

Interactions in Storytelling toys for children

A thesis proposal

By

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Abstract

The aim of this project is to create a storytelling toy(s) that will not only tell stories to children, but will also aid them in telling their own stories. While most toys available in today's market tell stories, there are few that enable children to tell their own stories, thus empowering them to create.

Introduction

Storytelling toys can be largely categorized into two:

1. Toys that tell stories.
2. Toys that aid children in telling their own stories.

Research on the Internet and visits to a few local toy stores showed that most toys available commercially come under the first category.

The [Interactive Yoda](#) and Leap Frog's [Read and Sing Plush](#) are two such toys. The former has storytelling and trivia related to the Star Wars franchisee. The latter can sing the alphabet, teach phonics, lead kids through letters and uncover colors.

Most other toys speak/ sing random sentences or songs, a majority of them based on characters from popular culture like Sesame Street's Elmo, Winnie the Pooh etc. Cassel and Ryoyki mention that although many of today's toys "use the newest technologies to produce better sounds, graphics and actions, they come no closer to supporting children's creativity." [1]

There is hence a gap in today's market when it comes to toys that aid children in telling their own stories. While Cassel and Ryoyki mention that children enjoy entertained by toys in which "they are passive consumers of adult conceptions of childhood", these toys do not "empower them to express and create or co-create...and to use their imaginations." [1]

However many research projects cater to the second category of toys. Interestingly, some of the narrative storytelling projects came to be from a very different direction, namely Tangible User Interfaces (TUI's). These were projects where the researchers felt the need to create "research systems relating to the use of physical artifacts as representation and controls for digital information." [2] Fitzmaurice, Ishii and Buxton first described "graspable user interfaces" in their research papers. [2]

The defining characteristic of a TUI is the "seamless integration of representation and control". Graphical user interfaces on the other hand make a distinction between an input device (keyboard, mouse) and an output device (monitors). This distinction blurs, and in many cases eliminated in a TUI. For example, CAD software like Auto CAD would be GUI; but a system where physical model buildings represented the actual building, would be a TUI (MIT media lab actually built such a system to represent reflections from skyscrapers and how they affected other buildings around them.) TUI's were developed to initiate physical embodiment in computer based systems. It was soon realized that TUI's were an alternative to software based computer products/games.

Electronic toys are essentially TUI's- only with lesser processing power and capabilities. With a TUI based system we can harness the power of modern processors, but still have a traditional tactile interface. While TUI's will not entirely replace GUI's, they will

emerge in certain specialized scenarios, toys being one of them (especially for children in the age group 3-5), because they could now interact with computers using physical artifacts they are naturally attracted towards like plush toys etc.

Early toys had a GUI in addition to the TUI. Thus the child had to actually sit in front of a computer to interface with the system. Rosebud is one such example. It consists of a number of toys and a computer. The computer interface recognizes the animal and asks the child to type a story about the animal. The interface assists the child in the process. The child then records the story in audio and is stored in the toy. [3]

These toys have the obvious disadvantage that although the child interacts with a physical toy, the need for a GUI is not entirely eliminated.

Such systems were the next stage in the evolutionary process. In GenieBottles [4], bottles represent genies and depending upon the state of the lid (opened/closed), the genies participated in the story. One open bottle meant that only one genie told the story. Three open bottles will result in all the three genies participating in the storytelling process in the form of a conversation.

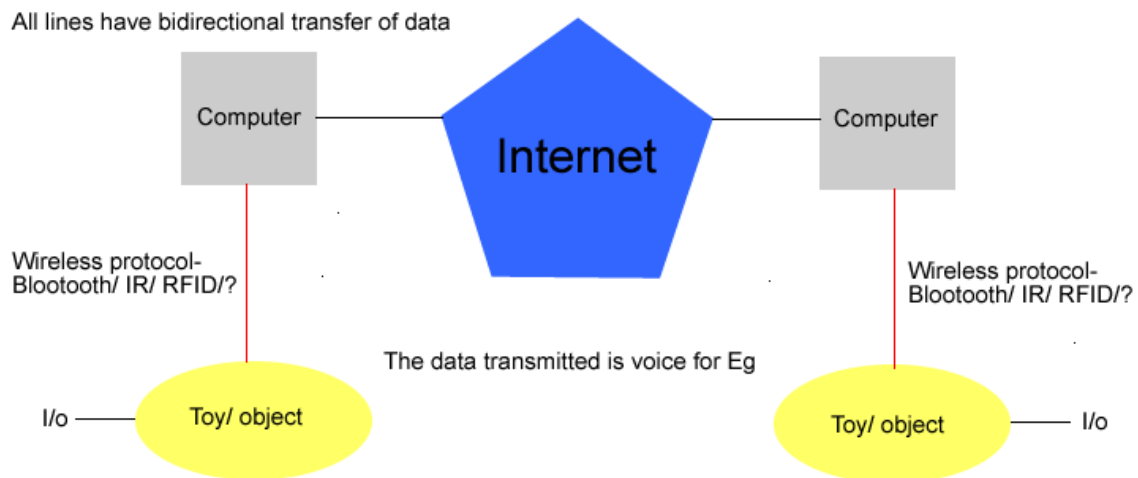
As mentioned before, Cassel and Ryokai [1] emphasize the need to support the child's own story. In this context they present StoryMat, a mat (with several toys on it, the mat representing the world) where children can tell their own stories. When the child is playing, the system records the position of the toy and his/her voice. Both can be projected at a later time onto the mat, thus enabling children to store their stories.

Objectives

Our main objective is to develop TUI based toys that are in line with research projects like GenieBottles and StoryMat. The toy will potentially have two modes-

- Passive
- Active

In the passive mode, the toy will have storytelling capabilities of its own. The toy will be able to download stories from a computer (and hence the Internet). Of course, the stories will have to be moderated by a parent/teacher. The figure below shows one possible framework.



The active mode will however enable the child to tell his/her own story. The interactions within the system will be simple, so that the child can use it with little or no training.

The toy will also support both individual and group storytelling, as much of the most robust storytelling occurs in groups. A child's first group interaction (pre-school/school) is in-fact an important reason the child transforms the 'pretend play' which s/he has been doing since childhood into 'socio-dramatic play', which in turn sow the roots of storytelling capability in children.

Methods

Data collection:

The main data collection method would be ethnographic observation. The sample size will be 15 children (convenience sampling). I will observe them playing in a natural environment like their home and schools.

I will observe children playing with a toy and participating in storytelling activities (both hearing and listening). Both individual and group play will be observed. The observation will take place in the presence of a parent or a teacher. UCHRICS approval for the data collection has been approved.

The observations will be done for around 90 minutes each. While the observation is going on, I will conduct an interview with the parent/ teacher asking questions about the play preferences and patterns of the child. The entire session will be audio taped.

Design methodology:

This is one of the most important steps in the entire process. My endeavor is to uncover hidden patterns of work. I will largely use a modified version of Contextual Design to this end.

The first step is to come up with Sequence Diagrams for each of the observations. This will help me streamline and encapsulate the activities of the child. I will capture the triggers, intent, artifacts and the breakdowns of each sequence.

Consolidated sequence diagrams will then be drawn from the various sequence diagrams that will give a complete picture of how the current scenario works.

Once this is done I will start building the modified system. I will use Object oriented modeling to represent it. Objects, views and relationships will be extracted and eventually class diagrams and state tables will be drawn.

I will then start building prototypes that will lead to the proof of concept. My aim here is to develop innovative ways in which children interact with storytelling toys i.e. define the interactions. I will thus not focus on the technologies that go into the product. For example, while the actual toy may have Integrated circuits/chips inside (sensors and transmitting information to/from the server) and use IR to communicate; I may use a PDA instead of the chips and say existing 802.11 protocols to communicate with the server.

The reason for doing this is that this will greatly simplify the technical processes (use a high level socket programming language in the PDA instead of assembly language for the IC) which are the means to the end of creating unique interactions.

Evaluation

The evaluation will take place at various stages. I will be continuously testing the toy starting from low-fidelity prototypes right until the final release of the proof of concept. This will give me the opportunity to make changes to the product design right at the conception stage. The evaluation will be qualitative and the responses of the child to the toy will be used as an indicator of the success of the product.

References

[1] Cassel, J and Ryokai . "Making Space for Voice: Technologies to Support Children's Fantasy and Storytelling." Personal and ubiquitous computing 5 (2001): 169-190.

[2] Ullmer, B and Ishii . "Emerging frameworks for tangible user interfaces." IBM Systems Journal 39 (2000): 915-931.

[3] Cassell, J. Towards a Model of Technology and Literacy Development: Story Listening Systems. Journal of Applied Developmental Psychology, 25, (2004), 75-105.

[4] Mazalek, A., Wood, A., Ishii, H., GenieBottles: An Interactive Narrative in Bottles. In Proceedings of SIGGRAPH conference (Los Angeles, USA, August 12-17, 2001). ACM Press, New York, NY, 2001.