WONDER OBJECTS

Magic and Interactive Storytelling

Tarun Jung Rawat
Interaction Designer
MA Interaction Design
Interaction Design Institute Ivrea, Italy
t.rawat@interaction-ivrea.it
http://jungrawat.com/

ABSTRACT
The inspiration for this project* comes from what we refer to as *cabinets of curiosities*, the forerunners of the modern museum, and it chooses to re-look at museums in context to the role they played as repositories of information and they manner in which they provided this information to their audience.

The first museums of the world were known as 'Wunderkammern' (literally, Wonder Rooms) and 'Wunderkabinette' (Wonder Cabinets), these collections of curiosities, both natural and man-made, offered their viewers a glimpse of the world they had not experienced until then. This project aims to recreate that experience of learning through a sense of discovery and wonder.

It explores interaction design in the context of intuitive and interactive storytelling interfaces, in a museum space, more specifically a 'Museum of Information Technology', displaying some of the famous writing and calculation machines developed by the Olivetti company of Italy during its most productive period.

These interactive storytellers are familiar objects from our everyday world, that we recognize easily, yet they possess an additional hidden layer of information to invoke a feeling of the extraordinary or the magical.

Museums often struggle with the effort of creating an engaging display of their collection of historic objects. This project explores ways in which such dormant inactive entities can be imbued with an animate quality, encouraging the viewer to discover the various hidden layers of information. Through this notion of discovery, and playing on the element of surprise, it seeks to provide a more engaging experience to the museum audience, combining the act of learning with play.

*This paper presents a part of my Masters Thesis Research undertaken at the Interaction Design Institute Ivrea, Italy, in 2004 titled, 'WUNDERDINGE {Wonder Objects} : *Familiar objects as interactive storytellers in a museum space*'. The advisors who assisted me on this project were Britta Boland, Associate Professor at the Interaction Design Institute Ivrea and Alberto Iacovoni from Studio maO, Italy.

Author Keywords
Magic, tangible computing, ubiquitous computing, physical virtual displays, museum spaces, single users, multiple users, interactive objects, interactive displays, easily comprehensible interfaces, active interaction, peripheral awareness, robust technology, surprise, discovery, wonder.

1.0. INTRODUCTION

As computers get smaller, more diverse, and are embedded in the environment around us more frequently than ever, is it possible to extend the inherent language of familiar objects that we instinctively relate to, or know how to interact with at an intuitive level, as a conduit between this physical world that we easily recognize and understand, and the virtual one which is more abstract and ever expanding? Can we create a complimentary relationship between the two by combining the multi-sensory and tangible richness of the former with the dynamic quality of the latter? By adding a layer of digital functionality to these familiar tangible objects, can we bestow upon them a quality of being 'alive' and animate, enriching them even further?

These were some of the questions I asked myself at the very beginning of my study and have frequently touched upon in the course of the development of this project. In this paper I present a set of interactive tools that are designed to provide information about a group of objects on display in a museum setting.

Having always been fascinated by magical objects and the fantastic, the design of these interactive information artifacts carry forward this enthusiasm by exploring the relationship between familiar physical artifacts from our everyday world and the hidden digital layers embedded within, which when revealed, could inspire feelings of surprise and wonder.

When placed within the context of a museum these artifacts function like tangible physical icons of the stories they contain or represent. Together they create an atmosphere, which imparts upon the space and the objects on display, an

animate quality of the living, making the museum a space for wonder and discovery.

As more museums all over the world begin to embrace interactive technologies in a variety of different ways to present their collections, this area offers new opportunities and challenges in re-looking at the museum as a living theatre of memories or a modern day cabinet of curiosities.

Keeping the above in mind, I began my research strongly inspired by the theme of 'magic' and the enthusiasm to explore how notions of magic relate to interaction design in general and interactive objects in particular. I set out to look at those qualities in an interactive artifact that drew parallels with an *object of magic*. When I say an object of magic I refer to the depiction of magical objects and devices as written about in folklore, popular literature, fantasy stories for children and as depicted in films, among other similar sources of inspiration. Objects like the magic wand, the crystal ball, magical instruments of various kinds, talismans and pendants, magical orbs and containers, ornaments and magical clothing, magic mirrors and magical books being a few examples of what one may call 'magical objects'.

Depicted below are some 'magical objects' from the popular Harry Potter film series and the Lord of the Rings film trilogy.

2.0. BACKGROUND REASEARCH

My background research touched upon two key areas. The first being the fields of ubiquitous computing and 'tangible computing', with a strong emphasis on some of the work that has been done by the Tangible Media Group at the MIT Media Laboratory, USA.

The second area of research dealt with understanding the idea of a museum. This meant understanding how the first museums of the world came into being, what did they offer their audience in terms of knowledge and experience, and what do museums today offer us and how - the mediums they use to convey these experiences.

3.0. PROTOTYPES

Presented below are four prototypes that were developed keeping in mind the concept of magic like interfaces as interactive storytellers.

3.1 MagicMirror

Most often information about objects in museums, is provided via textual panels and similar static displays. This piece seeks out other alternative means by which to provide such information in a more intriguing manner. Based on the idea of a 'magic mirror', this solution provides information to the viewer by playing on the elements of surprise and entertainment. By punning on the idea of 'reflections on the typewriter', this piece works in the following manner:

The viewer sees a typewriter, the key object of the display, placed upon a pedestal. It is spotlit (the intensity of the light could vary according to the viewer's proximity to the object, to create a sense of drama). The viewer can also hear sounds of tapping, as if someone is using the machine, giving the object an animate quality. As the viewer approaches closer, the tapping sounds stop, as if the machine were aware of his / her presence, further enhancing this quality of it being *alive*.

Facing the typewriter, a little distance ahead, is a large mirror. This mirror reflects the spotlit typewriter on it pedestal. However, as the viewer comes closer to the mirror, this reflection seems to jump out at him.

What it is

The 'MagicMirror' is essentially a 'two way mirror', with a digital projector placed behind it. Two way mirrors have the capacity to become either reflective or transparent, depending on which of its two faces is receiving more light. The side that receives more light becomes reflective, and the other transparent.

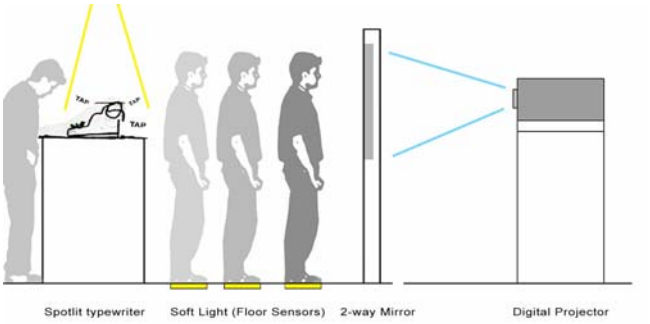
In this way, in its idle state, when the projector behind the mirror projects black (no light), the front surface of the mirror (which is receiving more ambient light) becomes reflective and displays the reflection of the spotlit typewriter on the pedestal. But as the viewer steps closer to the mirror, he activates certain sensors placed on the floor's surface (in this case - keyboard buttons), which trigger visual content on the surface of the mirror, via the projector. The moment the projector begins to display the content, the

mirror transforms from a reflective surface to a transparent backlit projection screen. This happens because, at that instant, the light source from the projector placed behind, is stronger than the ambient light in front of the mirror, hence the apparent transformation. The moment the projector switches back to black, the mirror becomes its reflective self again.

An interesting state in its transformation from a reflective surface to a backlit display is when the viewer steps upon the first floor sensor (keyboard button). The content thus activated, fades in slowly from a low opacity visual, to its full opacity. In the process the mirror is not suddenly transformed into a backlit screen, but instead its reflective quality fades away slowly, to reveal another layer, fading in.

In this way, the 'MagicMirror' becomes a dynamic content display system that uses the proximity and position of the viewer to generate and display content, in an unconventional manner.

For the sake of demonstration, a rough prototype was rigged up using a regular piece of glass in lieu of a two way mirror, a digital projector placed behind it, and keyboard buttons placed upon the floor as the proximity and position sensors.



3.2 WhisperingTable

The second idea, which explores the notion of providing information by inviting the viewer to interact with an object to discover its hidden layers of information, is the 'WhisperingTable'. Inspired by the notion of wonder cabinets and *shadow boxes*, the 'WhisperingTable' is, quite literally, a 'table of content'.

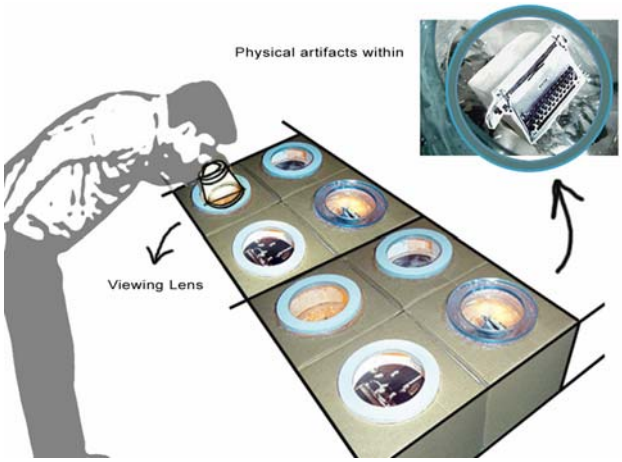
Like the first idea where the typewriter seems to be *alive*, this installation builds upon the similar theme of the animate object.

The 'WhisperingTable' is a table with small peep-holes on its surface. It is placed in a relatively dimly lit part of the space. In its idle state, the viewer can see a flicker of lights and hear a murmur of sounds, emanating from the table. This entices the viewer to approach the table. As the viewer approaches, the flickering stops as do the sounds. The table is seemingly aware of the viewer's presence.

What it is
The 'WhisperingTable' is essentially a hollow table with peep-holes on its surface. These peep-holes function as windows to the individual compartments below. These compartments are illuminated from within and the level of illumination is variable (like the effect of a light dimmer). In its idle state, these lights change their state from full illumination to a dim state, creating a flicker effect. Similarly, in the idle state, the audio content of the table, begins to play randomly and at a low volume, creating a murmuring / whispering effect, to draw the viewer to the table.

Each individual compartment houses artifacts and small digital screens, that when triggered launch contextual audio / video content. This content is triggered by the viewer placing a viewing lens (provided for on the table-top) upon any one of the peep-holes. The peep-holes, otherwise dimly illuminated, brighten up when the viewing lens is placed upon them, thereby bringing into focus the key peep-hole of the moment, while keeping the content of the others still a mystery, waiting to be unravelled.

For the sake of demonstration, a quick idea sketch was developed using cardboard boxes and keyboard buttons as the pressure sensor triggers.



3.3 InteractiveBook and WallCabinets

This installation has two key components:
a) InteractiveBook (plus fragmented/distributed projections)
b) WallCabinets

a) **InteractiveBook**
A book is an object that is symbolic of information. We have a tacit understanding of how to use it. We know, that to access the information within, we have to open it and flip

through its pages. Based on an earlier prototype called 'The Book of Answers' done by Aparna Rao, a colleague of mine at IDII, the 'InteractiveBook' explores this notion of our intuitive interactions with an ordinary book, to generate content in a not so ordinary manner.

What it is
Upon a spotlit pedestal is placed the key object of the display, a typewriter. Placed at a slightly lower level is a book. This book provides information about the typewriter on display. However it does so in an unusual manner, as the viewer soon discovers. At the first level, its pages provide textual information and printed imagery, as does a conventional book. But at a second level, certain pages once flipped by the viewer, launch contextual video projections onto a fragmented display system, making the 'InteractiveBook' a simple tangible and intuitive interface to access information. It plays on the theme of the 'magical object'.

The video projections take place on a set of papers that are suspended from the ceiling, seemingly floating in space. These papers are placed at varying distances from one another, creating an illusion of depth and producing a fragmented image of the whole. When viewed from the front, the viewer sees the whole image, but when viewed from any other angle, these floating papers appear like illuminated windows, animating the space in the periphery of the key exhibit. This fragmentation is suggestive of different ways of looking at the key object on display, as well creating an atmosphere of drama around it.

b) **WallCabinets**
The second component of this installation are the walls of the space surrounding the typewriter on display, and the 'InteractiveBook'.

Carrying forward the inspiration from *Wunderkabinette* (Wonder Cabinets) and building upon the idea of the 'WhisperingTable' is the concept of the 'WallCabinets' - the wall as an interactive space.

What it is
The walls surrounding the key display are embedded with a matrix of small windows / compartments, each displaying an image or artifact placed within. Some of these compartments have doors with handles (simple interface cues), which the viewer can open to reveal a hidden layer of information, in the form of audio or video content, transforming the entire wall into a large interactive wonder cabinet. The images and artifacts displayed within these compartments are arranged in context to the object on display, to give the viewer a broader sense of the times i.e. events, design directions and popular culture that existed, when this object was designed and produced.

While 'InteractiveBook' provides a micro view of the typewriter on display, the 'WallCabinets', like the *Wunderkammer* (Wonder Room), provide the viewer with a macro view - a glimpse at its larger context.

3.4 WonderObjects

In this third display, set up to present information about another landmark typewriter, the viewer finds a table with a typewriter placed upon it. Video content is projected from above onto the surface of the typewriter, and the surface of the table itself.

In its idle state the visitor sees and hears hands typing on the machine's keyboard. The video has been created in such a fashion that there is a precise one is to one layering of the virtual image upon the actual physical object, transforming the static object into a surreal animate entity.

As the viewer comes closer (via proximity sensing), he triggers another video, and the hands begin to type out a set of instructions which appear on a sheet of blank paper that is inserted in the machine. These are an index to certain 'hotkeys' on the typewriter's keyboard that when pressed, trigger contextual video content, animating the object on display and creating these 'wonder objects' that seem to pulse with life, haunted by an immaterial presence that enables them to tell their stories to us

CONCLUSION

By presenting the examples mentioned above, this paper illustrates ways in which an ordinary artifact in a museum space may be made more interesting to the viewer, by encouraging an active interaction between the viewer and the object on display. The interaction process has been designed with a strong focus on the elements of surprise and discovery, to make the viewer's experience a little like the Wonder Rooms and Wonder Cabinets of the 16th and 17th centuries - an experience of learning by wondering at and wondering about the object on display.

ACKNOWLEDGMENTS

Interaction Design Institute Ivrea for all its support, and the Yeditepe University, Istanbul for providing the opportunity to present this paper and for its publication.

REFERENCES

• DIS2002, *Serious Reflection on Designing Interactive Systems*, Publication of proceedings from Designing Interactive Systems 2002 (June 25-28, 2002, The British Museum, London), ACM Press, 2002.

• Edwards, W.K and Grinter, R. E. *At Home with Ubiquitous Computing: Seven Challenges*, Computer Science Laboratory, Xerox Palo Alto Research Center, California, US.A.
In: G.D Abowd, B. Brumitt, S.A.N. Shafer (Eds.); UBICOMP, 2001, LNCS 2001, pp 256-272, 2001 (copyright – Springer-Verlag Berlin Heidelberg 2001).

• Holmquist, L. E., Redstrom, J. and Ljungstrand, P. *Token-Based Access to Digital Information*.
In: Gellersen, H. W (Ed.); Handheld and Ubiquitous Computing, Lecture Notes in Computer Science No. 1707, Springer-Verlag, 1999, pp 234-245.

• Ishii, H. and Ullmer, B. *Tangible Bits: Towards Seamless Interfaces between People, Bits and Atoms.* In Proceedings of CHI '97 (March 22-27, 1997), ACM Press, 1997.

• Ishii, H. and Ullmer, B. *mediaBlocks: Tangible Interfaces for Online Media*, Published in the Conference Abstracts of CHI'99 (May 15-20, 1999), ACM Press, 1999.

• Ljungstrand, P. , Redström, J. and Holmquist, L. E. *WebStickers: Using Physical Tokens to Access, Manage and Share Bookmarks to the Web*.
In Designing Augmented Reality Environments (DARE'2000), Elsinore, Denmark, April 12-14, ACM Press, 2000.

• Marchak, F. M. *The Magic of Visual Interaction Design*, SIGCHI Bulletin Volume 32, Number 2, April 2000.

• Poynor, R. *The Hand That Rocks the Cradle*, I.D. Magazine, May/June 1995, pp 60-65.

• Rosenblum, M. and Macedonia, M. *The MagicBook - Moving Seamlessly between Reality and Virtuality*, IEEE Computer Graphics and Applications, May/June 2001.

• Smith, M., Davenport, D. and Hwa, H. *AURA: A Mobile Platform for Objects and Location Annotation*, Published in Adjunct Proceedings of Ubicomp 2003 (October 12-15, 2003), ACM Press, 2003.

• Svanaes, D and Verplank, W. *In Search of Metaphors for Tangible User Interfaces*.

• Tognazzini, B. *Magic and Software Design*, "Principles, Techniques, and Ethics of Stage Magic and Their application to Human Interface Design."
In Proceedings of INTERCHI, 1993 (Amsterdam, the Netherlands, April 24-29, 1993), ACM Press, New York, pp 355-362.

• Ullmer, B. *Models and Mechanisms for Tangible User Interfaces*, MIT Media Lab, Tangible Media Group, Cambridge, MA, USA, 1997.

• Ullmer, B and Ishii, H. *The metaDESK: Models and Prototypes for Tangible User Interfaces*. In the Proceedings of UIST '97, October 14-17, 1997, ACM, 1997.

• Ullmer, B and Ishii, H. *Emerging Frameworks for Tangible User Interfaces*, IBM Systems Journal, Vol 39, Nos. 3 & 4, 2000.

• Want, R. *Remembering Mark Weiser: Chief Technologist, Xerox PARC*, IEEE Personal Communications, February 2000.

• Weiser, M. *The Computer for the 21st Century*, Scientific American, 1995.

• Weiser, M and Brown, J. S. The Coming Age of Calm Technology, Xerox PARC, October 1996.

• Wellner, P. *Interacting with Paper on the Digital Desk*, Communications of the ACM, July 1993.

• Wisneski, C., Ishii, H., Dahley, M. G., Brave, S., Ullmer, B and Yarin, P. *Ambient Displays: Turning Architecturalinto an Interface between People Information*. In the Proceedings of the First International Workshop on Cooperative Buildings (CoBuild '98), February 25-26, 1998, Springer, 1998.

Bio

Tarun Jung Rawat is an Interaction Designer and independent researcher. He holds an MA in Interaction Design from the Interaction Design Institute Ivrea, Italy (2004). His current projects are inspired by issues arising from the realms of ubiquitous computing and more specifically, the area of tangible computing. His projects explore various interaction design/human computer interface related work within this framework. He is presently based in New Delhi, India. Examples of his work may be found at:

http://jungrawat.com/