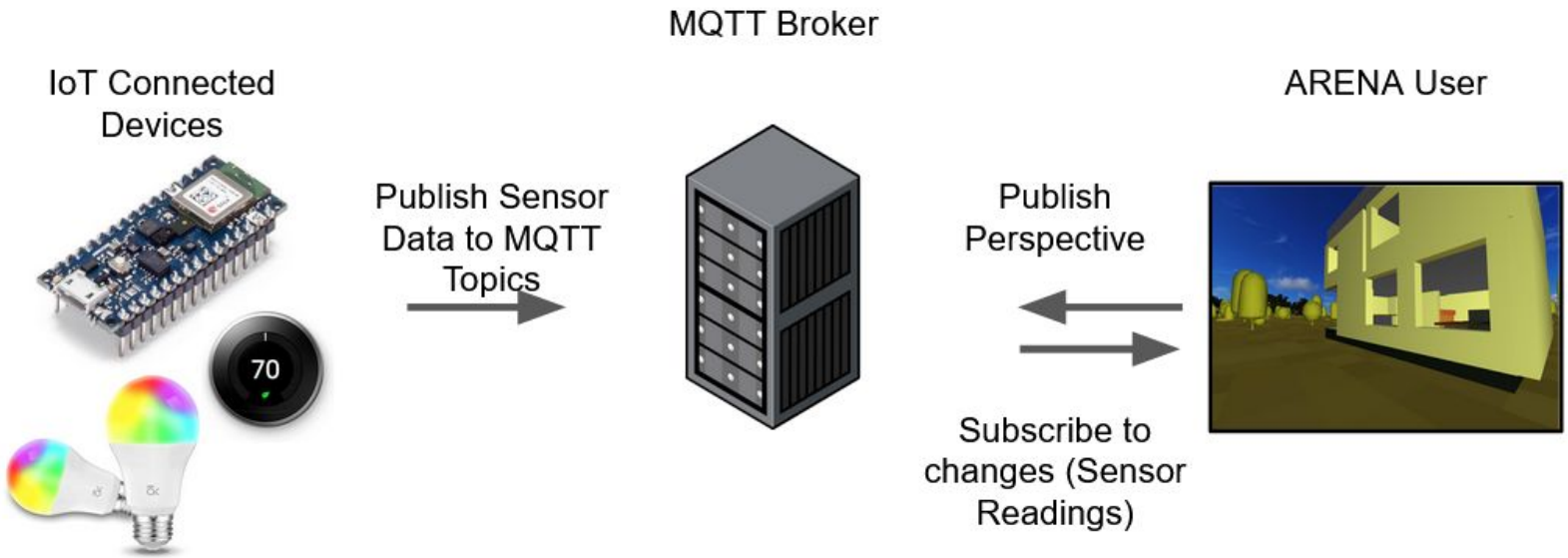
Home IoT Management in ARENA

Final Presentation, M202A

Patrick Han and Suvir Mehrota

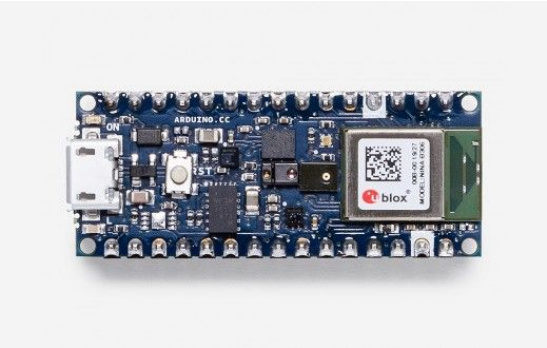
Project Introduction and Goal

- **Overall Project Goal:** Demonstrate several interesting meaningful use cases of managing IoT devices in the 3D space (ARENA) with a physical touch



Our Design (Hardware and Tools)

- **Arduino 33 BLE Sense:** temperature, humidity sensors, LEDs
  - Would have liked to use more hardware if not for COVID-19
- **ARENA-py library:** Parsing and forwarding data to the ARENA scene
- **Blender 3D:** Building 3D models of the apartment and scene objects



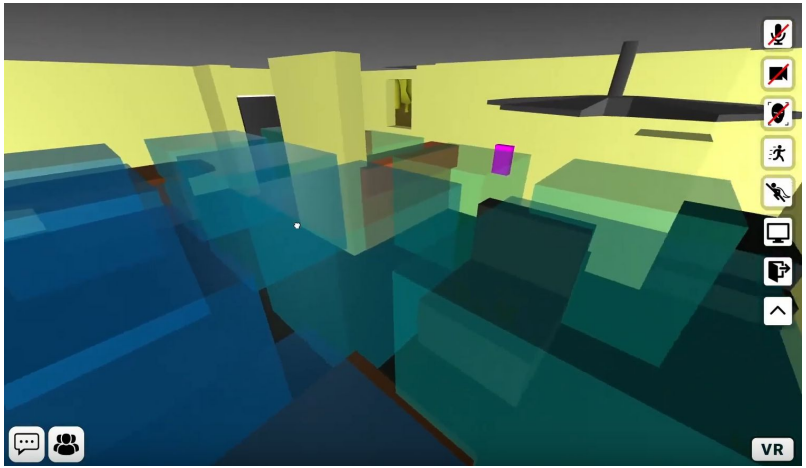
https://store.arduino.cc/usa/nano-33-ble-sense-with-headers

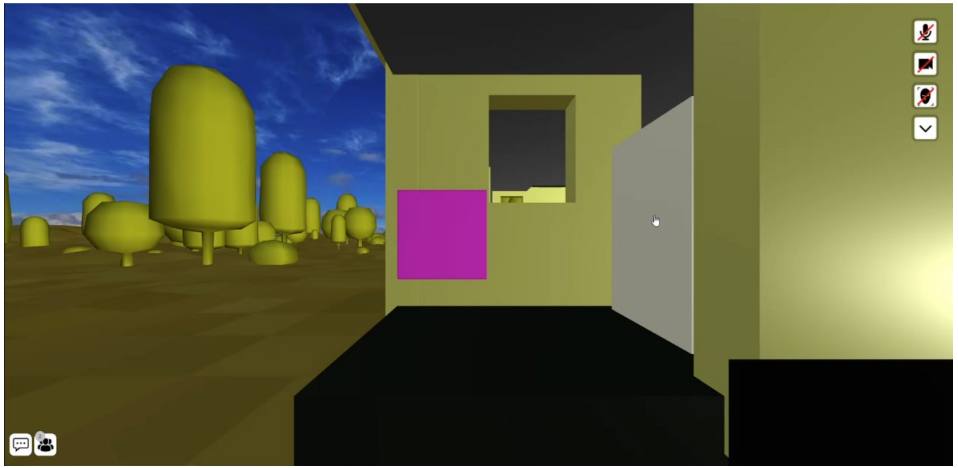
https://conix.io/arena

https://www.blender.org/

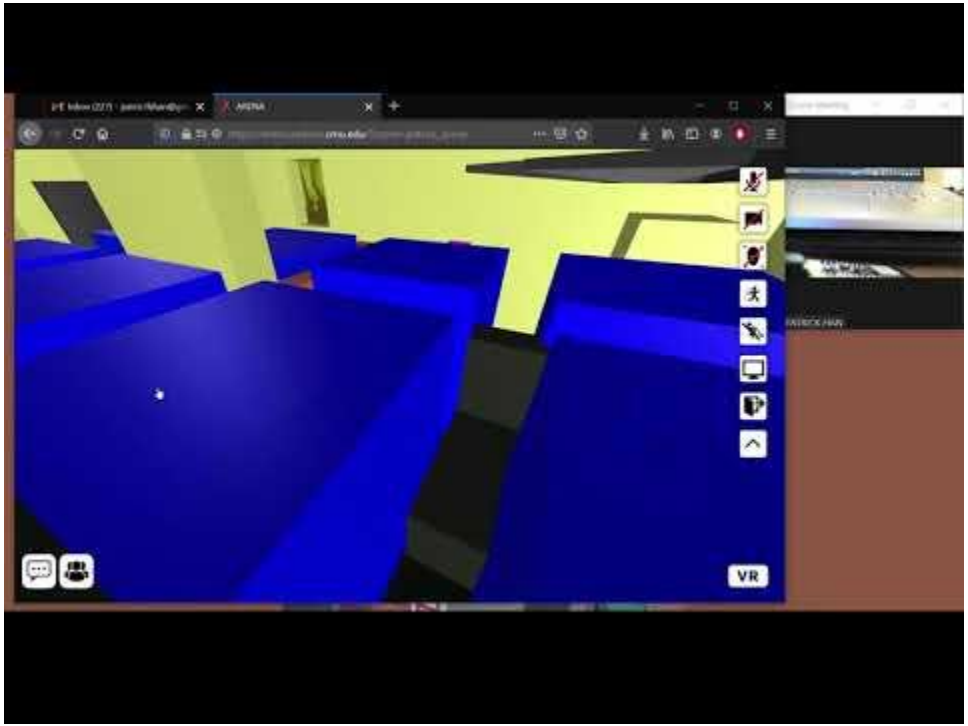
Our Design (cont.)

- Put together **two more demos:**
  - **Generalized Heat Maps (Made by Patrick):** Map out any 3D signal in the space with multiple (simulated) sensors and act appropriately (temperature, WiFi strength, gas leak, etc.)
  - **Smart Lock Management (Made by Suvir):** You have an entrance to your building with an IoT lock. You're away, but you may need to unlock the door for people who request it.

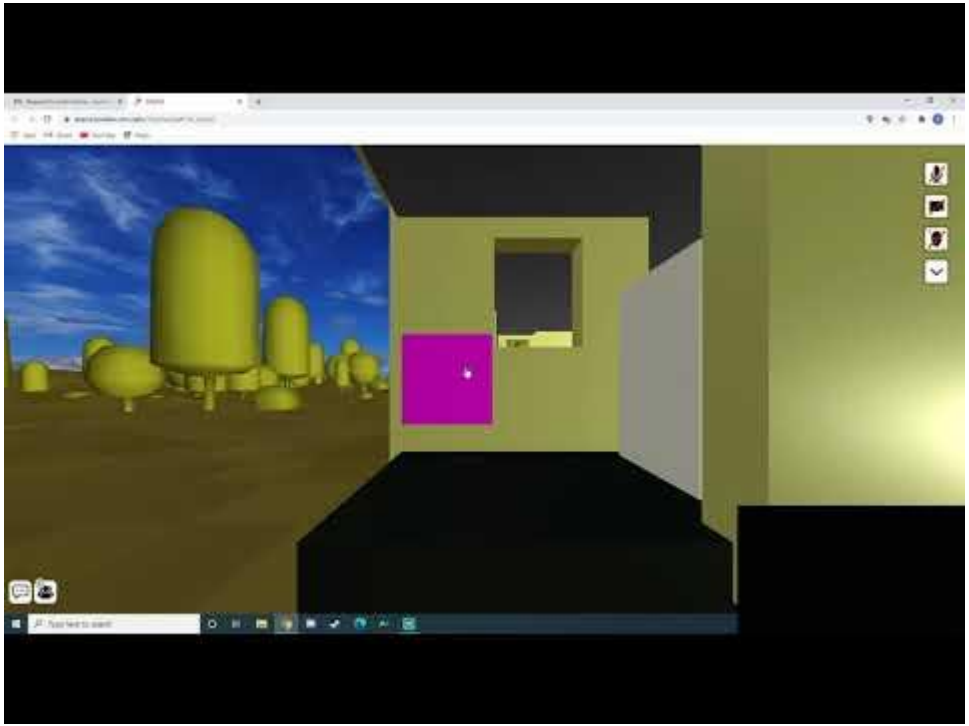




Generalized Heatmaps Demo (Patrick)



Demo Video 2 (Suvir)



Conclusion, Acknowledgements, and Further Work

- ARENA is an amazing platform that provides developers an easy way to connect IoT devices to the virtual space
- We presented two useful and practical demos for home IoT management
- Being able to use multiple real sensors post-pandemic would be great
  - **These demos can easily be reconfigured to read and write to more real devices**
- Faced some difficulties: Still in heavy development, **Nuno Pereira & Michael Farb @ CMU** were a big help in getting issues resolved!
- Thank you to **Dr. Srivastava** (Course instructor)
- More design and implementation details on project website!: https://suvir-patrick.github.io/