INTERACTIVE RADIO: EXPLORING VISITOR STORIES USING A RADIO INTERFACE

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Figure 1: Exhibition at the Hunt Museum.

ABSTRACT

In this paper, we describe an interactive environment designed and created within a museum context. "Re-Tracing the Past: Exploring objects, stories and mysteries" allowed visitors to explore and investigate artefacts housed within the museums permanent collection. One interactive installation within 'Re-Tracing the Past', the 'Radio', allows for the exploration of previously recorded visitor stories through an interface metaphor based on a 1940's style radio – the 'Radio'. This interface proved to be an ideal window into a continually growing repository of visitor opinions. This paper will briefly introduce the larger environment and particular museum context. We shall then focus on the Radio, looking at some of the earlier design ideas, the physical modifications, its technical implementation, and user responses to such a familiar object.

1. Introduction

This paper discusses some interesting features of one of the interactive artefacts developed for a museum exhibition. The work described in this paper was conducted within the EU SHAPE Project[1].

The project's focus is on creating assemblies of hybrid physical-digital artefacts in public spaces - such as museums and exploratoria- that allow visitors to actively interact with features of both physical and digital spaces. "Re-Tracing the Past", held at the Hunt Museum in Limerick (Ireland) was open to the public from the 9-19th of June 2003[1].

The theme of "Re-Tracing the Past" was concerned with mysterious objects from the Hunt Collection that were never fully interpreted and classified by curators and experts. Through this interactive exhibition, we aimed to encourage visitors to actively reflect on the nature of museum research and the classification processes involved. The exhibition content and rationale was carefully designed on the basis of extensive field studies conducted in the museum during the past three years, involving visitors, museum staff, docents and experts. The design of the first exhibition space, the Study Room, (see Figure 1) was inspired by a similar room in the home of John Hunt, the original owner of the collection. The Study Room had the goal of providing visitors with a place for investigation of the objects, where several kinds of information about the objects could be freely explored. Within the second space of the exhibition, the "Room of Opinion", visitors were able to handle replicas of the four mysterious objects, and most importantly were invited to express their opinion on them. These opinions were then collected and made accessible in real-time – to other visitors to the museum exhibition.

2. The Exhibition Interactive Components

The Study Room contained a large bureau or study desk; a trunk; two bookshelves; rugs; plants; old lamps; old books; an old radio and numerous other props. While this space was fitted with numerous artefacts to make it look like an actual study room, four of the objects in the room were designed to be interactive. The interactive installations included: the Interactive Desk; The Combination Machine (trunk); Radio; and a Virtual Touch Machine (a mirror), which was mounted on a wall in the Study Room. These installations were augmented with a number of software and hardware technologies: e.g., Polhemus 3D tracking1[1] and Radio Frequency Identification [2]. The 'Room of Opinion' afforded visitors the opportunity to actually handle and touch replicas of the four objects; and, furthermore, to contribute their opinions about the objects to a community repository of comments on the artefacts. There were five plinths in this second space, the Room of Opinion. On four of the plinths there were replicas of the objects for visitors to handle. On the fifth plinth, there was a telephone receiver, which visitors used to record their ideas about the objects. As visitors added their ideas to the digital archive, their opinions appeared as new recordings for the particular object in the Radio on the objects particular band. Speakers were also placed in each of the plinths so visitors could hear a sampled murmur of their collected voice recordings. Having submitted their ideas about the objects in the Room of Opinion, visitors subsequently returned to the Study Room, where they could search for and listen to their opinion that had been updated onto the interactive radio. The radio was used as a "sonic browser" for navigating through the body of opinions left by visitors. By changing a channel on the radio, visitors could browse the "stations" corresponding to each visitor's recording. When the selector was not over any 'station' white noise was played to simulate the scanning by the user that occurs with a normal radio when looking for the next station. There were several other interactive features in the Room of Opinion, but our focus in this paper is on the Radio.

Designing interactive auditory displays for the public requires that a number of issues have been addressed. First of all, we have to consider where and how the auditory display is appropriate. As designers we must take into account the users' capabilities, while carrying out tasks in real environments such as in the museum context, and also consider that surrounding noise levels might mask the sound. Where sound might enhance interaction, ways of creating and testing auditory metaphors need to be explored. The radio can be seen as an "embodied design" [3] with the auditory display embedded into an artefact that has well established and a known operational metaphor. The radio is an uncommon style of auditory display as it is both unidimensional and based on speech resources. These were choices for the particular museum scenario but we believe that this type of embodied interface could easily be used for non-speech audio based on our early findings on auditory displays into that area [4, 5]. The artefact had two other major requirements that should be highlighted; these were accessibility and an aesthetic appearance. The established operational metaphor and tangible feedback were used to meet the

accessibility requirement. The aesthetic requirement was meet by the presentation of the interface within the context of a 1950's style radio. Our main research goal in examining the interactive radio was to examine the suitability of an existing auditory metaphor within an accessible and aesthetic interface.

3. The Radio

In this section we shall introduce the Radio in more depth, beginning with its design origin and physical features. We briefly describe the iterative design and development of the Radio system, including hardware, software and conceptual design. We begin with a brief note on the origin of the concept.

The Radio was used as the main access point to the repository of opinions, which were recorded by the visitors. A number of different solutions were suggested throughout the design process to allow visitors to access this wealth of information. During this process we began to investigate using the recordings as a link between the two different spaces, as their content could act as an important primer of the imagination. When we decided to allow access to these recordings in the study room we began to look at suitable methods, which could be used as a vehicle for their delivery. One suggestion was to fit a selection of small speakers inside the dividing wall between the spaces so as to create a sonic wall, on which visitors could eavesdrop on the second space. However this did not fit with the overall scheme of the study room so we reverted to reviewing the period fixtures and fittings of a classic study room. One such device that came to our attention was a radio.

Figure 2: The Interactive Radio in the Re-Tracing the Past Exhibition.

A radio would not be out of character for a study room in use in the 1950's. This familiar object has already well established affordances of use, which we realised could be exploited in a playful and engaging way for the purposes of our exhibition. The radio, which was chosen for the exhibition, was a PYE valve radio originally built in the mid-1940s, still in working order. The innards of the radio were carefully removed and replaced with our specialised Radio electronic components. A new Perspex cover was created in the original style and the original knobs and finishes were put back in place. Speakers were added inside the now empty casing. A stripped down flat screen monitor was also pressed against the back of the Perspex cover. The tuning knob was attached to a deconstructed mouse. A piece of rubber was sandwiched between the mouse and the Perspex, which caused a reasonable amount of friction when turned. This was done to mimic the stiffness of the tuning knob on the original radio. The wavelength selection knob was connected to a rotary switch, with four selections printed on the new display corresponding to each of the four mysterious

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objects. The knob was connected to a Pico device and attached to the controlling computer. The display within the radio had four horizontal bands of grey that corresponded to the clear horizontal bands in the printed Perspex. If we look at Figure 3 we can see an example of the radio's display. The four horizontal bandwidths each indicate one of the four mysterious objects. The Bandwidth that represents the 'Disc' is selected, as it is a lighter shade (A) than the other three bandwidths. The screen strips on the radio were designed to evolve during the period of the exhibition. As more recordings were made by visitors, then more 'stations' holding visitor opinions would appear on the appropriate radio bands. These recordings were added in sequence from left to right within the channel. On Figure 3 we can see these stations highlighted as vertical red lines, (B.) The blue line (C) is the vertical marker that indicates where you are on the tuning dial. When this line rolls over a 'station' on the selected bandwidth, the 'station' - or rather recording - will play. The entire radio was designed so that at a glance this looked like a normal radio, with a light inside to illuminate the tuning screen. The lines were added to provide an overview of the number of opinions within in the collection and for allowing the users to become initially oriented but we found that users preferred to use the auditory aspect for navigation within an opinion category.
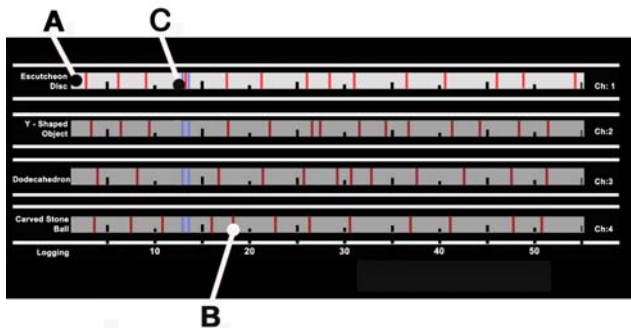

Figure 3: Display of the SHAPE Radio

The radio installation enabled visitors to listen and navigate while exploring an increasingly complex sonic space of voices. [These opinions are made at the Recording station in the Room of Opinion. The visitor put their keycard in the slot and this activated a prompt, which informed them to begin their recording. (A simple prompt such as "Please record your story on the Y-Shaped object after the tone") The purpose of the keycard was to assist us in determining which of the four artefacts the visitors' recording related to. This recording was stored and then transferred to the Radio for use in the particular object channel as a new station / visitor opinion.

4. Technical Implementation

The radio code was written using the Microsoft .NET framework in the C# programming language. This language was chosen due to time constraints as it allowed for rapid prototyping whilst still retaining the advantages of robustness and efficiency of the language as well as providing certain useful features such as file change monitoring. The .NET framework's directory and file change events were used to monitor for new wave files containing the visitors opinions

arriving on the machine from the recording station and then updated the display to add a station for each newly arrived recording. Figure 5 shows the sensor, computer and communication layout for the radio and for the recording station. The flow of information occurs when a visitor records their opinion on a particular object at the recording station. This recording is then saved and transferred to the Radio computer, which adds a new station in the relevant object channel for the new recording. This recording is then accessible to any visitors who are browsing the Radio installation. As you may also notice in Figure 5 the Radio and its controlling PC are some distance apart. The entire environment was configured in such a way that all the controlling technologies were 'behind the scenes' so as to not disrupt the ambience of the room. The traditional computer keyboard and screen had truly 'disappeared'.
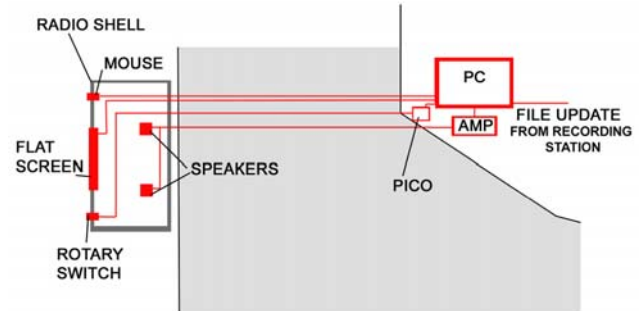

Figure 5: Sensor and Computer Technologies Assembly

5. Discussion

We believe that the use of the augmented Radio for the presentation of visitor opinions served a number of very purposes, from an interaction design perspective. One of the core features of the Radio is that it presents a user interface that takes advantage of the human ability to manipulate physical objects with either hand, providing a persistent audio and visual indicator of state, using familiar interface mechanism It also provides a housing for an assembly of inexpensive sensors and computer technologies that augment a physical device for use in a public environment while hiding the computer technology. The radio system has many affordances that help users when interacting with the digital narratives:

• The controls are easily handled with one or two hands.

• Their positions reflect the well understood radio metaphor

• They provide a tangible physical feedback which functions as a direct manipulation interface to the collection of sound files.

Figure 6: The Radio installation in use.

Over the course of the exhibition, we became increasingly taken with the many features of the Radio, and with the way it was used by the visitors. Developing mechanisms for browsing a corpus of sounds is a non-trivial task. (Earlier research by the authors has highlighted the difficult of managing and presenting collections of audio [6, 7].) Yet in our observations, visitors had no problems in determining how to use the device, or in "tuning" to hear different recordings. Of course, this particular interaction style is not without some limitations. If we were to have too many opinions, then the band "real-estate" would become crowded and people would have difficulty in finding different opinions. One response might be to view the Radio as only containing the more recent visitor opinions, and backing up earlier recording to another medium. Another option might be to examine the possibilities of scrolling channels to allow for unlimited bands. The issue of indexing into the stream of opinions also requires further investigation.

Our approach allows for visitors comments on an exhibition to be stored and browsed in a re-appropriated and engaging interface that engages users while taking advantage of the familiarity of the Radio interface metaphor among the users. The real time nature and organic growth of the collection allowed visitors to 're-visit' the installation at a later time and enjoy a different experience due to the growth of the opinion collection. Our implementation was based on relatively inexpensive technology and as such we expect to see many more museums exploring these types of unobtrusive multimedia installations, which engaged the visitors. Currently, our implementation is based on a single recording station with a single playback station but our architecture allows for multiple stations with the simple addition of more hardware.

6. Conclusions

In summary, this was our first public presentation of the Radio interface and we found that the vast majority of visitors enjoyed the unobtrusive nature of the interaction with the Radio. We also were intrigued by the way in which visitors gathered around the technology to listen to the stories – people sat, stood, knelt, and were able to interact with the technology in interesting ways, very different to sitting in front of a computer screen (see Fig. 6). Thus, while our interface could be seen as a single user station, we found that it was invariably the site of collective exploration and listening. We believe that exploitation of these

kinds of familiar interface metaphors with well established affordances open up a large design space that we are only beginning to explore.

7. Acknowledgements

8. References

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