Before the Sun Rises

Story behind the photo

Canace CHEN

(WallpaperCave, no date)

Abstract

"Before the Sun Rises" is an AR storytelling artworks. It is comprised of photo prints, AR animation and sound. The photo combined with the virtual layer tells an imaginary story that happens before the sun rises. According to the VOA news, people worldwide have recently become more stressed because of the economy, pandemic, media and many other reasons (Mekouar, 2022). The purpose of this project is to let the viewers take a break from all the problems they are experiencing, just like sleeping at night. To inspire them by creating their understanding and connection with the stories, and to remind them that even if they are in the dark right now, the sun will rise soon.

The inspiration for the artwork was apple's live photo. When the user presses and holds a live photo, a short animation from the time when the photo was taken will be played. The artwork uses Augmented Reality (AR) technology; when the viewer scans the photo print with the mobile app, the photo will turn into AR animation to tell the story behind it.

AR empowers the connection between the human senses and technology; it blends digital information with the real world for people to have a unique perspective. This gives AR the potential to influence people emotionally and socially (Pucihar and Kljun, 2018). Choosing AR allows viewers to experience the artwork with multiple senses, which not only gives the viewers a more engaging and immersive experience but also makes the artwork inclusive for a wider range of people.

The storyboards was designed using a sketchbook. The frame-by-frame drawings were made with Procreate and the Da Vinci Resolve was used for the video editing. The AR output was implemented using the mobile app Artivive. However, additional features were developed with relevant research to ensure the whole experience is smooth and intuitive.

Ideas, User Group and Persona

Ideas	User group	Status
VR museum	Museum visitors	Discarded
Interactive whiteboard for teaching	School teachers	Discarded
AR for exhibitions	Exhibition visitors	Discarded
Storytelling with AR	Viewers	Chosen

User group:
- general public who comes to the exhibition
  - engaging story and visuals
  - clear instructions
- people who is interested in art/AR technology
  - smooth and logical operation
  - fun to explore
- families
  - appropriate for all ages
  - simple to understand and interact with
- students
  - inspiring and informative
- people with disabilities
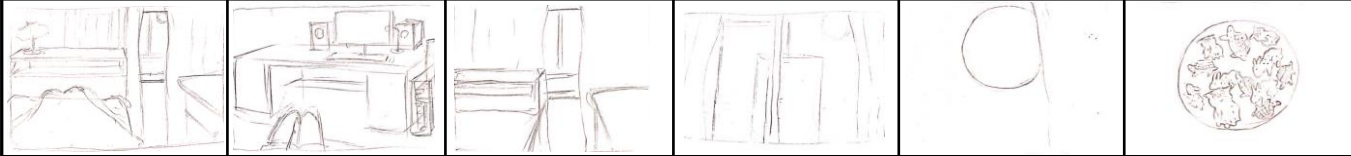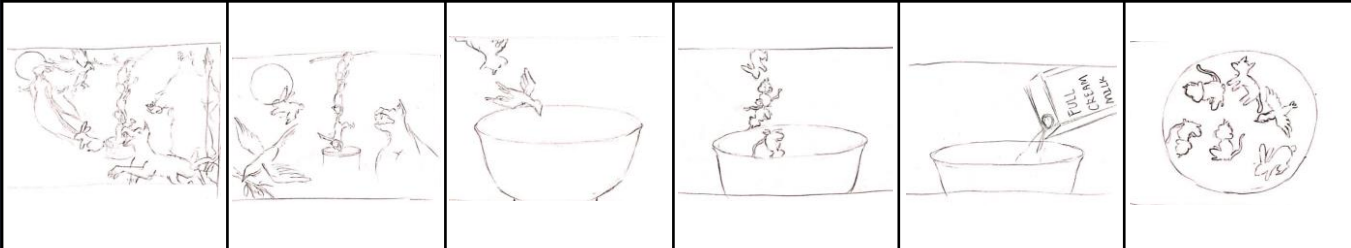 - inclusive design , accessibility research and features

Persona:

Viewer 1: Amanda is in her 40s. She loves painting. She dreamed to become a painter when she was young, but now the majority of her life is filled with work, problems and stress. She comes to the exhibition after work and finds this project very unique. She also checks out the art feed and explores other people's works. All the cool projects remind and inspire the creative side of her.

Viewer 2: Lucy is 3. She started to sleep alone recently and she is really scared. She comes to the exhibition with her parents. After playing with the AR animation, she collaborates with the project by adding her own paintings with the brushes. Her parents take photos of her artwork and herself using the camera feature. She thinks the experience is magical and fun. She enjoys the story and painting, and starts to believe nighttime is not that scary.

Viewer 3: Rohan is in year 3. He is blind, and he hates art excursions because it is hard for him to understand the beauty of those art pieces. However, this time he was guided through the whole experience by the audio narrative and the haptic system. He listens to the story and engages with the project like everyone else do.

Animation Making (sketchbook & Procreate)

Storyboards:

	Storyboard frames						Notes
1st version							The story is too simple and plain. It needs more creativity and imagination.
2nd version							I connect the animal shape biscuits to Chinese mythologies that relate to animals. However, there are too many things going on in the first two frames.
Final version								

Story: The animals from mythologies run across the sky every night, and before people wake up, they fall from the sky and become animal shaped biscuits.

Mythology 1: The moon rabbit lives in the moon. It's job is to pound the elixir of life for the moon goodness, Chang'e. (Hanyuefu, no date)

Mythology 2: Jingwei was the youngest daughter of the Yan Emperor. She was transformed into a bird after drowned in the East Sea. She always carries stones and branches from the West Mountain because she was aimed to fill the East Sea. (The Classic of Mountains and Seas, 2000, p.86)

Mythology 3: A group of monkeys try to save the moon because they think the moon fell into the well. Then they realise that it is only the reflection of the moon. (Daoshi, 2022, p. 1071)

Mythology 4: Xuanwu is also called the Black Tortoise. It is a turtle entwined with a snake. It represents the north. (Qu et al, 2014, p. 140)

Frame-by-frame drawings using procreate:

Animation Making (Da Vinci Resolve & Artivive)

Sound:

story narrative script:
Everyone is still sleeping. The moon rabbit jumps from the full moon into the waning gibbous. A bird flies out with the moon rabbit to the third quarter. A pile of monkeys swing to the waning crescent. And a giant turtle drops from the above.

Morning! Animal biscuits for breakfast!

without story narrative:
The sound of rabbit jumping, bird, monkey and giant steps were used for the animals. The sound of alarm was used to mark the end of the night and the start of a new day. These sound were used to give the viewers a multi-sensory and more immersive experience.

Animation with narrative:
https://artslondon-my.sharepoint.com/:v:/g/personal/c_chen0320213_arts_ac_uk/EcNQjfGMbctEhaSrb48YVRgBnFjywqb_hDAFfQFn4ZNa_A?e=xbegdQ
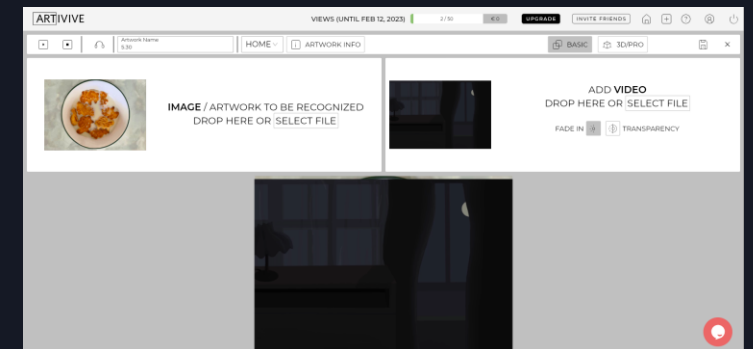

Animation video:

The animation was made using Da Vinci Resolve 16. The standard frame rate for 2D animation is 24 fps. However, animating on 2s is commonly used in animation studios (Lally et al, 2018). This technique is to have 1 drawing per 2 frames, therefore, to have a 30-second animation will need 360 drawings in total. Since this is an individual project, a mix of shot on 2s to up to 6s was used to reduce the workload (Ryan, 2021). A total number of 162 frames were drawn to create this 28-second animation.
The average frame rate is approximately 6fps. The smoothness and consistency of the motion is accordingly reduced.

Animation: https://artslondon-my.sharepoint.com/:v:/g/personal/c_chen0320213_arts_ac_uk/EZQHcXN9wcNEs4-KB8saqs8Bjge2nh5eQgjoTOQsTQ0xIQ?e=ARhbQR

The photo was printed on a standard 6×4" photo paper.


AR bridging:

The Artivive Bridge platform was used to connect the animation video with the photo. The platform also allows the user to select to fade in/out, preview the result and set transparency level. It also have options for 3D projects.

AR Interface Development

Research:

AR for mobile phone user: Since AR is displayed using a mobile device, the screen will be relatively small and the user will have one of the hands occupied. In this case, it would be easier for the user to move the device relative to the real world rather than moving their fingers on the screen (Henrysson, Billinghurst and Ollila, 2005).

Collaborative AR: The interface needs to display its components with clear visibility and information so that the users will understand the purpose of each component and find the right one to use. The tools should not take too many interactions to use because having faster switches among the them will allow the users to multitask better (Jacucci, 2005).
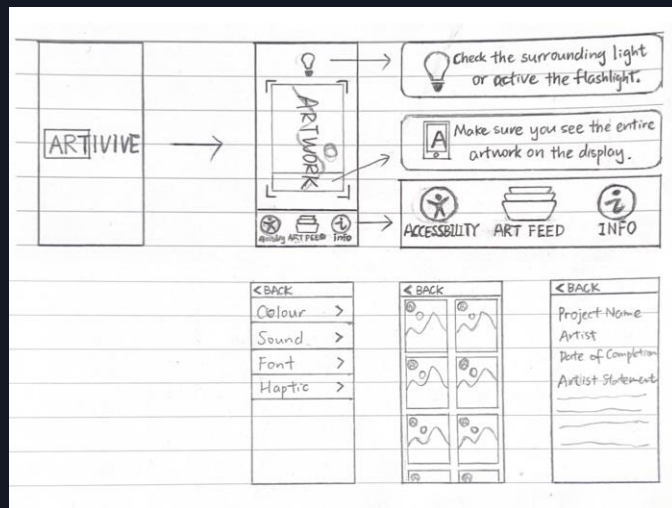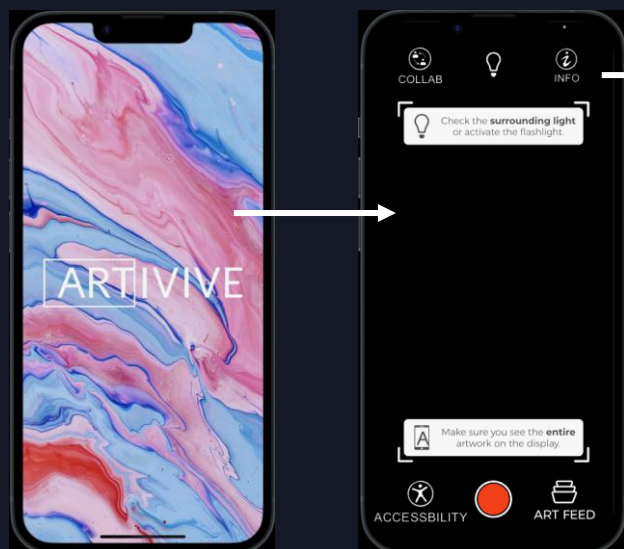
Initial design:

The initial design did not have the collaborative feature. It was too simple and not very different from other AR apps available on the current market.

Info: the information about the project including project name, artist(s) name, date of completion and artist statement will appear on top of the animation.

Collab: allows to viewers to collaborate with the artist(s) by adding their own "graffiti" on top of the project. There are a selection of brushes and colours.

Final design

AR Animation: after successfully recognising the photo, the AR animation will play on top of it. The red button allows viewers to take photos or recordings.

Accessibility: the page offers a range of tools including colour filters, sound narrative, magnifier and haptic to help disadvantaged groups to enjoy the experience.

Art feed: creates a space for inspirations. Allows viewers to see more projects produced by different artists.

Initialising page   Scanning page
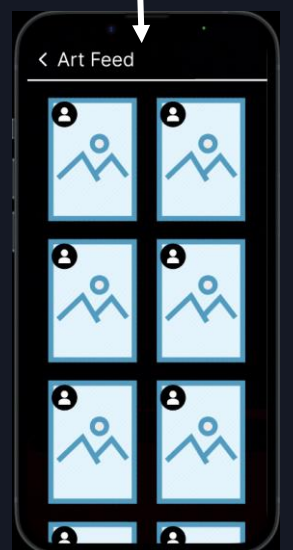
(Iconfinder, no date)
(Onlinewebfonts, no date)

Accessibility

Multi-sensory system: The AR animation is naturally multi-sensory. While this allows viewers to receive the inputs with multiple senses, the inputs are often presented in a fast succession (Bisenzi and Carducci, 2022).

Colourblind filters: 4 colour filters are provided for the 4 types of colour-blindness including protanopia, deuteranopia, tritanopia and monochromacy (applied results shown in the images below).

| original | protanopia | deuteranopia | tritanopia | monochromacy |

Sound: The animation provides 2 sound tracks: one with the story narrative and one without it. The story narrative is designed to help people who needs more context in order to understand the story, especially for blind people who heavily relies on hearing when experiencing the world (Bisenzi and Carducci, 2022).

Magnifiers:
The magnifier can enlarge any component of the interface as well as things in front of the camera. It would make it easier for older viewers to see the screen and the project details.

Haptic:
The haptic system is enabled by default. It will vibrate twice when the app is ready to scan, when the photo has been successfully recognised, when the frame is not within the camera during the animation, and when the animation is finished. It will vibrate once when the viewer press any button. It provides feedback to help guiding people and improve overall perception (Díaz et al, 2006). Viewer can turn it off manually.

Final Prototype
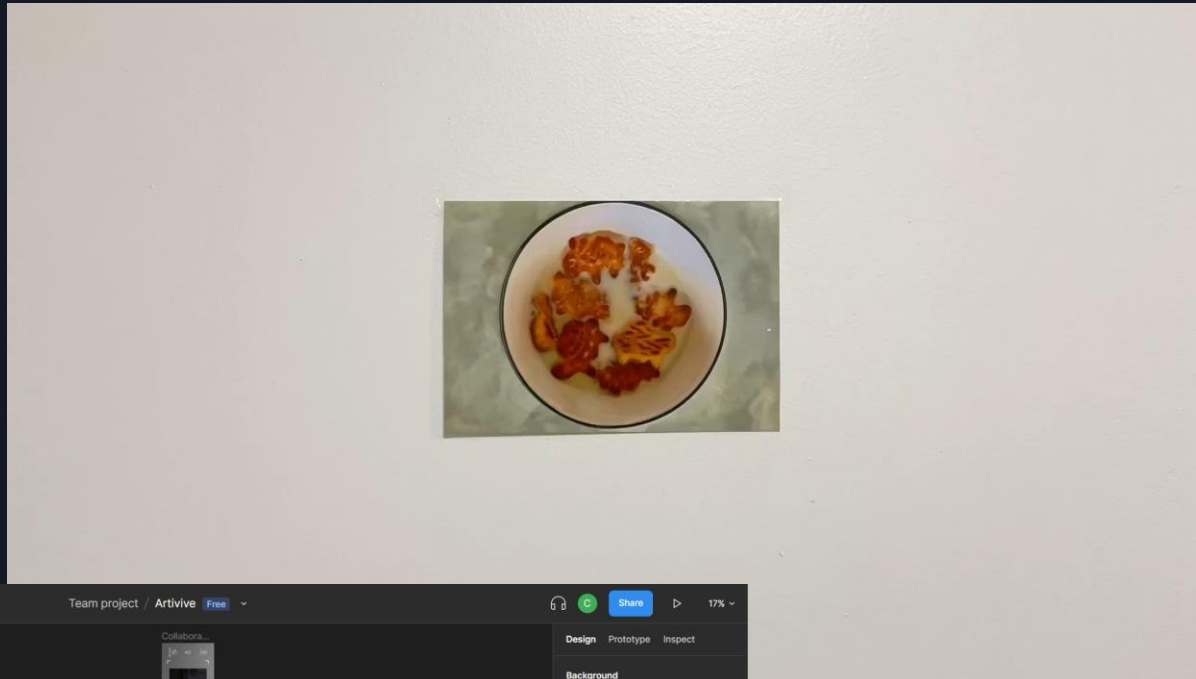
Video:
https://artslondon-my.sharepoint.com/:v:/g/personal/c_chen0320213_arts_ac_uk/Ef3G6FyEoxdHonVIPv48BacB-XVdKzgG6e3ND61GQ6JTew?e=aiZ5MG
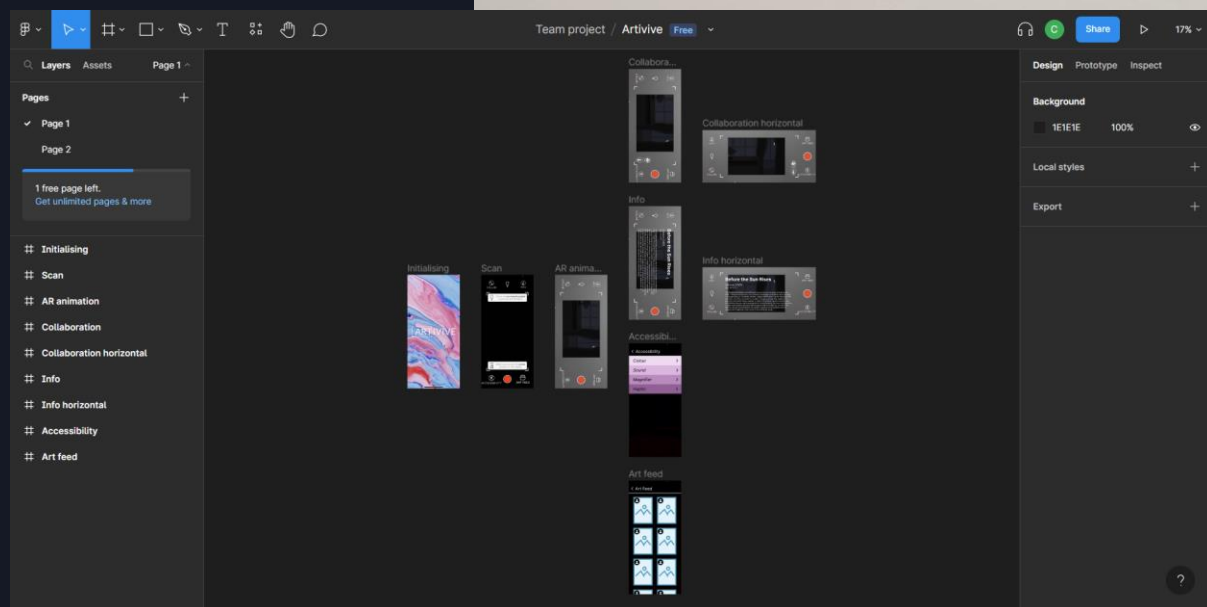
AR interactive interface design:
▶ Page 1 - Artivive (figma.com)

Evaluation

Self evaluation: The final product is easy to use— simply pointing the phone at the photo print and make sure the entire photo is within the frame. The app is providing clear instructions to guide the viewers. The product does not require a big physical space because it expands virtually. By including the collaboration and art feed features, it becomes more engaging and inspiring. It is designed to be inclusive and provides a range of accessibility tools to help.

Possible evaluation methods:

1. Neilson Heuristics Evaluation: the product will be given to a group of evaluators and they will inspect and assess the project against the Neilson Heuristics checklist individually. Then they will discuss and put together the problems which they have identified. At the end, they will report back to the designer.
2. Ethnography: observe the user when they are using the product in a natural environment. This can not only identify problems with the product, but also discover more possibilities through the users' interaction and usage of the product.

Possible improvement:

1. The Animation could have a higher frame rate to make the motion more smooth and natural. The original plan was to make three animation but the workload was too much beyond the expectation. Therefore the project only focused on one. However, with three animation, the story and the whole experience would be more complete and powerful.
2. It would be better to allow the viewers to adjust the speed of the animation. The story has a rich cultural context behind it which the narrative cannot fully explain. Therefore, it can be hard to understand for people who is from a different cultural background.
3. The collaboration feature could allow viewers to collaborate with each other, too. There could be an option to open a private canvas to collaborate with the project, and another option to open a shared canvas and connect to other viewers or just add on top of the previous viewers' work.
4. Since the project already has an integrated camera and virtual brushes, there could be a DIY filter feature for people to create their own filter and take fun photos at the exhibition.

References

1. Bisenzi, E. and Carducci, A. (2022) *48 Hours to make animation accessible*. Available at: 48 Hours to make animation accessible | Media Education (fupress.net) (Accessed: 23 Jan 2023).
2. Colblindor (2021) *Coblis — Color Blindness Simulator*. Available at: https://www.color-blindness.com/coblis-color-blindness-simulator/ (Accessed: 06 Jan 2023).
3. Daoshi 道士. (2022) *Fayuan Zhulin 法苑珠林*. Available at: http://buddhism.lib.ntu.edu.tw/FULLTEXT/sutra/chi_pdf/sutra21/T53n2122.pdf (Accessed: 13 Jan 2023).
4. Díaz, I. et al. (2006) *Influence of multisensory feedback on haptic accessibility tasks*. Available at: https://link.springer.com/article/10.1007/s10055-006-0028-4 (Accessed: 23 Jan 2023).
5. *Dong Tao Xing 董逃行* (no date) Chang'an, China: Han Yuefu.
6. Henrysson, A., Billinghurst, M., Ollila, M., (2005) *Face to Face Collaborative AR on Mobile Phones*. Available at: Microsoft Word - ISMARpaper.doc (canterbury.ac.nz) (Accessed: 20 Jan 2023).
7. Iconfinder (no date) *Document, file, image icon*. Available at: https://oaj.fupress.net/index.php/med/article/view/12029 (Accessed: 20 Jan 2023).
8. Jacucci, G. et al. (2005) *Augmented Reality Painting and Collage: Evaluating Tangible Interaction in a Field Study*. Available at: Title (tuwien.ac.at) (Accessed: 23 Jan 2023).
9. Lally, D. et al. (2018) *Unraveling Purl: continuing Pixar's experimental story initiative*. Available at: https://dl.acm.org/doi/pdf/10.1145/3214745.3214800?casa_token=PMH8be6sEI0AAAAA:h2kJG3g3okzCy42mV0MI4BURayQqu4KEfBNYAdu5cG2jQH-kxYKKhwojZTJHP4pKi05pspj-L-krsg (Accessed: 10 Jan 2023).
10. Mekouar, D (2022). *Why People Worldwide Are Unhappier, More Stressed Than Ever*. Available at: Why People Worldwide Are Unhappier, More Stressed Than Ever (voanews.com) (Accessed: 10 Dec 2022).
11. Onlinewebfonts (no date) *My Profile Free Icon*. Available at: https://www.onlinewebfonts.com/icon/329115 (Accessed: 10 Jan 2023).
12. Pucihar, K and Kljun, M. (2018) *ART for Art: Augmented Reality Taxonomy for Art and Cultural Heritage*. Available at: (PDF) ART for Art: Augmented Reality Taxonomy for Art and Cultural Heritage (researchgate.net) (Accessed: 12 Dec 2022).
13. Qu, Y. 屈原. et al. (2014*) Chu Ci 楚辞*. Available at: http://tw.shzu.edu.cn/_upload/article/files/30/fc/319c2bd04efc9b5fbfc8ccbf4572/390ef655-72f5-4d38-97ff-3eee8a9aac38.pdf (Accessed: 13 Jan 2023).
14. Ryan (2021) *What does animating on ones, twos, and threes mean?* Available at: What Does Animating on Ones, Twos & Threes Mean? | Definitions & More (idtech.com) (Accessed: 17 Jan 2023).
15. *The Classic of Mountains and Seas* (2000) Translated from the Chinese by A, Birrell. London: Penguin Classics.
16. WallpaperCave (no date) *Night Sky Stars Wallpapers*. Available at: https://wallpapercave.com/night-sky-stars-wallpaper (Accessed: 25 Jan 2023).