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# The Storytelling Machine: A Playful Participatory Automated System Featuring Crowd-Sourced Story Content



Figure 1. The Storytelling Machine, a playful participatory media art installation. Audiences contribute drawings and texts that together form a large collective narrative. The background of the above image shows six video worlds. The front left of the image displays the machine's custom-made photo booth. ©PluginHUMAN

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## **Abstract**

This paper offers a design rationale from a playful, participatory installation called “The Storytelling Machine”. The Storytelling Machine curated and delivered a collective story that was generated from crowd-sourced content. The machine transformed an audience member’s drawing into an animated character that roamed a series of video worlds. These animated characters were projected onto surfaces in an exhibition space. The machine randomly displayed audiences’ drawings and story texts, generating real-time graphics. This project involved a series of intercontinental public exhibitions and an extensive series of public workshops that spanned a three-year time frame. In this paper, we detail the design of the Storytelling Machine. Our contribution is an innovative, novel design that involves audiences in participatory activities in order to create a real-time collective digital story. This design may benefit game designers and researchers interested in engaging audiences through the design of participatory, digital story systems.

## **Author Keywords**

Participatory Art; Media Art; Automation; Storytelling

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Figure 2 Two video worlds projected onto surfaces in an exhibition space. Audience members are drawing characters in the foreground of the above image. Audiences' drawings and texts were automatically animated by The Storytelling Machine and were randomly placed into the video settings visible in the background of the above image. ©PluginHUMAN

## ACM Classification Keywords

### CSS Concepts

- **Computer systems organization** → **Real-time systems**; *Real-time system architecture*
- **Modeling and simulation** → **Real-time simulation**; *Interactive simulation*
- **Computer graphics** → **Shape Modeling**; *Mesh models*
- **Computer graphics** → **Graphics systems and interfaces**; *Graphics processors*
- **Applied computing** → **Arts and humanities**; *Media arts*

### Introduction

"The Storytelling Machine" was a participatory art installation that curated and delivered a collective story generated from crowd-sourced content. The collective story was told through text and moving images that were projected onto surfaces in an exhibition space (figure 1). Exhibition audiences drew characters, placed them into our custom-made photo booth and watched as their characters were instantly animated across a series of video "worlds". People could also contribute short story texts (micro-stories) in any language. The machine randomly displayed audiences' drawings and texts, generating real-time graphics. Consequently, each exhibition experience was unique.

The Storytelling Machine project involved a series of intercontinental exhibitions and an extensive set of public workshops that spanned a three-year time frame. We engaged seniors, children, students and members of the public in participatory art practices [3] and cross-generational workshops. We gave them opportunities to contribute text and drawings that went into forming The Storytelling Machine's collective narrative.

We differentiate our participatory practices from those that involve audience interaction [1, 3]. Through providing audiences opportunities to interact with art, artists and designers allow the public to alter or have an impact on their finished work [17]. In contrast, participatory art involves audiences in the formation and creation of the art itself [4, 7, 11, 16, 19]. We believe that participatory, rather than interactive, designs can offer a deeper level of public involvement, one that can lead to more active audience engagement [17].

Through this paper we contribute to knowledge on how to design a playful, digital story system that invites high levels of public participation. Our novel design used crowd-sourced content to create a real-time collective story. This design may benefit game designers and researchers interested in engaging audiences through the design of participatory, digital story systems.

### Related Work

#### *Digital Games, Play and Storytelling*

Research that investigates games and narrative storytelling [8, 12, 13, 14, 17, 18, 26] often uncovers game design that privileges a competitive experience over "narrative play" [18, 19, 20]. Other research investigates game design that involves playing with narrative content and structure [6, 24, 25, 27]. Story apps designed for mobile devices can include strong game and play elements [20]; and some involve traditional game features such as score boards and timers [2]. Other story apps invite users to play with the narrative content in less competitive ways [21]; for example, users may draw their own pictures that then appear later in the app's visuals [10]. This prior



Figure 3 An audience member drawing a character that was later entered into The Storytelling Machine. Stories were entered into the machine via a custom-made photo booth. ©PluginHUMAN

research and design work helps us understand the complex relationship between games and storytelling and how these elements can be present in both competitive and non-competitive play environments. The Storytelling Machine offers a non-competitive environment where audiences are invited to play with the structure and content of an interactive digital story.

#### *Participatory Culture*

In order to involve the public in making cultural and creative artworks and designs, some practitioners engage in digitally networked processes [11, 15] and digitally-connected audience involvement [5]. Yet social technology platforms can have an isolating effect on users [23]. These platforms can disempower rather than empower audiences [23]. This research helps us understand some of the methods that can be adopted in order to invite audiences to participate in digital design projects. The Storytelling Machine does not rely on a digital network for public participation, audiences need to attend the installation or workshops to be involved.

#### *Existing Automated Participatory Drawing Installations*

Our design extends the work of Disney Corporation and TeamLAB [9, 22]. These design teams have created automated systems that animate coloured-in drawings that have been created by the public. These existing designs offer some opportunities for self-expression, yet they are focused on audiences colouring-in set drawing templates. Neither of these existing designs allows audiences to contribute story text. Unlike the Storytelling Machine, these existing designs do not aim to deliver a story, they offer participatory drawing activities.

## **CONTRIBUTION**

The Storytelling Machine was a unique, playful, automated digital story system that allowed for high levels of public participation. This novel design used crowd-sourced content to create a real-time collective story. The contribution centered around the installation's unique design. This research may help inform game designers and researchers who are interested in engaging audiences through the design of participatory, digital story systems.

### **Our Process: The Storytelling Machine Installations**

The Storytelling Machine project involved over 3000 different story contributions from people in two countries. The Storytelling Machine was designed by PluginHUMAN in 2015 and had its debut at the Asia Culture Centre (Gwangju, South Korea, 2016). It was also exhibited at the Geelong After Dark festival (Geelong, Australia, 2017), Glen Eira Storytelling Festival (Melbourne, Australia 2018), and an exhibition of "How to Make a Storytelling Machine" was held at St Kilda Library (Melbourne, Australia, 2017). This project has seen high levels of public participation.

Audiences began their exhibition experience by drawing a character of any shape on an A4 sheet of paper (figure 3). They inserted their paper into a custom-designed photo booth (figures 4, 5 and 6), pressed a button, and their character was instantly digitised, animated and placed into one of the installation's video setting. Audiences could watch as their character traversed different international locations, each video setting showed an iconic site from Australia or South Korea (the two countries in which the project was exhibited).



Figure 4. A hand-drawn image in The Storytelling Machine's photo booth. ©PluginHUMAN



Figure 5 The four buttons in The Storytelling Machine's photo booth. Each button corresponds with one of the paper templates. ©PluginHUMAN

Audiences were invited to not only contribute to a collective story but to consider the impact that automated systems are having on contemporary storytelling. Once they entered their character into the machine, audiences relinquished control over their character. The machine animated each character using a random selection of pre-programmed commands. The machine stored all of the drawings and texts that were entered by the public over time; the more this work was exhibited the bigger the collective story became. The machine curated and randomly controlled the narrative. The collective story did not have a beginning, middle and end; it was a post-modern fragmented set of story vignettes. The machine controlled the narrative.

### **The Design of The Storytelling Machine**

Prior to each exhibition, PluginHUMAN's design team shot video footage of iconic locations from the local area. Storytelling Machine exhibitions included videos featuring a Korean temple, a bamboo forest and an Australian beach. We invited audiences to watch as their character was embedded into a diverse range of video settings (figures 8 and 9).

#### *The Technical Design*

The Storytelling Machine's novel system was designed in the software suite TouchDesigner. TouchDesigner facilitates the design of real-time generative visuals, particularly for projection-mapped environments. Justin Dwyer programmed this software using Python script so that The Storytelling Machine generated real-time graphics that were projected across a series of projection surfaces.

In order to create the automated animation system, we designed animation meshes in the software application Creature Animation. These meshes were then ported to TouchDesigner. When audiences created a character, they used one of four drawing templates (Figure 7). Audiences placed their drawing into our photo booth and pressed a button. When the button was pressed, a digital image of the drawing was taken and was sent, via HDMI, to the TouchDesigner system. TouchDesigner automatically matched each image's template with the corresponding animation mesh and randomly allocated a series of animation states to the drawing. Each of the four character templates corresponded with 350 different animation states. Consequently, there was a multitude of different ways that a character could be animated. We aimed to create the illusion that each character was being individually animated by the system. This may provide the illusion that the system was operating as an artificial intelligence.

#### *The Photo Booth Design*

Our custom designed photo booth (figures 4, 5 and 6) was a painted wooden box with an open slot on one side (figure 6). Embedded inside the roof of the box was a webcam. Audiences inserted their A4 sheet of paper into the photo booth's paper slot (figure 4). They then press one of four large (midi controller) buttons that were situated besides the paper slot (figure 5). Each button corresponded with one of the four animation templates (figure 7). Once the photo booth button was pressed, it took approximately one second for the animated character to be displayed in the exhibition's projected video settings.

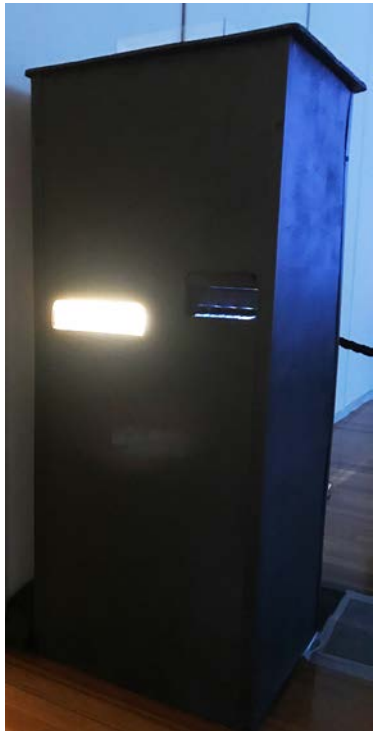


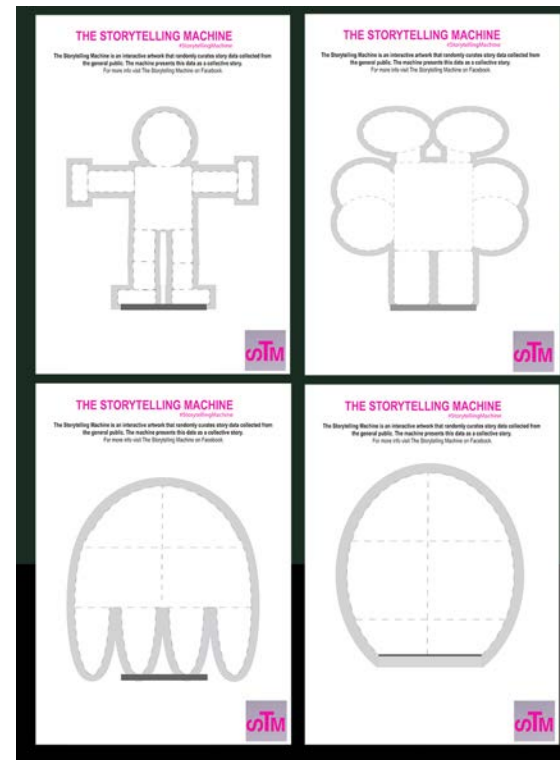
Figure 6. Version 2 of the Storytelling Machine's photo booth. Audiences placed a hand drawn character into this booth and at the press of the button the drawing was digitalised, animated and placed into one of the installation's video settings. ©PluginHUMAN

*The Storytelling Machine Drawing Templates*  
 During exhibitions and workshops, we provided audiences with a choice of four drawing templates (figure 7). These templates provided a starting point or inspiration for a person's character. Audiences could draw an image of any shape and size within the boundaries set on the paper templates.

The drawing templates allowed audiences to create a humanoid form, a flying form, a tentacled form, and a freeform character (figure 7). Each of these templates corresponded with one of four animation meshes that existed in TouchDesigner. If an audience member wanted to draw a human character, for example, they could use the humanoid template. By using this template, the system would be able to identify and isolate the character's legs, and animate the figure so that it appeared to be walking. Other templates allowed audiences to create characters that would fly or characters that would move in different and unusual kinetic patterns. The points in which a characters' body parts were moved by the animation system were represented on the paper templates by grey dotted lines (visible in figure 7).

During exhibitions and workshops, we provided the public with all of the materials required to contribute to the collective story. We set up drawing areas, containing coloured ink pens and paper templates. During Korean workshops and exhibitions, participants used orange, blue, yellow and black ink pens. In Australia, participants used green, blue, yellow and black ink pens. By limiting the audience's colour palate, we created a level of visual unity between the images drawn in each geographic location. It is possible to use this colour coding system to identify the geographic

location in which a character has been created. There are of course common colours that were available to all workshop participants; black for example. People did not always use every colour that we supplied. Therefore, not all characters can be colour identified and linked to the geographic location in which they were made.



**Figure 7:** The Storytelling Machine's four drawing templates. The public can draw a character of any shape and size inside the thick grey outline shown on each sheet. ©PluginHUMAN

Figure 8. A Korean micro-story overlaid on video footage from Australia. ©PluginHUMAN



Figure 9. A Korean senior sharing their experience and showing the group her story contribution. ©PluginHUMAN



### *The Storytelling Machine Workshops*

This project involved a series of public workshops that ran over a three-year time span. We ran free public workshops in Australia and South Korea, inviting children, seniors, families, students and interested individuals to learn about storytelling practices, share their knowledge and contribute to The Storytelling Machine's collective story. Participants needed to have developed literary skills, so these workshops were suitable for most people aged approximately nine and above.

During a six-month residency period at the Asia Culture Centre (South Korea) we conducted six workshops for the citizens of the regional city of Gwangju. We also ran public sessions during the art centre's ACT (Arts and Creative Technologies) festival (November 2016). Over 1000 people from the city of Gwangju contributed drawings and story texts to this project.

During an arts residency in Melbourne (Australia), we conducted six workshops and have run a further series of workshops for the Glen Eira Storytelling Festival (2018). Over 2000 people from Australia have contributed drawings and story texts to this project. The machine's collective story was created from public contributions from over 3000 people.

We began each workshop by asking participants to list five pivotal personal life events. These events could be real or fictional. Their writing could be disjointed and poetic, or it could be structured from fully formed sentences. It could be realistic or impressionistic; the stylistic approach was left to the individual. Participants then selected one event from their list. We guided workshop members to write a structured version of this

story and to edit their writing so that it contained only crucial aspects of the overall narrative. In doing this, they gradually formed a micro-story, a tightly edited written depiction of a pivotal life, expressed in under 100 characters. *The Storytelling Machine* presents text that are written according to structures similar to those established by social media platforms such as Twitter.

Workshop participants and exhibition attendees had the option to enter their completed micro-story into The Storytelling Machine. During exhibitions, the public (or the artists) used a computer keyboard to enter textual contributions. The machine randomly displays this content, overlaying it onto the iconic video settings. The machine displays each micro-story for 20 seconds before replacing it with a different person's text.

We invited cross-generational participation in workshops. In doing this we provided opportunities for young children to partner with seniors and share their knowledge and experience of digital storytelling technologies. We then invited any interested participants to share their stories and experiences with the group (figure 10). We explained and showed the group how we designed The Storytelling Machine in order to teach participants about digital technologies, digital data, creative processes and new storytelling techniques.

### **Lessons Learned**

Following the first exhibition we redesigned the photo booth creating a smaller paper slot in which audiences could insert their character drawing. This helped to control the amount and quality of light that was cast onto the drawing. By limiting and controlling the light, we were able to get more consistent digitised images.

This may be an important learning for other designers who are intending to construct similar participatory drawing systems.

### **Limitations**

We acknowledge limitations to our approach. Our installation cannot be experienced via the Internet. Audiences have to attend workshops or exhibition events in order to be involved. We recognise that this project is only for those with access to our workshops or exhibitions. All exhibition and most workshops have been free of charge.

### **Conclusion**

The Storytelling Machine presented content created in different languages and set in different geographical locations. We invited audiences to see a diverse range of human communications as a single story. The machine randomly displayed audiences' drawings and texts creating a real-time playful installation. This work could perhaps be viewed as an imprint of digital communications that provided opportunities for both geographic and virtual story experiences.

To participate with this installation, audiences engaged in the act of collaborating in order to help form a collective story. Through this collaborative process, one that is randomly curated by a digital system, we aimed to provide audiences with an experience of active participation in a playful art and creative technologies process. This process of story creation may inform future work undertaken by game, art and design researchers and practitioners who are interested in furthering playful, social, participatory digital story experiences.

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