The background is a dark blue-grey color, decorated with various geometric shapes and patterns in teal and white. There are circles of different sizes, some with dotted interiors, hexagons, and triangles. Some shapes are solid teal, while others are white outlines or dotted patterns. The overall aesthetic is modern and technical.

Picture This! (C6)

Joseph Ayala, Anthony Meza, Sophia Zhang

Use Case

Problem – Most games do not promote social connection nor active movement of the body

Solution – Game of pictictionary with drawings visible in virtual space

- Provides a novel way of entertainment, as well as social interaction, bonding, and strengthening
- Fun way to form connections, (e.g. icebreaker games or company social events)
- Improves creativity, spacial awareness, and hand-eye coordination in children while still promoting social interaction

ECE Areas

- Software ECE area: line drawing algorithm and AR
- Hardware ECE area: pen used to track positional data



Background



- Hardware Device (**Pen**)
- Draw In a **virtual space**
- Drawings visible with Personal Device camera



Use Case Requirements

Encourage Social interaction

Specific Requirements:

- 1) At least three players can participate simultaneously
- 2) Real-time tracking and updates to increase collaboration
- 3) Highly rated by users

Use Case Requirements

Intuitive and easy to use

Specific Requirements:

- 1) Simple and clean UI
- 2) Navigation of gameplay is straightforward
- 3) Low render latency (<150 ms)



Use Case Requirements

Hardware is responsive and relatively accurate

Specific Requirements:

- 1) 500–600 DPI¹
- 2) Small (6x9x3 in.) and light (less than 1.5 lb)
- 3) Battery life of 4 hours

1. <https://www.daskeyboard.com/blog/how-to-change-dpi-mouse/#:-:text=Average%20mice%20range%20between%20800,to%2020%2C000%20DPI%20or%20more.>



Technical Challenges



Communication and calibration between devices and AR Space



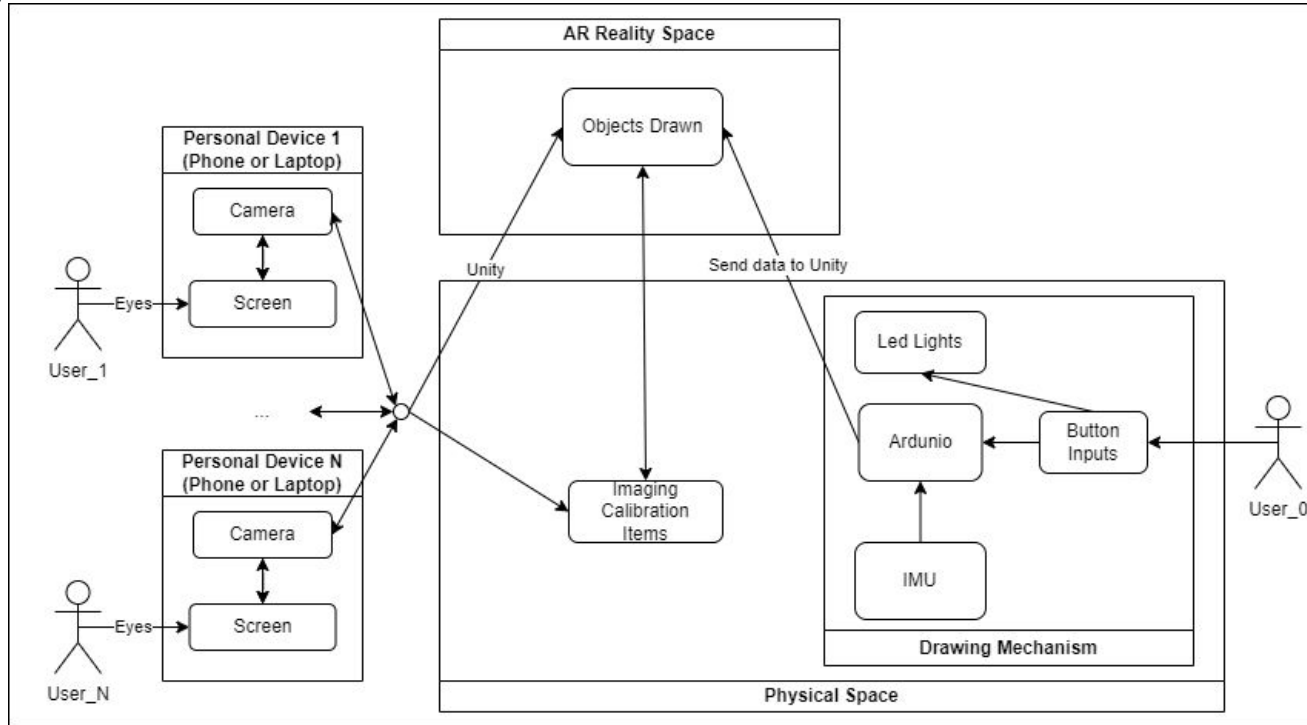
Reducing latency to improve user experience



Make line drawing accurate enough to avoid harming user experience



Solution Approach



Testing, Verification, and Metrics

- Pen
 - Collection of data during specified intervals
 - Measurement on latency of sending data
- Visual verification of drawn lines
 - User testing - 4 out of 5 users are satisfied with drawn
 - Achieve 95% accuracy between AR line and real line
 - E.g. a virtual red line drawn over a real black line, 95% of line pixels should be red
- Game Functionality
 - 2 players are able to view drawing on devices

Tasks and Division of Labor

Circuitry: Sophia

Hardware and Software Communication: Sophia + Anthony

Unity Setup: Joseph

Game UI: Anthony

AR backend: Anthony + Joseph

Software Line Algorithms: Sophia + Joseph

Integration: Everyone



Conclusion

- Proposed project of AR Pictionary
- A new innovative way to play a popular, nostalgic game

Next steps:

- Set up Unity Environment
- Research hardware components