

Listening2Painting: an Audio Augmented Reality approach for Arts

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ABSTRACT

This paper describes the first stage of the Listening2Painting project, which involves researching the effects of experiencing paintings through sonification. The report includes details of a pilot study and the initial version of an application as part of a larger project that involves multiple university students.

KEYWORDS

Audio-Augmented Reality (AAR), Arts, Mobile development.

1. INTRODUCTION

Painting has been one of the most effective and treated forms of communication and expression since the origins of the human species. Visiting art museums and observing the marvelous artworks of the past and present is a hallmark of cultural tourism. However, due to a lack of knowledge or limited time, we often fail to fully comprehend the elements artists intended to communicate through their works. A relevant contribution could be offered by using technologies such as Audio-Augmented Reality (AAR) to reduce this distance between the observers and the paintings. Utilizing the definition provided in [1] the AAR presents an additional layer of contextual information in addition to the user's experience with the real world, and the additional layer is presented in audio form. In this paper, we present the initial stage of the project "Listening2Painting". The main objective of this research is to explore how a tool like AAR can be utilized in the art world to ensure that a wider audience can comprehend the meaning of a painting. The study encompasses several areas of interest, including enhancing art appreciation and understanding, improving the museum experience for visitors, and introducing an innovative approach to teaching computer science skills to humanities students.

A milestone point is the release of a mobile application called L2P, allowing users to interact with a collection of selected artworks in various ways. This app will provide a unique experience by enabling users to explore several paintings using, at the same time, hearing and sight senses. The project aims to involve users in each step of the designing phase, from creating a participatory audio-labeled collection of artworks to being testers and peer-reviewers of the community work.

The project's objective can be summarized in three points. Firstly, to enhance the visitor's experience at the museum. Secondly, to provide a tool that enables the reading of a painting by uncovering details and making it easier for visitors to understand the choices made by the painter. Finally, the project aims to serve as a way to teach computer skills to humanities students. There are several ways to enrich the experience of exploring an artwork through audio. In [2] it is described as an interactive system that uses machine learning to recognize objects inside Claude Monet's painting automatically. In this research, the authors manually created a training dataset and enriched the user experience with soft music and natural sounds played in response to mouse positioning. The automatic sonification of a group of four artworks is the topic discussed in [3]. The music is produced using a designated algorithm [4] and further developed by a musician. Finally, a laboratory test is carried out in which participants view the reproduction of the painting while listening to the proposed audio in a setting that mimics a museum gallery. A sentiment analysis was conducted to explore participants' reactions. The approach proved useful in enhancing their experience. The effects of background music on the aesthetic experience of visual art are presented in [5]. In this paper, the authors explore the emotional impact of background music while observing an abstract painting by Wassily Kandinsky, reporting the effects on the experience reported by a group of visitors and how affected their judgments about the artwork. The use of sound in pictorial observation is also a topic of interest in the case of people who are blind or visually impaired, and there are several different approaches to this task. For instance, in [6] the relationship between sound and color is analyzed. The goal is to codify a set of colors with different melodies that enhance the experience for people with visual impairments. The touchscreen exploration and the verbal feedback are investigated in [7], where two different approaches are presented for segmenting elements within a painting for presentation. Finally, proxemic audio is the approach involved in [8]. Using a Microsoft Kinect to detect the observer's position and so provide

specific audio. In this paper, we first present a pilot study, followed by the web platform where the first group of participants contribute, and finally, the alpha version of the app.

2. PILOT STUDY

A prototype version of the L2P has been created to enable visitors of the "Palazzo Chiericati" Museum in Vicenza to interact with four selected paintings. Each painting has been associated with the most significant elements which are represented through sound. For instance, the unsheathed sword is represented through the bright noise, the calm babble of a river represents the house of Nereids at the court of Diana, and the sound of wind strokes on a flag represents the banner of an army. An attempt was made to reproduce the sounds in such a way that they were as representative as possible of the symbolic representation of the work, thus taking into account the impact of the individual elements within the work itself. The choice of sounds and their processing was made not by a stereophonic expert but by an art history expert as part of a thesis project. The relevance of the pictorial element has guided the choice of these elements. The aim was to make visitors more participative than simply contemplative. However, it's not always possible to associate all the relevant elements with a sound, and not all of the elements that produce sounds are relevant to the picture. After completing the acoustic description, the sounds have been added to the interactive app. A tablet was positioned in front of each painting and visitors were invited to listen either to a soundscape that presented all the sounds in a sequence that suggested the direction in which the painting was supposed to be read or to interact with the touch screen that presented an image of the painting, activating the corresponding sound when the element was touched. Twelve museum visitors, aged between 18 and 30, freely agreed to participate in the test. They were provided with headphones to ensure that they could perceive the sounds well and not disturb other museum visitors. The participants were divided into three different groups representing three different routes, this one in a random manner, alternating between listening to the sound narration, interacting with the app, or without any sounds. Results have been encouraging. In a short interview carried out after the experience, visitors showed appreciation for the experience, saying that it was involving and informative at the same time. No further information was provided in this initial prototype, so the user experience was limited to listening to the sounds. However, some of the users expressed an interest in knowing more about the reason why some elements have been sonified. An interesting outcome of the interviews was that visitors slightly preferred the passive experience of just listening to the soundscape because they were afraid of missing some sonic elements through the interaction.

3. THE WEB PLATFORM AND THE APP

The next step in our research is to transform the prototype into a tool that allows anyone to create an AAR experience using the app by selecting the painting and adding the sonic elements.

At this initial stage, a group of about twenty students from the bachelor's degree program in Cultural Tourism Planning and Management and Art History were involved in the project. The first operation is the sonification of a proposed set of artworks. Students are asked to select one painting, without limitations about artistic movement or genre, and manually set the opera pieces in which users can interact. After the mandatory registration, the web portal provides a page dedicated to the insertion of the artwork. Figure 1 shows on the left the parameters required: Title, Artist, Year, a brief presentation of the painting, and two multimedia files, respectively the image file (in PNG or JPG/JPEG) format and file audio, which is optional in this stage of the project, which represent the complete soundscape. The resulting page is on the right side of Figure 1. Users can modify each field whenever they want.



Figure 1 - Screenshot of the web Portal

Once the fundamental element of the artwork is inserted, users can proceed with the process of sonification. To accomplish this task, a dedicated webpage has been created. The required information for the sonification process includes the audio file, the rectangle coordinates associated with the sound, the volume level, and a brief description. A flag indicates whether the sounds should be played in the background without user interaction to provide a basis on which individual sounds are added: the sound of wind through the leaves in a forest, the voices of a crowd of people, and so on. Participants added to the Google Android Dashboard tester group can now test and check the added elements. The app is currently being tested internally and is only available on Android. The aesthetics have been kept to a minimum for testing purposes. Figure 2 and Figure 3 show, respectively, the dynamic list with all artworks and the basic screenshot of one of them. Users are guided to identify rectangles in red shadows. We plan to remove this function in the final version. Users can explore the painting with their fingers and play linked sounds automatically.

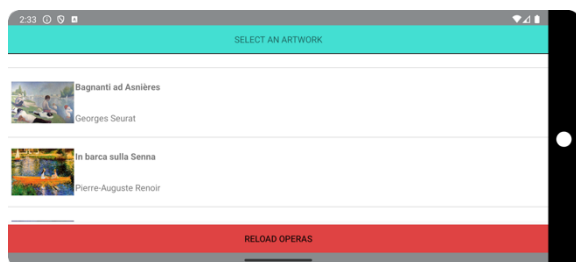


Figure 2 - App screenshot



Figure 3 - App screenshot

4. FUTURE WORKS

As reported, this work is in the initial stage. There are several directions in which the research can be developed. First of all, we plan to improve the interaction by providing information about the elements associated with sounds. Once the visitor's attention is directed towards an element, we can provide a description of that element, its role in the picture, the artistic choices of the painter, and so forth. Moreover, additional feedback can be provided about the number of sonic elements, with a counter highlighting how many elements have been selected. Most of all, we intend to replicate the initial experiment in a real museum with a larger group of users testing the L2P app and providing feedback.

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