Novel Interaction – Augmented Reality for Madame Tussauds

Joshua Viado
Middlesex University, London,
UK
JV244@live.mdx.ac.uk

INTRODUCTION

Augmented Reality (AR) adds any sort of digital data on top of the physical world to enhance the user's view of existing reality. There are several use cases that AR can be useful such as adding additional information, highlighting certain details and overall adding a sense of realism to the digital data itself. One subject matter that AR has been taken into consideration is museums and exhibitions. This paper consists of the team's research, design and prototype for an Augmented Reality experience for visitors in Madame Tussauds.

RESEARCH

Madame Tussauds is a museum that displays life size wax figures of famous celebrities, athletes and characters from well-known franchises such as Star Wars and Marvel.

Museum observation

The team visited Madame Tussauds located in London. During the museum visit, the team had a set of observations to look out for. The team wanted to observe the way the wax figures are presented and how they are grouped together, the visitor's behavioural patterns and how they navigate inside the museum.

Figure 1. Photo of wax figures on a music stage scenery.

The wax figures are presented out in the open with no barriers. Almost all the wax figures do not have information plaques alongside them. Some figures are gathered together based on their careers along with a suitable scenery (shown in Figure 1.). Other wax figures are more individually placed and have a specific scenery that replicates a certain moment of their career.

The visitor's main activity is taking pictures alongside the wax figures. Most visitors have their smartphone in their hands, ready to take pictures. They usually came along with friends and family to assist each other when taking pictures. Since the wax figures can be touched, the visitors try to be more creative and silly with their picture taking. Because these wax figures are based on famous people and characters, the team discovered that most visitors had little to no intentions of gathering additional information about the wax figures. This is because they already have some knowledge about the wax figures.

In terms of navigation, the museum is a one-way direction when going to different sections. All the sections are in order meaning the visitors cannot just go to a section they want, but must go through each other sections in order.

The result of the team's observation has influence the design ideas the team has put together for Madame Tussauds. Knowing that there are no information plaques on most wax figures has influence the team's idea of augmenting additional information for the wax figures. However, establishing that most visitors had little intentions of gaining knowledge about the wax figures and taking pictures is the visitors main activity, augmenting additional information should be presented more visually rather than in text.

DESIGN CONCEPT

The main goal for this project is to enhance the visiting experience for Madame Tussauds using Augmented Reality. For the design concept, the team picked three wax figures to work with and create an AR experience specific to each wax figures. Based on the team's findings during the museum visit, one objective to achieve during the design concept is to augment additional information but present it more visually. Another objective is using AR to add other materials that allows visitors to be more creative and experimental when taking pictures with the wax figures.

Forms of AR used

One form of AR used is augmenting additional information on the wax figures. For this type of augmentation, the team chose Lady Gaga's wax figure.

Figure 2. Illustration of AR overlays for Lady Gaga's wax figure.

As shown above (Figure 2.), to present additional information more visually, the team decided to augment Lady Gaga's music discography by displaying all her album covers continuously rotating around the wax figure. In case the visitor doesn't know who the wax figure represents, the team also decided to add the name of the celebrity or character for all the wax figures. Also, the team decided to add an information button to get a short description regarding to the specific moment the wax figure is based on.

Another form of AR used is adding augmentation to the users itself. Since taking pictures next to the wax figures is the main activity in the museum, the team decided to overlay certain AR objects that relates to the wax figure. This further extends the visitors experimentation when it comes to taking pictures. For this type of augmentation, the team chose Captain America and Muhammad Ali's wax figure.

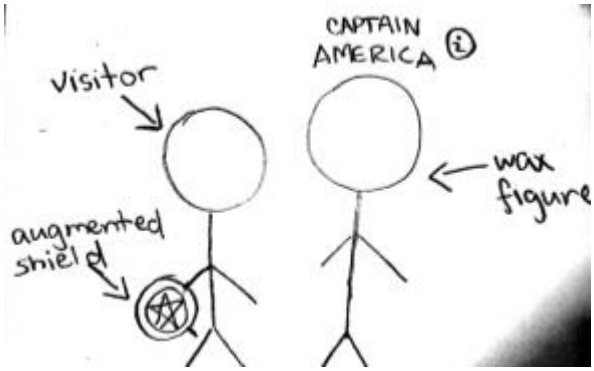

Figure 3. Illustration of AR overlays for Captain America's wax figure.

Figure 3 shows the visitor next to the wax figure with Captain America's shield augmenting on the visitor's arm. The wax figure also has additional information overlays like shown in figure 1.

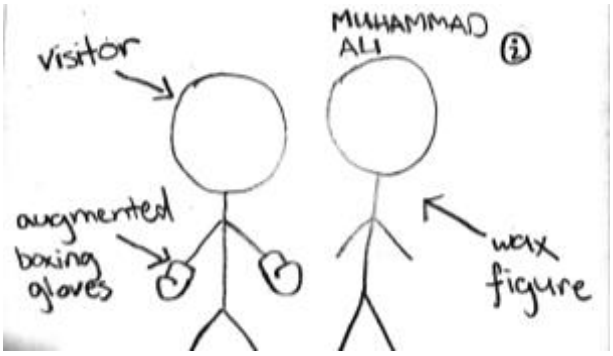

Figure 4. Illustration of AR overlays for Muhammad Ali's wax figure.

As shown in figure 4, the visitor is augmented with boxing gloves overlaying both hands next to Muhammad Ali's wax figure.

User Interaction

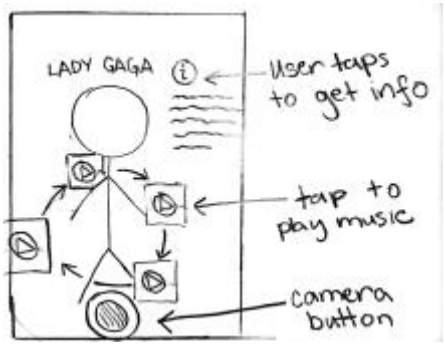

Figure 5. Illustration of the user interface and interactions

The team wanted to keep the focus on taking pictures as the main interaction. However, there are a few elements the user can interact with when going into the AR experience. Figure 5 shows the overall user interface and the key interactions for the user. In terms of user interface, the camera button located at the bottom is the only UI element to keep picture taking as the focus of the interaction. Also, when the user taps the camera button to take a picture, the name label and the info button on top will not be visible on the photo. The team felt that the user would not want those elements in the picture.

There are some key interactions with some AR overlays. Specifically, with Lady Gaga's wax figure, the user can tap one of the album covers around the figure to get an audio preview of the songs in the album.

PROTOTYPE

During the prototype, the team used an application called Unity that specializes on creating games for PC, consoles and mobile devices. In addition to that, Vuforia is an API the team used that adds AR elements to Unity. Vuforia works by detecting images targets and augment 3D objects from Unity around the image. Object recognition is also possible with Vuforia by using image targets to detect physical objects on top of the image. This allows accurate augmentation around the physical objects

Limitations & Compromises

Figure 6: Left to right: 1) A neck strap with a Vumark 2) A wristband with a Vumark 3) A glove with a Vumark

The first limitation the team came across is not having a physical object up to scale of the wax figures. Not having the right size and scale would cause inaccurate positioning of the AR objects. A compromise the team made is using one of the team members to represent the wax figures. To do this, the team had to put an image target to a neck strap for one of the members to wear it (Figure 6.1).
However, the image targets were unreliable when detecting in a certain distance. To fix this, the team used Vumarks from Vuforia. Vumarks allowed the team to create custom designed barcodes that is more easily recognized compare to image targets (Figure 6).

With Vumarks, the team could attach the barcodes into wearables such as gloves and wristbands. The team chose the gloves to augment the boxing glove and the wristband to augment Captain America's shield (Figure 6.2. & 6.3). However, the team was limited to using only one Vumark barcode as Vuforia required obtaining a pro version of the API. This limitation restricted the team from adding all the AR overlays on the same application.

Figure 7: Left to right: 1) Screenshot of running application for Lady Gaga's wax figure AR overlays 2 & 3) Screenshot of application showing AR overlays on top of users.

Testing

The team used a Nexus 9 Android tablet for testing purposes. During testing, the team had to keep adjusting the size and position (Figure 7). Getting the right size and position is important to get the AR overlays feel more immerse.

Ideal museum setup

Visitors would need to download the native application to their preferred smartphone to get the AR experience. The wax figures would be placed on top of image targets to enable object recognition for accurate augmentation. Visitors ideally would open the native application and point the camera to the wax figures to get the AR overlays. Wristbands with the Vumarks are placed next to the wax figures for the visitors to wear. This displays the AR object related to the wax figure for the visitors to experiment with and ideally create silly pictures.

TEAM WORKING

The members who contributed in this project are Joshua Viado, Raj Tandel and Nadia Suleyman. All members attended during the museum visit as well as working on the design concept. For the prototype, each member worked on one wax figure.

CONCLUSION

The overall process of producing an AR experience for Madame Tussauds was successful. The team manage to implement enough elements to get an enjoyable AR experience. Adding AR overlays to the users itself increments the level of enjoyment when taking pictures. Creating an AR experience for a museum made the team acknowledge that Augmented Reality should enhance the focus of what the museum is about rather than being a layer of distraction. Madame Tussauds is already a more engaging experience compare to other museums so it was challenging for the team to come up with an idea that pushes further the engagement between the visitors and the museum. The team believes that this AR experience will effectively enhance the overall experience of the museum.