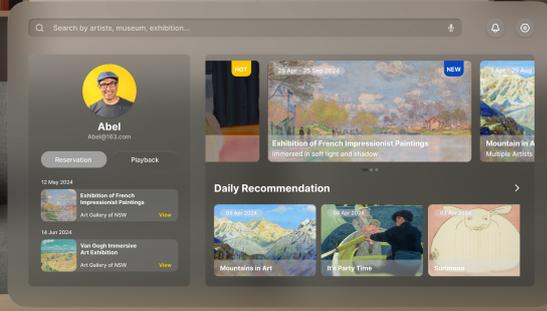


DESIGNING FOR MUSEUM

Telepresence Robot

Yueyang Wang



[A link to the interactive live prototype.](#)

Design Solution

Our digital platforms include mobile apps and Vision Pro. The problem space we are addressing is allowing museums to welcome remote visitors via telepresence robots. The project aims to create an art museum experience through telepresence robots and an interface design that brings art lovers together in a virtual environment.

Users can experience the virtual museum immersively by wearing the Vision Pro device:

1. This device allows users to control a remote robot via virtual buttons to move freely around the museum and explore the various galleries.
2. Additionally, users can gesture or touch virtual buttons to resize artworks, zoom in on details or shrink panoramas for a deeper, more nuanced viewing experience.

This interactive experience not only enhances the engagement of the virtual tour, but also enables users to appreciate and understand the artworks in a whole new way.

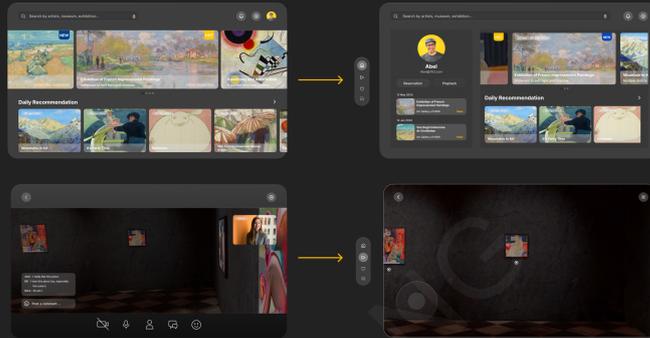
Heuristic Evaluation

To ensure that the design solution was user-friendly, I conducted heuristic tests with three evaluators based on Jakob Nielsen's 10 Usability Heuristics (Jakob Nielsen, 1994).

The testing centred around visibility of system state, user control and freedom, and overall design aspects of the interface, and was iterated based on the content of the testing, with not all feedback being incorporated due to time constraints (Appendix 5).

Iteration 01

This iteration is modifying the part that overlaps with the mobile software, and will pay more attention to the exhibition playback and remote control of the robot (Appendix 2).



In order to highlight the main function-- view the virtual exhibition (Appendix 5-- Recognition rather than Recall), according to Design Precedent 1, modified the layout of the home page. The user information is placed on the left side of the interface for easy search exhibition.

Iteration 02

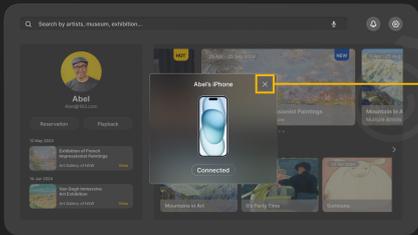
This iteration is mainly about the difference in key switching and the adjustment of font color (Appendix 3).



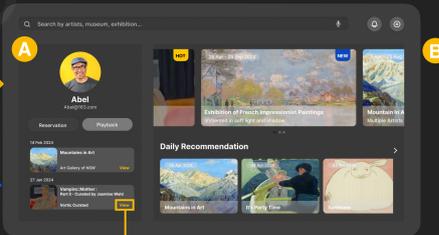
Final Wireflow -- Main Process

This is the final iteration, showing mainly the main user flows (Appendix 4).

1. Pairing Phone With Vision Pro



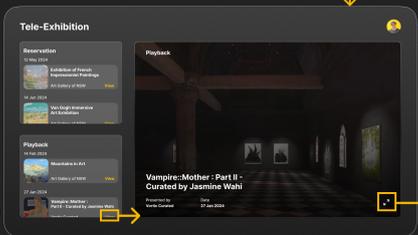
2. Home Page



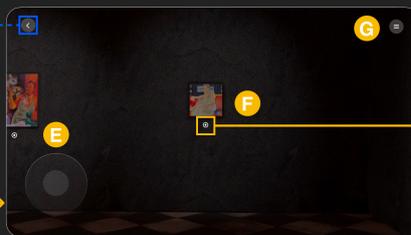
Legend

- Forward Navigation
- ⋯ Back Navigation

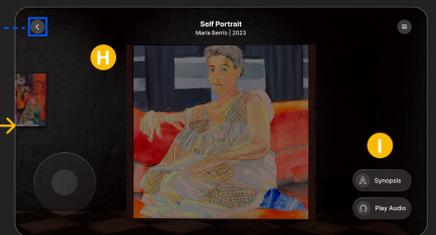
3. Select Exhibition



4. Enter The Exhibition



5. Browse Exhibition Information



1. Pairing Phone With Vision Pro
Users can book an exhibition within the mobile app, and by pairing their mobile phone with vision pro, they can import the booking information into vision pro.

2. Home Page
A. Based on feedback in the Recognition rather than Recall section (Appendix 5), users will be able to view the exhibitions they have booked and those they have already seen from the homepage, and they can directly select the exhibitions they want to see.

B. On the left side of the homepage are the exhibitions recommended by the system. The upper part of the homepage focuses on the recent new exhibitions and the most popular ones. The bottom half is the daily recommended exhibitions.

3. Select Exhibition
C. On the left side of the interface, users can select the exhibition they want to see.
D. On the right side of the interface is a small window for the exhibition, which allows you to preview the

content of the exhibition, presented as a short video, this design refers to Design Precedent 3 and clicking on the icon in the bottom right corner takes you to the exhibition.

4. Enter The Exhibition
E. Users react not knowing how to operate the robot (Appendix 5), therefore design the control key to manipulate the robot, users can operate the robot to move by moving it up and down, left and right, or you can use your hand to zoom in and out on the screen.

F. When the user clicks to tap the screen, a white dot appears, and when the user clicks the screen again, the dot disappears. Click on the dot to view the details of the work.

G. This is the setup of the exhibition interface, where the user can set it up according to their preferences (A Darejeh, D Singh, 2013). Not only can you set up video, voice and other interfaces in it, but you are also able to set up robots. In this way, the exhibition content can be fully displayed

without interference (Appendix 5 -- Aesthetic and Minimalist Design).
5. Browse Exhibition Information
H. The user can adjust the angle and size of the work, which is presented in 3D, at will through various gestures.

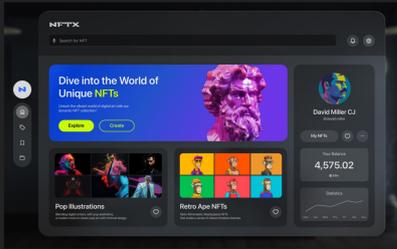
I. Users can choose whether to read the text introduction or the audio narration according to their preference (A Darejeh, D Singh, 2013).

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7. Design Precedent 1 -- https://www.behance.net/gallery/195462455/NFTX-Spatial-UI-concept-NFT-Marketplace?tracking_source=search_projects|vision+pro&I=38
8. Design Precedent 2 -- https://www.behance.net/gallery/162868141/MMORPG-GAME?tracking_source=search_projects|game+interface&I=222
9. Design Precedent 3 -- <https://vortic.art/discover>

Appendix 1 -- Interface Design Principles

1. Make user interfaces consistent. Consistent UI means using similar design patterns, identical terminology in prompts, homogenous menus and screens, and consistent commands throughout the interface. (Maham, 2021)
2. From recognizing interactive and static elements to making navigation intuitive, clarity is an essential part of a great UI design. (Maham, 2021)
3. Obvious Start: Design an Obvious Starting Point. A user must know how to start interaction with the content. (Blair-Early, Adream, and Mike Zender, 2008)
4. Using appropriate graphical objects like avatars or icons. (A Darejeh, D Singh, 2013)
5. Reducing the number of features available at any given time. (A Darejeh, D Singh, 2013)



Design Precedent 1

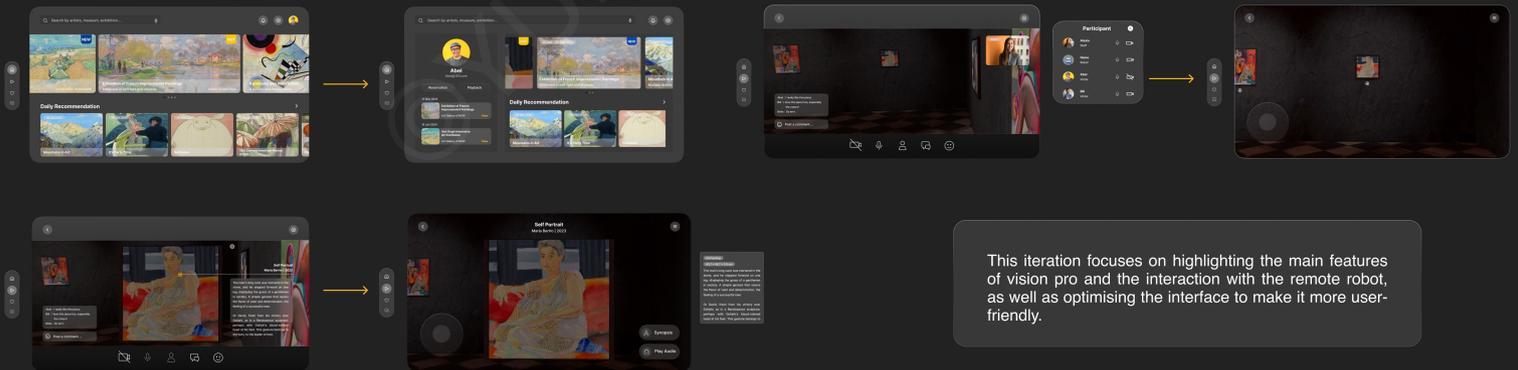


Design Precedent 2

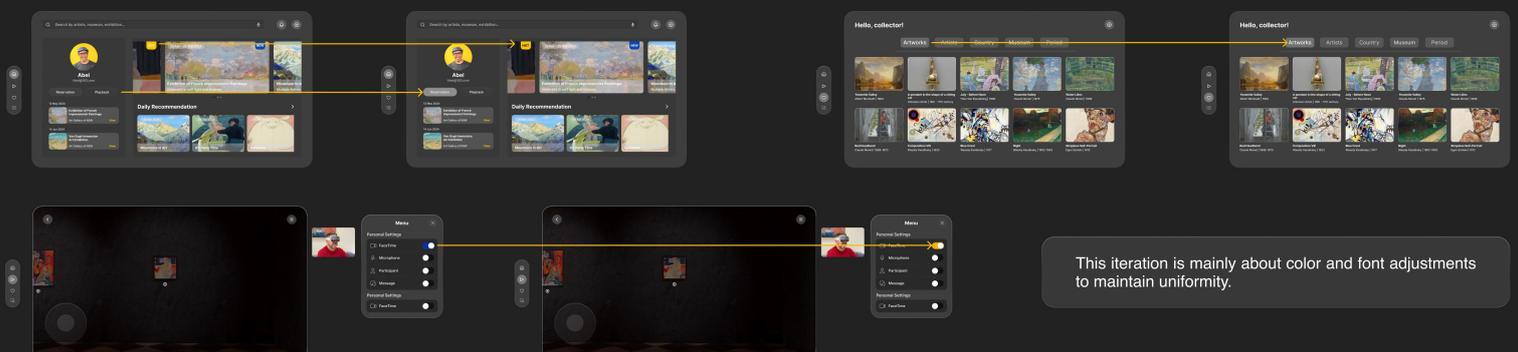


Design Precedent 3

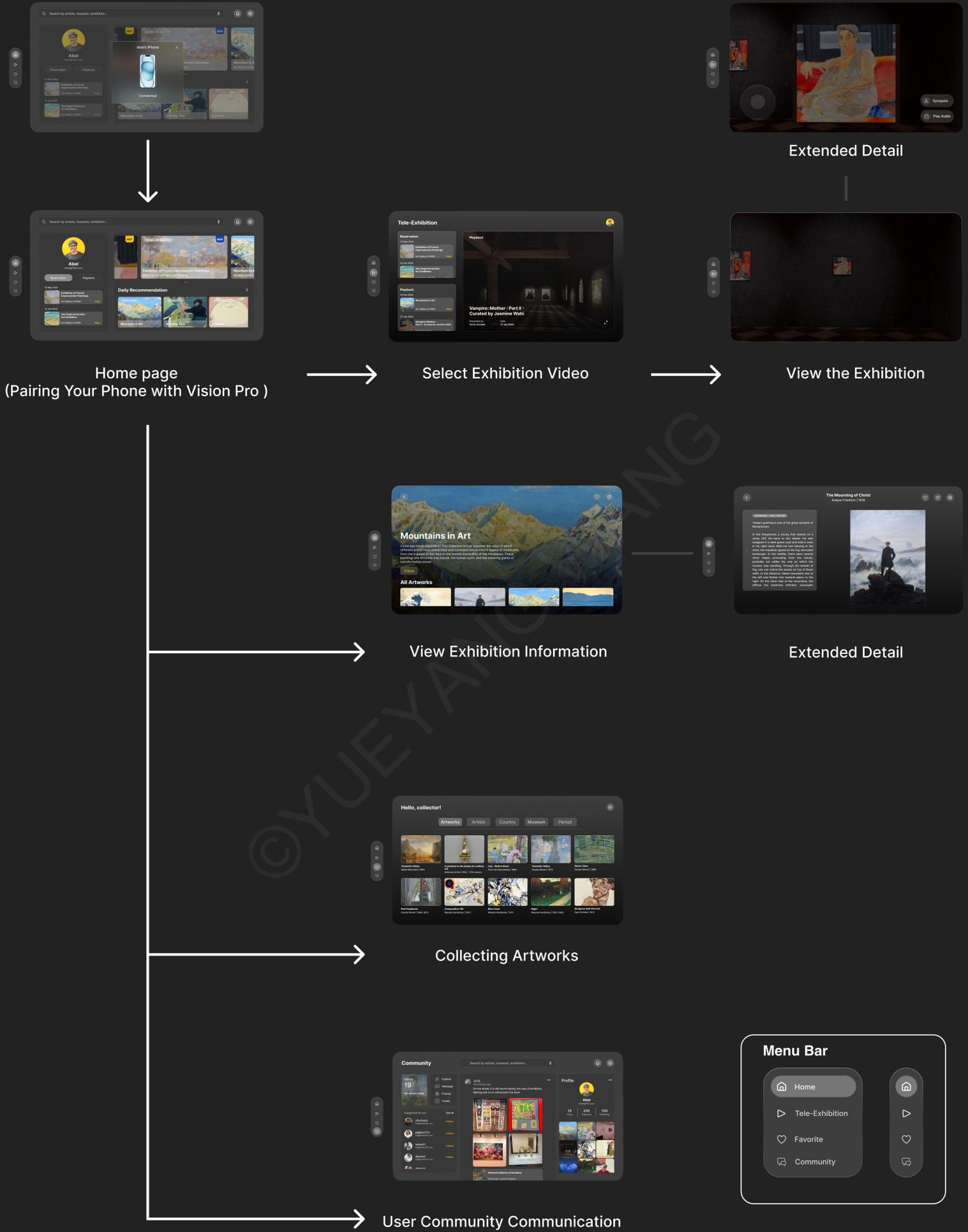
Appendix 2 -- Iteration 01



Appendix 3 -- Iteration 02



Appendix 4 -- Final Wireflow



Appendix 5 -- Heuristic Evaluation

Heuristic	Comments	Issue	Severity	Recommendations
Visibility of system status	Ability to provide basic loading status and connection status between mobile phone and vision pro.	Users report that they do not know how to operate the robotic robot and that there is a lack of associated buttons.	3	Enhance the connection between vision pro and the remote robot by adding more detailed instruction keys for operating the robot.
Match between system and the real world	The interface elements basically use icons that are familiar to the user and easy to understand.			
User control and freedom	Basic and clear navigation controls are provided, and users can follow instructions to return to the previous step, being able to undo or redo actions easily.	Evaluator 2: Some of the keys are not clearly colour-coded during switching, and it's not very clear which key is being pressed.	2	When designing the key switching, there needs to be a big difference that can make the operation smoother for the user.
Consistency and Standards	The interface elements and operation flow are kept consistent, and the overall design content and style are unified.			
Error Prevention	The exhibition interface doesn't have complicated operation keys, so users don't have to worry about accidentally operating robot control buttons that could lead to unexpected results.			
Recognition rather than Recall	Some of the operations are prompted by clear icons, which reduces the burden of memorisation on the user.	Evaluator 2: The home page section doesn't show the booked exhibitions very visibly and you have to keep clicking through the page to see them.	3	A more prominent location for viewing the exhibition.
Flexibility and Efficiency of Use	Basic customisation options are provided in the Exhibition Collection section, allowing users to define their own categories for exhibitions.			
Aesthetic and Minimalist Design	The overall design of the interface is aesthetically pleasing, with a good colour scheme and layout.	Evaluator 3: The viewing page after entering the exhibition is small in scale and has a lot of other icons and chat boxes floating at the top of the screen, obscuring the exhibition and affecting viewing	2	Simplify the interface design to show only the necessary information. Use a clean visual design to avoid visual clutter.
Help users recognize, diagnose, and recover from errors	Error messages are clear and can indicate to the user the reason for the error.	Users are not sure what the problem is or how to fix it when they encounter an error.	1	The system should provide methods or suggestions for resolving the error to help the user recover from the error. For example, a failed connection could prompt the user to check network settings or restart the robot.
Help and Documentation	When users are faced with an operation that they do not know how to perform, they can learn more about how to do it from the help page in the Settings section of the homepage.			

Appendix 6 -- Mock-ups

