

Research Article

Analyzing the Relationship between the Legend of Dōjōji and the *Kabuki-Dance Kyōganoko Musume Dōjōji* to Develop Prototyping Systems

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ABSTRACT

Using detailed analysis of the stage structure of the *kabuki-dance Kyōganoko Musume Dōjōji*, as well as the legend of Dōjōji that comprises the background of the *kabuki-dance*, we present a 2D simulation system that uses music, lyrics, and images. A prototype system was then developed that complements the above system based on *Kyōganoko Musume Dōjōji* using a 3D animation system based on the analysis of the storyline of the legend of Dōjōji, which serves as the origin of *Kyōganoko Musume Dōjōji*. In particular, we organize 11 scenes from *Kyōganoko Musume Dōjōji* and map them to six scenes from the legend of Dōjōji. In our prototype system, the latter scenes insert into the former scenes based on this mapping. This paper shows detailed analyses of two narrative contents and concretely describes system mechanisms according to these narrative analyses.

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1. INTRODUCTION

Kabuki is a representative cultural heritage in Japan that incorporates various types of performing arts from dance and classical performance, such as *nō* and *kyōgen*. Many studies have been conducted regarding its preservation and inheritance, and in recent years, there are also studies investigating *kabuki* from the viewpoint of technology.

For example, many studies of *kabuki* have examined the ways in which video technology has been introduced to performances. Some researchers have analyzed the preservation of “Shosagoto (the movements of actors)” using motion capture. For example, Oda and Genda [1] studied characteristic movements in *kabuki* using a motion capture system. Omoto et al. [2] created a model of Minamiza, a traditional *kabuki* theatre, in Kyōto. Kobayashi [3] focused on actor’s movements, comparing Western dance in the ballet *La sylphide* with the Japanese dance *Kyōganoko Musume Dōjōji* to examine the creation of dances. Another study focused on “Furi (swing),” analyzing small movements such as walking and hand expressions [4]. Using a commercially available robot (desktop robot “Premade AI”), the stage of *ningyō jōruri Hidakagawa Iriaizakura* was also reproduced remotely by the Tokyo University of Technology. In contrast to these studies, we approached the narrative of *kabuki* from multiple different viewpoints.

Kyōganoko Musume Dōjōji [The Maiden at the Dōjōji Temple] is one of many works based on the “legend of Dōjōji,” which has also been related in narratives and picture scrolls, and is a latter-day description of the legend of Anchin and Kiyohime. Dōjōji is a temple of the Tendai sect in Hidakachō, Hidaka, Wakayama, Japan. This temple is the subject of the legend of Dōjōji, which has been recorded for over a 1000 years. Although this legend has undergone many changes over its long history, it is still well known in Japan. Of the versions of this legend, we focus on the *kabuki-dance Kyōganoko Musume Dōjōji*, which is considered to represent the modern form of the legend of Dōjōji. We also examined the stage performance structure of *Kyōganoko Musume Dōjōji* and the storyline of the legend of Dōjōji.

Based on these narrative analyses, this paper describes the development of two prototyping systems: (1) a 2D animation system that reproduces the stage performance structure of *Kyōganoko Musume Dōjōji* and (2) a 3D animation system that complements the story of *Kyōganoko Musume Dōjōji*. Although the former system uses music, background, people, and the dance of *Kyōganoko Musume Dōjōji*, the dance is limited to a simple presentation, since the purpose of the system is to represent the entire stage performance structure. These two systems are related. In particular, we analyze the scenes of the legend of Dōjōji and associate them with the scenes of *Kyōganoko Musume Dōjōji*. The system based on the legend of Dōjōji complements the system based on the stage performance structure of *Kyōganoko Musume Dōjōji* to represent a somewhat complementary explanation using visual imagery.

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In previous research, we surveyed and analyzed Dōjōji story and *Kyōganoko Musume Dōjōji* in *kabuki* [5], and developed a first system to simulate the stage performance structure of *Kyōganoko Musume Dōjōji* [6]. We integrated narrative generation systems, including explanation generation, into the abovementioned simulation system [7]. This paper extends and integrates the previous analysis of *Kyōganoko Musume Dōjōji* and its systematization and aims to present a new idea regarding the system according to the storyline of the legend of Dōjōji to complement the former system. Although *Kyōganoko Musume Dōjōji* is a narrative work that was derived from the legend of Dōjōji, it does not directly describe the narrative of legend of Dōjōji. In the proposed complementary system, the simulation system based on *Kyōganoko Musume Dōjōji* and the narrative system according to the legend of Dōjōji are combined to ultimately aim users of the system to better understand the relationships between the two narratives and to ultimately enjoy the story of Dōjōji as a Japanese traditional narrative.

It is significant that this study treats *kabuki* as a research object and approaches the narrative of *kabuki*, which has not previously been surveyed and analyzed, from the viewpoint of systematization using the methods of artificial intelligence and cognitive science, specifically aiming at automated narrative generation. This is a challenge in intelligence system research, including artificial intelligence. In particular, *kabuki* is interesting in that it is a narrative collection of many Japanese traditional narratives. Moreover, in terms of the perspective of formulating a system, the narrative of *kabuki* is a somewhat complex system that includes complicated diverse narratives that can be expressed in multiple forms. Likewise, precise analysis of structures is an immensely important theme in research involving computer systems. Concerning our research on *kabuki*'s narrative generation, please refer [8–12].

Ultimately, the goal of our studies—including this paper—is automated narrative generation. Specifically, we aim to present the concept and idea of “narrative content works,” including automated narrative generation function that did not previously exist and to develop a system according to this framework. Furthermore, in one of our future studies, we hope to incorporate the developed functions into robots [13]. In this paper, we state two types of narrative analyses, namely research that integrates previous analysis results of the stage structures of *Kyōganoko Musume Dōjōji* and research that analyzes the storyline of the legend of Dōjōji, which ultimately allows the development of two types of systems based on the analyses. Artificial intelligence, which this study centers on, is an engineering genre that has essential basis in cognitive science. Since the motivation of this study is to explore the framework of human intelligence, analyses of research objects using a variety of methods also serve as important steps in the development of artificial intelligence.

Although *Kyōganoko Musume Dōjōji* is a narrative work that was derived from the legend of Dōjōji, it does not directly describe the narrative of legend of Dōjōji. In the proposed complementary system, the simulation system based on *Kyōganoko Musume Dōjōji* and the narrative system according to the legend of Dōjōji are combined to ultimately allow users of the system to better understand the relationships between the two narratives and enjoy the story of Dōjōji as a Japanese traditional narrative.

We can readily demonstrate the structure of this paper. Section 2 introduces surveys and analyses of *Kyōganoko Musume Dōjōji* and the legend of Dōjōji. The former description corresponds

to the summarization and extension of the previous research results. Moreover, Table 1 is a comprehensive table. In Section 3, we describe a 2D animation system based on the above analysis of *Kyōganoko Musume Dōjōji*, and the analysis is an extended version of one that we have previously sought. Section 4 describes a system in which the 3D animation system based on combining the analysis of the storyline of the legend of Dōjōji with the system in Section 2. Furthermore, in Section 5, we present problems with the developed system and indications for future directions. Section 6 is a summary of this paper.

2. ANALYSES OF KYŌGANOKO MUSUME DŌJŌJI AND THE LEGEND OF DŌJŌJI

In this section, we discuss the investigation and analyses of *Kyōganoko Musume Dōjōji* and the legend of Dōjōji.

2.1. What is *Kyōganoko Musume Dōjōji*?

Kyōganoko Musume Dōjōji is a representative work of *kabuki* dance that has been played by representative female *on'nagata* such as Nakamura Utaemon VI and Tamasaburo Bando V. The ancient legend represented in *Kyōganoko Musume Dōjōji* was transmitted through Buddhist narratives, *nō*, texts, picture scrolls, and other means.

Kyōganoko Musume Dōjōji is a development of the legend of Anchin and Kiyohime. Unlike the Kiyohime legend, a woman's obsession is not the focus in this version, and various *kimono*s and props are used to show her daughter in love, making it a completed work of *Musume Dōjōji* as a *kabuki* dance. That is, it basically inherits the form of the *nō Dōjōji* intact, but the legend of Dōjōji is not specifically shown in the verse; a changing dance is central. Therefore, the story of the legend of Dōjōji is expressed only symbolically, and the narrative is weakened.

2.2. Analyzing the Stage Performance Structure of *Kyōganoko Musume Dōjōji*

Table 1 displays the elements of *Kyōganoko Musume Dōjōji* and the methods through which they are implemented. The table includes the following five items for each scene:

- (1) [Actual stages] Flow and characteristics of the dance on stage (the contents in brackets indicate scene characteristics);
- (2) [Music] Music used in the system, based on the Kineie Shamisen score [14], and created with a free composition tool (“Wagaku Hitosuji,” <https://jonkara.net/soft/wagaku/>). However, the system uses the actual music because there are no scores for *Michiyuki*, *Ranbyōshi*, and *Kaneiri*. In other scenes, we only reproduced the music for the shamisen. Since the sound of the shamisen music feels higher than that on the actual stage, there is a lingering sense of discomfort compared with the actual music;
- (3) [Lyrics] Excerpts from the beginning and end of the lyrics (only the *Ranbyōshi* is shown in full). The lyrics are Romanized because they are written in old Japanese;

Table 1 Stage performance structure of *Kyōganoko Musume Dōjōji*

Scene name	Actual stages	Music	Lyrics	Images	Commands
<i>Michiyuki</i>	<p><i>Shoke</i> walks from <i>Hanamichi</i></p> <p>Talk about <i>kane's</i> memorial service on stage.</p> <p>A stage device imitating the door to the temple has been prepared on the stage.</p> <p>The narrator and the shamisen player come out and sit on a long table.</p> <p>Shirabyōshi Hanako comes out of <i>Hanamichi</i> with a fan.</p> <p>A dance is performed along with <i>Shirabyōshi</i>.</p> <p>After the dance, they head to the stage.</p>	Existing music (<i>Jōruri</i>)	<p><i>Tsuki ha hodonaku</i> <i>hairu Shiono</i><omission> <i>Hirari bōshi no</i> <i>fuwafuwa to</i></p>	<p>Characters: <i>Shoke</i> (12 people)</p> <p><i>Katarite</i></p> <p>Musicians: <i>Shamisen</i> [Japanese guitar]</p> <p>Place on stage: Main stage, <i>Hanamichi</i></p> <p>Stage equipment: Dōjōji, <i>Kane</i> [bell], <i>Sakura</i> [cherry blossoms]</p> <p>Characters: Shirabyōshi Hanako, <i>Shoke</i> (12 people)</p> <p><i>Katarite</i></p> <p>Musicians: <i>Shamisen</i></p> <p>Place on stage: Main stage, <i>Hanamichi</i></p> <p>Stage equipment: Dōjōji, <i>Kane</i>, <i>Sakura</i></p> <p>Characters: Shirabyōshi Hanako, <i>Shoke</i> (12 people)</p> <p><i>Katarite</i></p> <p>Musicians: <i>Hyōshiita</i></p> <p>Place on stage: Main stage, <i>Hanamichi</i></p> <p>Stage equipment: Dōjōji, <i>Kane</i>, <i>Sakura</i></p> <p>Characters: Shirabyōshi Hanako (Have <i>Chūkei</i>), <i>Shoke</i> (12 people)</p> <p><i>Katarite</i></p> <p>Musicians: <i>Shamisen</i>, <i>Taiko</i></p> <p>Place on stage: Main stage</p> <p>Stage equipment: Dōjōji, <i>Kane</i>, <i>Sakura</i></p> <p>Characters: Shirabyōshi Hanako, <i>Shoke</i> (12 people)</p> <p><i>Katarite</i></p> <p>Musicians: <i>Shamisen</i>, <i>Taiko</i>, <i>Kodutumi</i>, <i>Fue</i>, <i>Kane</i></p> <p>Place on stage: Main stage</p> <p>Stage equipment: Dōjōji, <i>Kane</i>, <i>Sakura</i></p> <p>Characters: Shirabyōshi Hanako (<i>Hanakasa</i>), <i>Shoke</i> (12 people)</p> <p><i>Katarite</i></p> <p>Musicians: <i>Shamisen</i>, <i>Taiko</i>, <i>Fue</i>, <i>Kane</i></p> <p>Place on stage: Main stage</p> <p>Stage equipment: Dōjōji, <i>Kane</i>, <i>Sakura</i></p> <p>Characters: <i>Shoke</i> (12 people)</p> <p><i>Katarite</i></p> <p>Musicians: <i>Shamisen</i>, <i>Taiko</i>, <i>Fue</i>, <i>Kane</i></p> <p>Place on stage: Main stage</p> <p>Stage equipment: Dōjōji, <i>Kane</i>, <i>Sakura</i></p>	Not yet reproduced.
<i>Ranbyōshi</i>	<p>Put on the <i>Eboshi</i> given by <i>Shoke</i>. Move from the stage to <i>Hanamichi</i> according to Noh.</p> <p>Show off the dance, then return to the stage from <i>Hanamichi</i>. Perform a dance at the center of the stage (Mai has many small movements of wrists, feet, and props.)</p> <p>Continuing from <i>Ranbyōshi</i>, perform a dance at the center of the stage in tune with <i>Kanedukushi</i>.</p>	Existing music (<i>Nō</i>)	<p><i>Hana no hoka ni ha matsu</i> <i>bakari hana no hoka ni</i> <i>ha matsu bakari</i> <i>kuresomete kane ya</i> <i>hibikuran</i></p>	<p>“Hana” command makes it look like he is going back and forth between the stage and <i>Hanamichi</i>.</p>	
<i>Chūkeinomai</i>	<p>Continuing from <i>Ranbyōshi</i>, perform a dance at the center of the stage in tune with <i>Kanedukushi</i>.</p>	Created from the score (<i>Nagauta</i>)	<p><i>Kane ni urami ha kazukazu-</i> <i>gozaru</i><omission> <i>Shinmyo</i> <i>no tsuki wo nagameakasan</i></p>	<p>Not much movement, many small dances.</p>	
<i>Teodori</i>	<p>Reappear on the stage without props. Perform at the center of the stage along with <i>Hauta</i> (<i>Shōfu no Erothizizumu</i>).</p>	Created from the score (<i>Nagauta</i>)	<p><i>Iwazu kataranu waga</i> <i>kokoro</i><omission> <i>Miya-</i> <i>kosodachi wa hasuppama</i> <i>mono ja e</i></p>	<p>Not much movement, many small dances.</p>	
<i>Mariuta</i>	<p>Perform a dance at the center of the stage in accordance with <i>Rō-dzukushi</i> (<i>Yūjo</i>) (choreography like playing with <i>Kakū no Mari</i>).</p>	Created from the score (<i>Nagauta</i>)	<p><i>Koi no wake sato</i><omission> <i>Omoi sometaga en ja e</i></p>	<p>By repeating the vertical movement, it is possible to express that a ball is attached.</p>	
<i>Hanakasaodori</i>	<p>Put <i>Hanakasa</i> on the head and hands at the center of the stage. Perform the dance according to <i>Wakitebushi</i>. Shirabyōshi Hanako and disappear from the stage.</p> <p>All <i>Shoke</i> line up on stage with <i>Hanakasa</i>. Show off the dance.</p>	Created from the score (<i>Nagauta</i>)	<p><i>Ume to-san-san sakura</i> <i>wa</i><omission> <i>Kawairashi-sa</i> <i>no hanako</i></p>	<p>The character does not move much because the movement of <i>Hanakasa</i> is the main movement.</p>	

(Continued)

Table 1 Stage performance structure of *Kyōganoko Musume Dōjōji*—Continued

Scene name	Actual stages	Music	Lyrics	Images	Commands
<i>Kudoki</i>	Appear with <i>Tenugui</i> at the center of the stage. Show off Mai along with <i>Koi to Shitto no Kouta</i> .	Created from the score (Nagauta)	<i>Koi no tenarai tsui minarite</i> <omission> <i>Sawaraba ochin fuzeinari</i>	Characters: Shirabyōshi Hanako (<i>Tenugui</i>), <i>Shoke</i> (12 people) <i>Katarite</i> Musicians: <i>Shamisen</i> , <i>Taiko</i> , <i>Kodutumi</i> Place on stage: Main stage Stage equipment: Dōjōji, <i>Kane</i> , <i>Sakura</i> Characters: Shirabyōshi Hanako (<i>Kakko</i>), <i>Shoke</i> (12 people) <i>Katarite</i> Musicians: <i>Shamisen</i> , <i>Taiko</i> , <i>Kodutumi</i> , <i>Hyōshiita</i> , <i>Kakko</i> Place on stage: Main stage Stage equipment: Dōjōji, <i>Kane</i> , <i>Sakura</i> Characters: Shirabyōshi Hanako, <i>Shoke</i> (12 people) <i>Katarite</i> Musicians: <i>Shamisen</i> , <i>Taiko</i> , <i>Fue</i> Place on stage: Main stage Stage equipment: Dōjōji, <i>Kane</i> , <i>Sakura</i> Characters: Shirabyōshi Hanako (<i>Suzudaiko</i>), <i>Shoke</i> (12 people) <i>Katarite</i> Musicians: <i>Shamisen</i> , <i>Taiko</i> , <i>Kodutumi</i> , <i>Hyōshiita</i> , <i>Suzudaiko</i> Place on stage: Main stage Stage equipment: Dōjōji, <i>Kane</i> , <i>Sakura</i> Characters: Shirabyōshi Hanako, <i>Shoke</i> (12 people) <i>Katarite</i> Musicians: <i>Shamisen</i> , <i>Suzudaiko</i> Place on stage: Main stage Stage equipment: Dōjōji, <i>Kane</i> , <i>Sakura</i> Characters: Shirabyōshi Hanako, <i>Shoke</i> (12 people) <i>Katarite</i> Musicians: <i>Shamisen</i> , <i>Suzudaiko</i> Place on stage: Main stage Stage equipment: Dōjōji, <i>Kane</i> , <i>Sakura</i>	<i>Tenugui</i> is wrapped around the body or held in the mouth. In this way, the character is not moving because the focus is on using props. Rotational movements using <i>Kakko</i> .
<i>Yamadukushi</i>	Appear with <i>Kakko</i> close to the center of the stage. Show Mai while hitting <i>Kakko</i> according to <i>Yama-Zukushi</i> .	Created from the score (Nagauta)	<i>Omoshiro shikimonagameya</i> <omission> <i>Tsuki no kaobase Mikasayama</i>		
<i>Teodori</i>	Reappear on the stage with nothing. Perform at the center of the stage along with <i>Hauta (Shōfu no Erotishizumu)</i> .	Created from the score (Nagauta)	<i>Tada tanome</i> <omission> <i>Niku terashi hodo itoshirashi</i>		Not much movement, many small dances.
<i>Suzudaiko</i>	Around the center of the stage, hit <i>Suzudaiko</i> and perform a dance along with <i>taueuta (Saotome odori)</i> .	Created from the score (Nagauta)	<i>Hana ni kokoro o fukamigusa</i> <omission> <i>Hiki ka dezuite zo use ni keru</i>		<i>Suzudaiko</i> is difficult to reproduce because it turns its wrist and rings.
<i>Kaneiri</i>	Shirabyōshi Hanako defeats all <i>Shoke</i> . <i>Kane</i> comes down on stage. Shirabyōshi Hanako climbs on <i>Kane</i> and gazes around her like a snake.				Not implemented because it is not a dance part.

- (4) [Images] Images of appearing characters, the main stage, and stage equipment. The props are listed in parentheses in the “Shirabyōshi Hanako”;
- (5) [Commands] The command is written in the code. Commands used in the system (input sentences instructing the reproduction system to create the character animation or the background).

2.3. Analyzing the Narrative Structure of the Legend of Dōjōji

The story of the legend of Dōjōji (also known as the legend of Anchin and Kiyohime) involves Kiyohime, a woman living in Kumano (the area covering a part of present Wakayama and Mie prefectures) who is betrayed by a Buddhist monk (Anchin). Her anger causes her to be transformed into a snake, and she burns the monk together with a bell in Dōjōji. Figure 1 presents a flowchart that summarizes the legend of Dōjōji. Figure 1 is based on three stories: *Dainihonkoku Hokekyō Genki* [15], *Konjaku Monogatari Shū* [16], and *Dōjōji Engi* [17].

In Figure 1, each box shows a scene, and the frame that summarizes multiple events shows a scene. The scene summarizes the events that occurred in the same place. In addition, the third scene has a branching structure that shows the small differences in the three quoted stories.

3. THE SIMULATION SYSTEM BASED ON THE STRUCTURAL ANALYSIS OF KYŌGANOKO MUSUME DŌJŌJI

Regarding the simulation system using 2D animation based on the above structural analysis of *Kyōganoko Musume Dōjōji*, we have published the idea and implementation [6,18,19]. In this paper,

we completed the development of all of the scenes of *Kyōganoko Musume Dōjōji* to extend the system through the development of the first scene of *Michiyuki*.

As we mentioned in Section 1, our goal is to create a system that uses inputs to automatically generate a staging structure. This study presents the preliminary phase of this work. To study the system for automatic generation, we created an animation from the content shown in Table 1. This section first describes the animation tool, then discusses the flow used to create an animation.

This study uses the user interface of KOSERUBE [20], which has two modules. The first module converts the generated stories into animation code specific to KOSERUBE, based on which the second module plays the animation. Although this 2D animation system was developed using the previously mentioned KOSERUBE, KOSERUBE was originally a system that we developed with the aim of use in various application aims. Moreover, the 2D animation system in this paper also corresponds to an application system. In fact, the characters, music, stages, etc. used in this 2D system differ from the original KOSERUBE. In particular, the system utilizes the analysis results of *Kyōganoko Musume Dōjōji*. However, although KOSERUBE has the ability to automatically generate stories from defined elements, the 2D animation system in this paper currently does not have an automated narrative generation mechanism since its main objective is to directly simulate the stage structures of *Kyōganoko Musume Dōjōji*. In the future, the system will be able to acquire more intelligent narrative generation ability through utilizing the narrative generation mechanism of KOSERUBE and other methods and techniques that we are currently investigating.

The system reproduces a performance by combining a background and a character image with another image that imitates the play’s stage. In addition, the music in *Kyōganoko Musume Dōjōji*, along with the text showing the story and lyrics, are displayed at the bottom of the screen. Our goal is not to produce computer graphics, but to reproduce the elements that make up the entire stage. For this reason, we do not pursue a realistic representation in our animations.

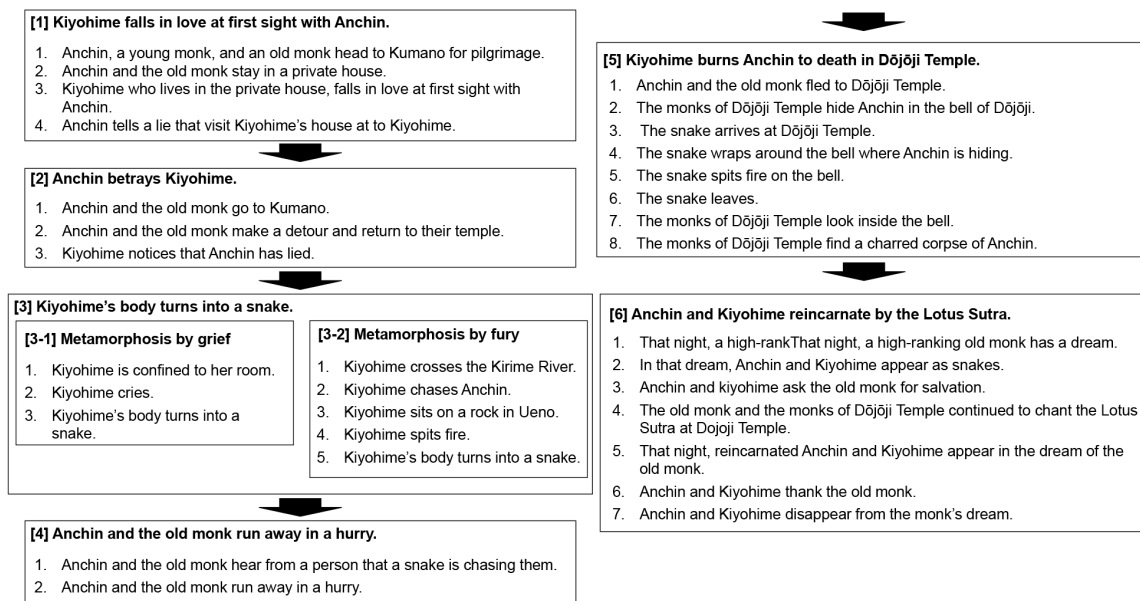


Figure 1 | Flow chart of the legend of Dōjōji.

Figures 2 and 3 present an example of an animation. As the scenes on the stage are largely divided into *hanamichi* and *hon-butai* (main stage), the figures portray these scenes (Figures 2 and 3 respectively show the main stage and *hanamichi*). The screen structure shown in Figures 2 and 3 use images from the KOSERUBE database to represent the background and characters on stage. The screen consists of four layers: text, character, stage, and background. Here, the dancing figures are the characters, and the instrumentalists, monks, and bells are depicted in the background.

The system uses two kinds of music: the music of the actual *Kyōganoko Musume Dōjōji* and the electronic music created from a musical score. The musical score used was *Nagauta Kyōganoko Musume Dōjōji: Shamisen Bunka-fu* by Kineie. To create the music, we used a free composition tool called “Wagaku Hitosuji.”

4. THE SYSTEM INTEGRATING THE STRUCTURAL STORY OF THE LEGEND OF DŌJŌJI WITH KYŌGANOKO MUSUME DŌJŌJI

In Section 2, *Kyōganoko Musume Dōjōji* was described as representative of the legend of Dōjōji; however, the stories are not explicitly the same. Therefore, we developed a system to complement the story of *Kyōganoko Musume Dōjōji* by using the story of the legend of Dōjōji [13]. This system is discussed below.



Figure 2 | Example of a visualized stage performance structure (“Ranbyōshi”).



Figure 3 | Example of a visualized stage performance structure (“Michiyuki”).

4.1. Analysis of Story Structure of the Legend of Dōjōji

We analyzed the structure of scenes in the legend of Dōjōji based on three works that depict the legend. Figure 1 presents a flowchart created as a result of the analysis. Table 2 has detailed information on the narrative components of the event sequence described in Figure 1. In this table, “Scene” describes the titles of the scenes, “Components” lists the elements that appear in each scene, and “Events in Each Scene” divides each scene into sentences to demonstrate the flow of the story’s events.

4.2. Associating *Kyōganoko Musume Dōjōji* with the Legend of Dōjōji

We associate the scene of the legend of Dōjōji with scenes from *Kyōganoko Musume Dōjōji* to use it for the rhetoric in which the memories of Anchin and Kiyohime are revived. Table 3 connects the legend of Dōjōji with the scenes of *Kyōganoko Musume Dōjōji*, using the eleven scenes that make up *Kyōganoko Musume Dōjōji* described by Watanabe [21] as the key. Scenes from the legend of Dōjōji are based on the structure shown in Figure 1. Eleven scenes of *Kyōganoko Musume Dōjōji* were classified into negative and positive.

At first glance, *Kyōganoko Musume Dōjōji* is played on a bright and flowery stage, and the heroine’s clothes are also splendid. However, the legend of Dōjōji, which is the background story or origin of *Kyōganoko Musume Dōjōji*, is a dark story in that it is based on the heroine’s dark emotions and resentment, which ultimately transform her into a snake so she can kill the man she blames for her negative emotions. Thus, these two narratives share common narrative material yet contrast in terms of presenting a bright versus a dark narrative. Furthermore, although *Kyōganoko Musume Dōjōji* is a bright narrative on the surface, characteristics of the original dark narrative sometimes appear through the heroine’s actions and facial expressions. We associated the bright aspect that forms the underlying tone in *Kyōganoko Musume Dōjōji* with the positive side of the heroine’s personality. In contrast, the dark aspect in *Kyōganoko Musume Dōjōji* is associated with the negative side of the heroine’s personality. Although her negative personality is not distinguishable in bright scenes—such as when she does a flowery dance with big flower hats in the scene of “Hanagasa_Odori”—she still exposes her true character and markedly glares at monks in the last scene of “Kaneiri” with heightened resentment to the ring.

A scene with negative verses such as a gesture of glaring at a bell or a grudge is considered a negative scene, and a bright scene is considered a positive scene. Of the six scenes from the legend of Dōjōji, one or more scenes are associated.

4.3. Development of the Prototyping System

Based on the correspondence of the scenes in Table 3, the scenes from *Kyōganoko Musume Dōjōji* can be extended using the scenes of the legend of Dōjōji according to using three methods. One involves inserting a fragmentary memory like a flashback that represents one event that constitutes a scene, another involves representing the entire scene, and the third involves representing the

Table 2 | Details of scenes in the Legend of Dōjōji

Scene	Components	Events in each scene	
[1] Kiyohime falls in love with Anchin at first sight.	Characters: Anchin, Old monk, Kiyohime Locations: Murogun, Kiyohime's House Time: Afternoon, Night Things: -	Anchin, a young monk, and an old monk head to Kumano on a pilgrimage. Anchin and the old monk stay in a private house. Kiyohime, who lives in the private house, falls in love with Anchin at first sight.	
[2] Anchin betrays Kiyohime.	Characters: Anchin, Old monk, Kiyohime Locations: Murogun, Kumano Time: - Things: -	Anchin lies to Kiyohime about visiting Kiyohime's house. Anchin and the old monk go to Kumano. Anchin and the old monk make a detour and return to their temple. Kiyohime notices that Anchin lied.	
[3] Kiyohime's body turns into a snake.	[3-1] Metamorphosis by grief Characters: Kiyohime, Snake (Kiyohime) Locations: Kiyohime's room Time: - Things: - [3-2] Metamorphosis by fury Characters: Kiyohime, Snake (Kiyohime) Locations: Kirime River Time: - Things: -	[3-1] Kiyohime is confined to her room. Kiyohime cries. Kiyohime's body turns into a snake.	[3-2] Kiyohime crosses the Kirime River. Kiyohime chases Anchin. Kiyohime sits on a rock in Ueno. Kiyohime spits fire. Kiyohime's body turns into a snake.
[4] Anchin and the old monk run away in a hurry.	Characters: Anchin, Old monk, Person, Snake (Kiyohime) Locations: Murogun Time: - Things: -	Anchin and the old monk hear from a person that a snake is chasing them. Anchin and the old monk run away in a hurry. Anchin and the old monk flee to Dōjōji Temple.	
[5] Kiyohime burns Anchin to death in Dōjōji Temple.	Characters: Anchin, Old monk, Snake (Kiyohime), Monks of Dōjōji Temple Locations: Murogun, Dōjōji Temple Time: - Things: Bell of Dōjōji	The monks of Dōjōji Temple hide Anchin in the bell of Dōjōji. The snake arrives at Dōjōji Temple. The snake wraps around the bell where Anchin is hiding. The snake spits fire on the bell. The snake leaves.	
[6] Anchin and Kiyohime are reincarnated through the Lotus Sutra.	Characters: High-ranking old monk, Monks of Dōjōji Temple, Anchin, Kiyohime Locations: Dōjōji Temple, Dream Time: Afternoon, Night Things: The Lotus Sutra	The monks of Dōjōji Temple look inside the bell. The monks of Dōjōji Temple find Anchin's charred corpse. That night, a high-ranking old monk has a dream. In that dream, Anchin and Kiyohime appear as snakes. Anchin and Kiyohime ask the old monk for salvation. The old monk and the monks of Dōjōji Temple continue to chant the Lotus Sutra at Dojoji Temple. That night, a reincarnated Anchin and Kiyohime appear in the old monk's dreams. Anchin and Kiyohime thank the old monk. Anchin and Kiyohime disappear from the dream.	

entire scene as a recollection. The numbers like [1], [2], and [5] correspond Table 2. Table 3 is an incomplete example that uses only the first methods.

In the system that associates the simulation system of the stage performance structure of *Kyōganoko Musume Dōjōji* with the legend of Dōjōji, each scene in the legend of Dōjōji coincides with a scene of *Kyōganoko Musume Dōjōji*. To associate a scene of *Kyōganoko Musume Dōjōji* with a scene of the legend of Dōjōji, we focused on specific elements of lyrics and scenes as key information to better visualize a scene of the legend of Dōjōji according

to keys. We defined three types of methods: (1) inserting a fragmentary memory, such as a flashback, which represents one event that constitutes a scene, (2) representing the entire scene in present time, and (3) representing the entire scene as a recollection. This method relates to studies regarding the methods in which various narrative elements outside of the elements of a current story are introduced into the current story. For example, Genette [22] proposed the narratology of narrative discourse, including the aforementioned methods, and we have applied narratology into our narrative generation research [23]. The methods mentioned are simplifications.

In this prototyping system, how each scene of the legend of Dōjōji relates to a scene in *Kyōganoko Musume Dōjōji* by 2D animation is represented using 3D animation. Figures 4 and 5 portray examples of the two scenes. The “Michiyuki” scene corresponds to the scene in which Anchin hides in the bell, just before the scene shown in Figure 4 in which Anchin is burned. Figure 5 shows the scene of “Kaneiri,” which corresponds to the scene in which Kiyohime burns Anchin. The “Kaneiri” scene corresponds to the scene in which Kiyohime is burning Anchin, and Kiyohime is blowing red fire into the bell.

In addition, we used MikumikuDance models related to Hatsune Miku, a vocaloid character, for the 3D models*.

5. DISCUSSION

5.1. Problems

The 3D animation consists of six scenes in total, four of which we have already created. Completing the remaining two scenes will allow us to express the legend of Dōjōji throughout *Kyōganoko Musume Dōjōji*. We have not yet implemented the representation of more fragmented scenes.

Moreover, there is a problem regarding the definition of each scene. For example, “scene [2]” in Figure 1 has the following three events:

Table 3 | Correspondence between scenes in *Kyōganoko Musume Dōjōji* and the Legend of Dōjōji

Scene in <i>Kyōganoko Musume Dōjōji</i>	Kokoro (mind)	Scene in the Legend of Dōjōji
<i>Michiyuki</i>	Ghost (Jealousy)	[1]Kiyohime burns Anchin to death in Dōjōji Temple./[6] Anchin and Kiyohime reincarnate by the Lotus Sutra.
<i>Ranbyōshi</i>	Girl	[1]Kiyohime falls in love at first sight with Anchin.
<i>Chūkeinomai</i>	Girl	[1]Kiyohime falls in love at first sight with Anchin.
<i>Teodori</i>	Jealousy	[2]Anchin betrays Kiyohime./[4] Anchin and the old monk run away in a hurry.
<i>Mariuta</i>	Girl	[1]Kiyohime falls in love at first sight with Anchin./[6] Anchin and Kiyohime reincarnate by the Lotus Sutra.
<i>Hanagasaodori</i>	Girl	[1]Kiyohime falls in love at first sight with Anchin./[6] Anchin and Kiyohime reincarnate by the Lotus Sutra.
<i>Kudoki</i>	Girl in love (Betrayed girl)	[1]Kiyohime falls in love at first sight with Anchin./[2] Anchin betrays Kiyohime.
<i>Yamadukushi</i>	Girl	[1]Kiyohime falls in love at first sight with Anchin.
<i>Teodori (2)</i>	Jealousy	[2]Anchin betrays Kiyohime./[4] Anchin and the old monk run away in a hurry.
<i>Suzudaiko</i>	Girl	[2]Anchin betrays Kiyohime./[3] Kiyohime’s body turns into a snake.
<i>Kaneiri</i>	True character	[5]Kiyohime burns Anchin to death in Dōjōji Temple.



Figure 4 | *Michiyuki* (left scene) and Anchin hiding in the bell (right scene).



Figure 5 | *Kaneiri* (left scene) and Kiyohime burning Anchin (right scene).

*Model: MMDモデル 初音ミク 振袖 ver. 2.0 [MMD Model Hatsune Miku Furisode ver. 2.0], Modeler: 金子卵黄 [Kaneke Ran'ou]
Model: よーでる僧 v. 0.1 (Yoderu_so v. 0.1), Modeler: ペニシス (細かすぎ P) [Penishisu (Komakasugi P)]

Model: 和風劇場ステージ [Wafu_gekijo_sutegi], Modeler: いしころ [Ishikoro]
Model: 紅葉の夜 ST20 [Momiji no Yoru ST20], Modeler: 怪獣対若大将 P [Kaiju tai Wakadaisho P]
Model: 般若面 ver. 1.00 (Han'nya_men ver. 1.00), Modeler: キツネツキ [Kitsune_tsuki]

“Anchin and the old monk go to Kumano,” “Anchin and the old monk make a detour and return to their temple,” and “Kiyohime notices that Anchin lied.” Although these three events are represented as a scene in the current prototyping system, these need three different places: (1) the road of Anchin and the old monk, (2) the temple of Anchin and the old monk, and (3) Kiyohime’s house. In the future, we are necessary to elaborately divide each scene into the corresponded places.

Since the differences between the negative and the positive scenes in inserted scenes of the legend of Dōjōji may be difficult to detect, we would like to consider mechanisms that can bring more clarity to users. For example, the simplest methods include changing the colors of the respective scenes.

Moreover, although the current insertion of the legend of Dōjōji into *Kyōganoko Musume Dōjōji* is automatically conducted by the system, we would like to consider alternative methods—including methods that involve interactions between the user and the system.

5.2. Future Direction

Recent years, *kabuki* practitioners have worked to incorporate video technologies like computer graphics into performances. During the COVID-19 pandemic, in fact, a new form of performance called “Zūmu Kabuki” was created. In “Zūmu Kabuki”, each actor is displayed on a video on the “Zoom” video calling app, and the videos are combined to form a single stage. This is also known as online *kabuki*. The *Zūmu Kabuki Chūshingura* was performed from the end of June to the middle of July 2020. *Kabuki* has continued to develop with the utilization of artificial intelligence and digital technology.

Hatsune Miku and Nakamura Shidō co-starred in the “Nico Nico Chōkaigi,”[†] in which a *kabuki* called *Hana Kurabe Senbon-zakura* was performed. This stage combined the world view of Hatsune Miku’s representative song *Senbonzakura* with *kabuki* (Minamiza, Kyoto, August 2019). In addition, the *ningyō jōruri Koimusume Tsumugi no Labyrinth*, using Hatsune Miku, was held at the Tomioka Silk Mill (Tomioka, Gunma, Japan/October 2020).

Currently, although this paper does not have relationships with actual *kabuki* content and related genres’ content, it would certainly be more challenging to introduce previous methods that are more closely related to *kabuki* content, such as simply expressing existing *kabuki*’s stories using computer graphics, etc.

6. CONCLUSION

In this paper, we first analyzed the stage performance structure of *Kyōganoko Musume Dōjōji* and its systematization through our animation tool. In particular, we analyzed and organized the stage performance structure, including elements such as musical instruments and stage backgrounds, and created a 2D animation

system using KOSERUBE. This analysis corresponds to the result in which our previous analysis of the stage performance structure of *Kyōganoko Musume Dōjōji* was revised and extended, and the extended version of the previous system includes all scenes of the analyzed *Kyōganoko Musume Dōjōji*.

Second, we have summarized the narrative structure of the legend of Dōjōji. As seen above, this paper analyzed the history and story of the legend of Dōjōji, focusing on the transformation of the legend of Dōjōji to *Kyōganoko Musume Dōjōji* and the personality of the characters. Moreover, we aimed to develop a prototyping 3D animation system that blends the legend of Dōjōji with *Kyōganoko Musume Dōjōji*. The narrative analysis of the legend of Dōjōji and its systematization serves as the first findings, based on the previous preliminary survey and concept.

As mentioned above, in this paper, we proposed a research that integrates the analysis of *Kyōganoko Musume Dōjōji* and its systematization and then formulate the analysis of the storyline of the legend of Dōjōji and its systematization into a framework.

CONFLICTS OF INTEREST

The authors declare they have no conflicts of interest.

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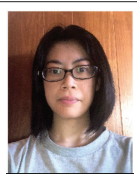
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