Aesop: Authoring Engaging Digital Storytelling Experiences

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ABSTRACT

The traditional storytelling experiences are often one dimensional, wherein they only contain a single channel of communication with the audience through narration. With the advancements in technology, storytelling experiences have been augmented with the help of digital media to be more engaging and immersive. Authoring these scenarios, however, is complicated as it requires technical knowledge to interface the means of engagement. In this work, we talk about Aesop, a system which assists the narrator to author engaging storytelling experiences. Aesop provides a block-based interface like Scratch [16] and manifests words of a story, Cues, and Visualization (Outputs) as blocks that enable the user to create captivating stories. Our system also leverages physical actions performed by the user as Cues. These cues can trigger visualizations like robot actions, animations, environments simulation using sound and lighting effects.

Author Keywords

Story; Narration; Digital Storytelling; Authoring Tool

CCS Concepts

•**Human-centered computing** → **User interface programming;** *Web-based interaction;*

INTRODUCTION

Stories are an integral part of human society. They have been defined in over a million contexts to suit different narratives. In our work, we define a story as a temporal arrangement of events, places, or things [3]. The narration has been one of the most conventional ways of telling a story, which usually involves communication over audio from the narrator to the
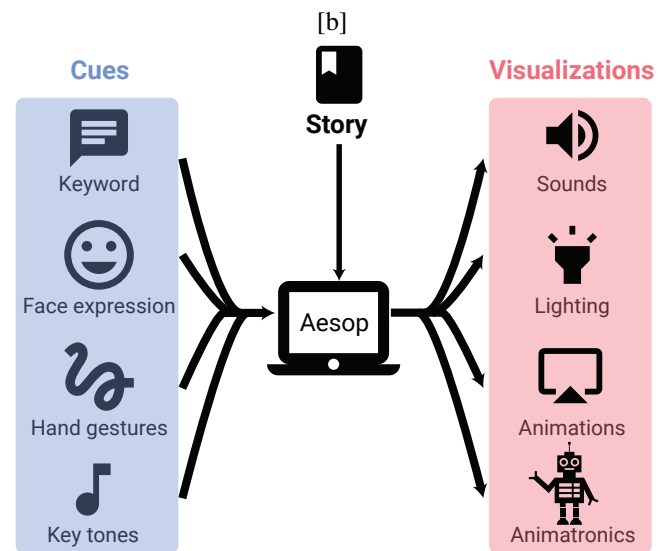

Figure 1. System Design

audience. Puppetry[1] and Theatre[2] are two examples of how the practice of story narration has transformed with the help of accessories which support the narrator to engage the audience. Due to our co-existence with technology in the modern era, digital media has augmented the means of engagement in storytelling. Digital Storytelling is the amalgamation of technology and stories, which leverages the idea of combining the art of telling stories with a variety of digital multimedia, such as images, audio, and video [17]. The advent of digital storytelling prompted researchers to leverage the concept to promote programming, literacy, and development among children [1, 2, 4, 19].

Now, to create Digital Storytelling experiences, a person should be familiar with the latest digital media, which requires

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[1]https://www.theaterseatstore.com/blog/history-of-puppetry
[2]https://www.londontheatredirect.com/news/a-brief-history-of-theatre

a steep learning curve and is a tedious task as is. Aesop leverages block-based visual programming, which has been widely accepted to lower the threshold to interface with computing systems in previous literature [16, 7], to create mappings between the story elements- keywords, Cues: which trigger an action, and Visualizations which the audience witnesses in addition to the story narration by the narrator. We present a system capable of detecting Cues like Hand Gestures, Eye Gaze, Tones, and Facial Expressions in complement to the narration to capture and hence enhance the communication channel [21] between the audience and narrator. As most of the stories involve a character, our system uses a robot to emphasize the character's role throughout the story [6]. Users can configure the robot to react to specific queues across the story to demonstrate physical movement. In addition to this, creating custom animations, sounds, lighting, and simulating environmental conditions are some augmentations that our system offers.

RELATED WORK

Story Visualization

Stories have countless manifestations in the modern era owing to our co-existence with digital media. Some of the more popular and contemporary forms of story manifestations include Movies, TV Shows, Theatre, Video Games, and Narrations. Technologists have developed widely varied story experiences like 4D movies at theatres and live shows at amusement parks[3] and movie theatres. To enrich storytelling, researchers have augmented the process with Robots [5, 13], Narration [13] and sound effects [10] as well as incorporating other physical experiences to build an engaging environment for the audience. The community has also explored story creation to express creativity as well as collaborative learning [20]. However, our system enables the storyteller to build an engaging experience to complement the story narration. With Aesop, a user can elevate the whole story narration experience by extending the story presentation to multiple realms. We aim to modify and augment the narration experience offered in the most conventional storytelling setting.

Visual Authoring Tools

In the 21st century, user interfaces need novel methods of interaction [14]. Building systems around these interfaces usually involves gaining expertise, extensive prototyping, and programming, which in turn are exorbitant tasks. The community developed interfaces for speech design like Suede, RAD, and Unisys's Natural Langauge Speech assistant to prototype speech-based applications with ease [12, 22, 18]. As the use of sensors became highly prevalent to create interactive systems, Hartmann et al. proposed Exemplar [8], which help designers to explore and implement interactions via demonstration. Owing to the need of iterative prototyping and designing in user interfaces, Dtools was intended to offer state-chart based interface which enabled a seamless transition from lower-level circuits to PCs [9]. Tools like Mogeste and Eventhurdle have been proposed to integrate gestures in UIs which are crucial to modern-day computers involving smart-phones and wearables like watches etc. [15, 11]. Owing to the avenue created

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[3]https://www.ferrariworldabudhabi.com/en/rides/viaggio-in-italia

by the tools above, Aesop helps the narrator in interfacing with modern technologies to author captivating storytelling experiences.

SYSTEM DESIGN

We borrow the widely accepted block-based programming construct to lower the barrier for programming. Our system has three main interface components (Fig.1); 1. A story which serves as a script for building the narrative 2. Cues (Additional Inputs) to capture actions performed by the presenter in addition to the story narration, 3. Visualizations (Outputs) which build an engaging and immersive environment for the audience. These elements drive Aesop's design and implementation and hence form an interactive and immersive system both for the user and the audience. Aesop is a web-based UI implemented in JavaScript (JS). It works seamlessly in a browser, liberating the user from the dependency on the operating system as well as offering multitudes of other features enabled by internet connectivity. Here we describe the design inspiration and implementation of each component:

The story

We enable a user to provide the story in multiple forms like scanning (picture to text) by using an OCR scanner JS plugin, uploading a text file or narrating the story word by word with the help of browser in-built speech-to-text engine. The story is an essential piece of our system as it is used a the main trigger for controlling the digital environment outputs. Each word of the story can be considered as a keyword and manifested as a block as in Fig 1.

Cues

A storyteller often uses body movements, physical movements like hand gestures, eye gaze when narrating a story to engage the audience [21]. Hence, we define cues as the multiple types of inputs that a narrator can perform in addition to the narration (Speech). Apart from bodily gestures, our system also detects tones as a trigger. Similar to the story words, cues can be used to create blocks, which then can serve as a trigger to various outputs.

Visualization

Digital Storytelling usually involves the use of media like graphics, sound effects, and lighting variations [17]. To create an engaging environment for stories, we augment the experience with facilitating the narrator to map the triggers to digital mediums like Robots, Animations, Sound effects, Lighting effects and many other actuators controlled by a microcontroller. Again, these can be controlled by our web-tool offering visual manifestations for authoring each of them — for example, a color palette to choose the color and intensity of the lighting.

CONCLUSION AND FUTURE WORK

We present Aesop, a system for authoring engaging digital storytelling experiences. We plan to evaluate the initial implementation of our system with user studies for both narrators and audiences. Further, we hope to explore its potential in expanding the scope beyond stories.

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