuda, and Naoki Mori presents three narrative-related studies on computational implementations of generation or analysis of story, comic, and animation storyboard. The first part presents a method of semi-automatic story generation based on agent-based simulation. The second part describes methods of generating and analyzing comics. The third part shows a method of estimating the difficulty of translating a storyboard into original pictures for supporting an animation creation process.

**Section 3: Language and Narrative**

Section 3 contains studies primarily relevant to the fields of linguistics and natural language processing. Language is one of the major media for narrative representation. In addition, both narrative and language are closely related as the fundamental natures that characterize human intelligence and cognition. From a broader perspective, the chapters contained in this section are divided into two categories. First, chapter 7 and chapter 8 approach narrative from the standpoints of linguistics and linguistics-based natural language processing. They deal with the relationship between narrative and language based on the formal and computational studies on semantics and syntax of language. These challenges will be connected to the technology of computational narrative processing—e.g., generation, analysis, understanding, interpretation, etc.—in the future. Second, Chapters 9 and chapter 10 analyze human created/told narratives for understanding the author/tellers, by using techniques of natural language processing. In particular, they apply natural language processing to the effective employment support for people with disabilities and the authorship identification problem of a classical literary work. The chapters contained in this section are outlined below.

Chapter 7 by Koichi Takeuchi discusses the possibility or availability of language resources, semantic dictionaries of language, mainly constructed in the field of natural language processing, on narrative comprehension and generation processing. In particular, the chapter considers availability of the “Predicate-argument structure Thesaurus: PT,” a Japanese language resource constructed by the author, for various narrative processing, including the determinations of states, actions, and change-of-states of characters in human- or computer-generated narrative texts.

Chapter 8 by Tohru Seraku and Akira Ohtani reveals several grammatical properties of “postposing” based on Japanese contemporary novels and presents an explicit account of an integrated theory of grammar. In Japanese, non-verbal elements may be permuted with the restriction that such elements cannot occur post-verbally. This restriction, however, does not apply to dialogues or conversations, especially in novels. The chapter addresses this syntactic flexibility within “Dynamic Syntax: DS”, a cognitively realistic grammar formalism that specifies a set of constraints on building up an online structure.

Chapter 9 by Kai Seino, Yuichiro Haruna, and Shun Ishizaki describes clinical knowledge for the effective employment support for people with disabilities through a computer-based analysis of the many narratives obtained from mail survey questionnaires from people with various disabilities who described their work and work life. The chapter presents the mixed analytical method of text mining as a topic in recent natural language processing field and narratological language analysis for examining effective employment support.

Chapter 10 by Gen Tsuchiyama involves stylometric research of “The Tale of Genji,” one of the greatest novels in the world penned by Murasaki Shikibu (1973) in the middle age of the Heian era (794-1185 or 1192), which consists of 54 volumes. “Stylometry” is the application of quantitative analysis to
Preface

identify variations in style and is applied to identify authorship, creation period, and creation order. The chapter especially addresses authorship identification—the theory that “The Tale of Genji” was written by different authors—by the stylometric method.

Section 4: Cognition, Culture, and Narrative

This last section mainly deals with the aspects of reception and cultural nature of narrative. In the literary field, the reception aspect of narrative is mainly discussed or thought in the reception theories or reader-centric criticisms of Iser (1978), Jauss (1982), and others. The studies in this section empirically address the issues of narrative reception based on the methodologies of cognitive science, neuroscience, information technology, etc. In addition, based on the obtained knowledge, several studies discuss rhetorical techniques for computational narrative generation. On the other hand, from the cultural perspective, the chapters particularly examine the genres or narrative systems rooted in the Japanese culture, including rakugo, kabuki, and emoji communication. The chapters contained in this section are outlined below.

Chapter 11 by Ryota Nomura and Takeshi Okada presents an empirical method for assessing the appeal power of narrative performance by using “eyeblink synchronization” as an objectively observable feature of the human audience. The chapter applies the method to empirical studies to assess the appeal power of performance in rakugo, a Japanese traditional narrative performance based on one sitting artist’s direct narration and body language on the stage. The chapter also discusses the applicable scope of the eyeblink relevant indices, upcoming research on eyeblink synchronization, and new research on human collective behaviors.

Chapter 12 by Sara Uboldi and Stefano Calabrese introduces “neuronarratology,” an emergent perspective that includes linguistic and cognitive contributions to the cognitive poetics and neurological studies of human mind’s structure and function. The chapter addresses the issue around suspense effect in a narrative reception process. After overviewing cross-disciplinary studies on suspense analysis, the chapter reports a case study on human cognitive responses using the result of a study on narrative generation system.

Chapter 13 by Yukiko Ogawa proposes a combined method for film analysis that connects structural analysis of the overall narrative and cognitive analysis of the narrative effect of the expression in a specific image of a characteristic part. The chapter applies the method to “The Land of Hope” (2012) by Shion Sono, a fictional film that is based on an actual event, the 2011 Great East Japan Earthquake. The chapter mainly takes the following two perspectives in the film analysis: how the facts are dramatized in the fictional narrative film and how enjoyment is obtained from the themes of love and death.

Chapter 14 by Tüge T. Gülşen discusses the nature and mechanism of new communication modes that have emerged from digital platforms, especially emojis as a new language system of daily narratives. Through reviewing related studies in the fields of communication study, linguistics, narratology, semiotics, etc., the chapter explores how computer users integrate emojis in their daily narrative practices and how emojis create a new mode of language to communicate stories on digital platforms.

Chapter 15 by Akihito Kanai deals with the aspects of non-story narrative—in which discourse is considered more important than story or a clear story does not exist—and nostalgia effect in the cognition of film reception, in addition to the story aspect of narrative. In particular, the chapter analyzes film cognitive effects related to nostalgia through the method of narrative rhetoric of “cutting techniques” (for a flow of a story), which the author has been studying, and “defamiliarization” in literary theories.
Preface

The knowledge derived from the analysis is applied to a computational modeling for composing films or images of nostalgia-based narrative rhetoric, based on his non-story narrative concept.

Chapter 16 by Takashi Ogata seeks to undertake the problem of a narrative generation-reception and narrative production-consumption modeling of kabuki from the viewpoint of an information system, and in particular, a narrative generation system. A fundamental concept of the modeling is “multiplicity,” or “multiple narrative structures” in narrative. Therefore, the direct objective of this chapter is to propose a first approach to a narrative generation-reception and production-consumption model of kabuki based on the above concepts. In addition, this chapter associates the model to the concept of the “Geino Information System: GIS,” representing a system model in which multiple narrative generation and production mechanisms or processes, i.e., narrative multiple structures, are included. Introductory knowledge on kabuki, including the history and basic terms, is also mentioned as background for the discussion. The next main objective of the chapter is to phenomenally describe the aspects of kabuki’s multiple narrative structures with actual examples. Although only indicated in this chapter, the ultimate goal of the author is to conduct social distribution experiments of the “Integrated Narrative Generation System: INGS,” which the author has been developing as a synthesis of previous studies. By social distribution, the author means a new type of business model for social applications using the Web, etc., for the narrative generation system itself, or for a content system including narrative generation systems. Finally, the chapter anticipates directions for future research on social distribution of INGS through a greater understanding of kabuki and its multiple narrative structures model. This topic will be one of the central issues of the following book.

Takashi Ogata
Iwate Prefectural University, Japan

Taisuke Akimoto
The University of Electro-Communications, Japan

REFERENCES


