



MaRker

Attention Beacon for Mixed Reality Game Development

Riley Park, Andrew Le, Rex Zhang, Alexander Choi
Professor Tess Tanenbaum
Department of Electrical Engineering and Computer Science

Background

Mixed Reality (MR) communication is an ongoing challenge for developers. Traditional use of MR environments often utilize complicated equipment including virtual headsets and visual tracking. As a result, MR does not benefit from certain design staples that designers can use in AR, VR, and traditional computer games [1]. For example, in VR games, designers can highlight important objects in a scene in order to draw the attention of the player and encourage certain actions. Employing theatre tactics and custom modules, MaRker is designed to solve these shortcomings.

Project Goals

MaRker seeks to empower MR designers and fill the hole in design space for interactive visual elements [2]. Broadly speaking, the device must be a multipurpose light with controllable properties for applications in game engine environments. Secondary goals include scaling the device down to an easy-to-manage size which could attach any variety of surfaces.

Project Members

Riley Park (EE) Project Lead	Tess Tanenbaum Professor (ICS)	Alex Choi (CpE) Unity Integrator
Rex Zhang (EE) Hardware Specialist		Andrew Le (CpE) Hardware Integrator

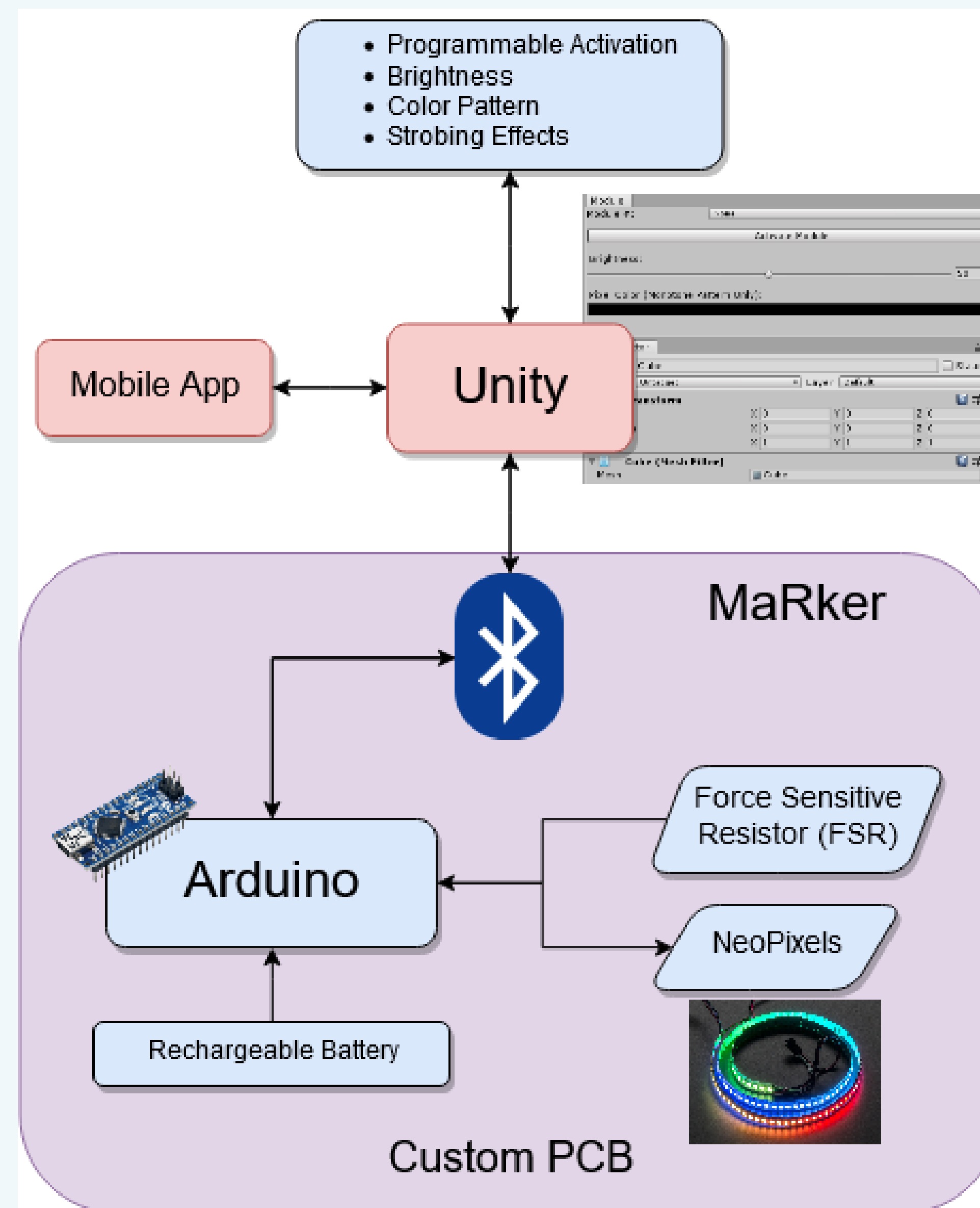
Materials

- | | |
|---|---------------------------------|
| Hardware | |
| • NeoPixels (LED Strip) | • Lithium-Ion Polymer Battery |
| • Interlink 406 Square Force-Sensitive Resistor | • Bluefruit LE UART (Bluetooth) |
| • LAFVIN Arduino Nano V3.0 | Software |
| | • Unity (C#) |
| | • Android Studio (Java) |

Current Progress and Challenges

- Accomplishments**
- Constructed a fully functioning prototype with Unity input through a wired connection
 - Unity GUI designed and functional
 - Tested LEDs through a variety of patterns and brightness and hue settings
- Pending Obstacles**
- Bluetooth Integration with Unity a continuous challenge
 - Scaled down PCB designs to a template
 - Materials acquisition halting progress and ongoing

Product Diagram



Future Timeline

- Winter Quarter**
- Week 1-3: Plan Final Purchases, Continue Unity Integration
 - Week 4-5: Obtain Purchases, Begin Housing Construction
 - Week 6-8: Final Marker Testing, Finalize Wiring
 - Week 9-10: Finalize Deployable Package for Unity, Finalize Housing Construction

References

[1] A. Schankin, D. Reichert, M. Berning and M. Beigl, "The Impact of the Frame of Reference on Attention Shifts Between Augmented Reality and Real-World Environment", *2017 IEEE International Symposium on Mixed and Augmented Reality (ISMAR-Adjunct)*, 2017. Available: 10.1109/ismar-adjunct.2017.24

[2] K. Jing, N. Nygaard and J. Tanenbaum, "Magia Transformo: Designing for Mixed Reality Transformative Play", *CHI PLAY'17 Extended Abstracts*, pp. 421-429, 2017. Available: <https://dl.acm.org/citation.cfm?doid=3130859.3131339>.