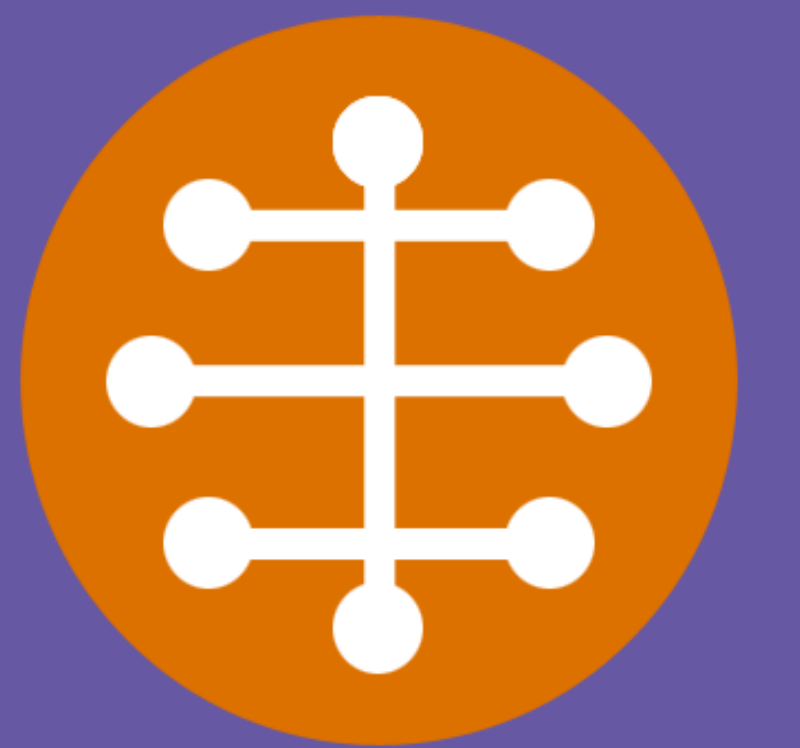




Project Concordia – All In One Smart Home Solution

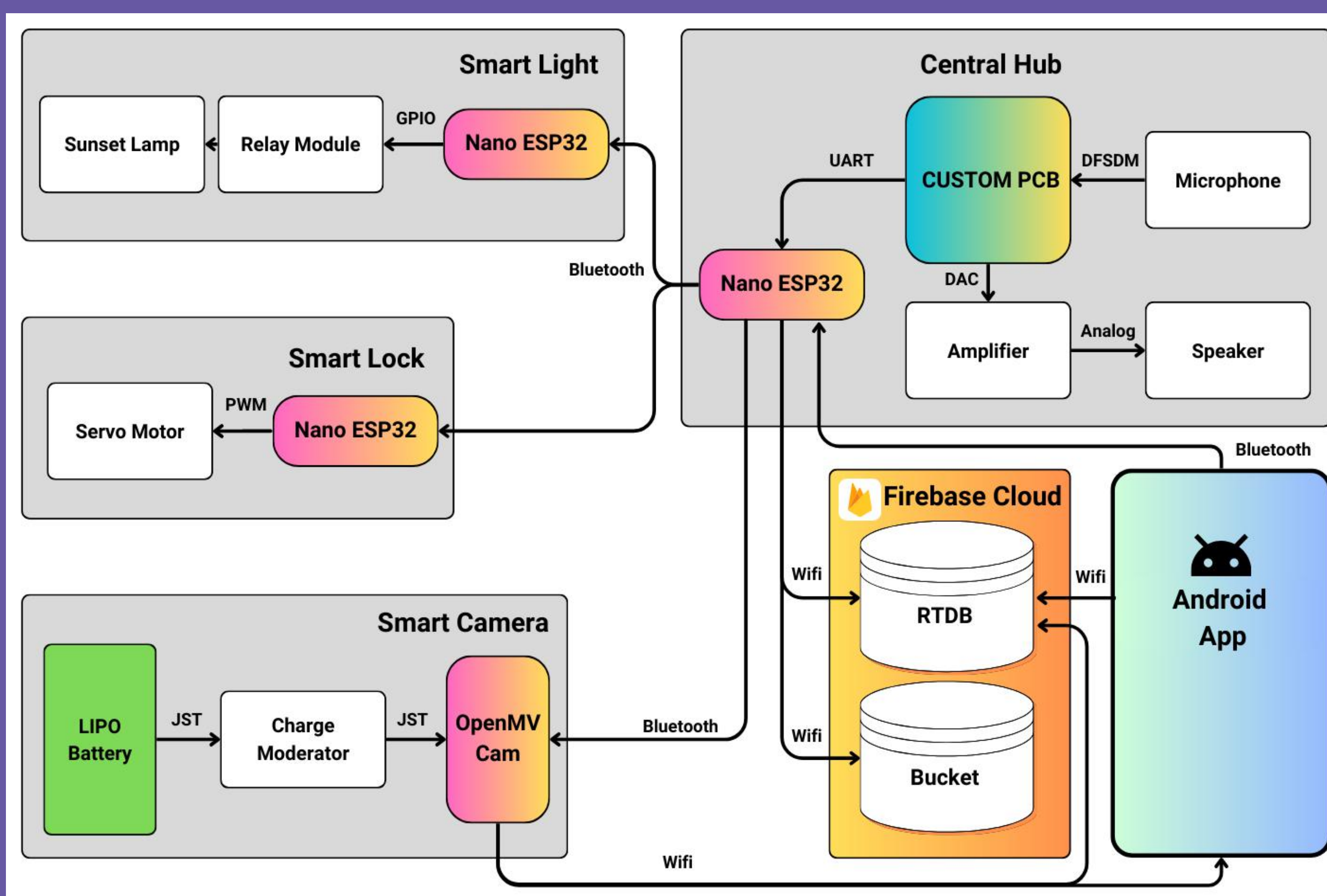


Logan Geivet | Peter Lototsky | Jackson Newman | Nicholas Pellegrin | Alexander Robles

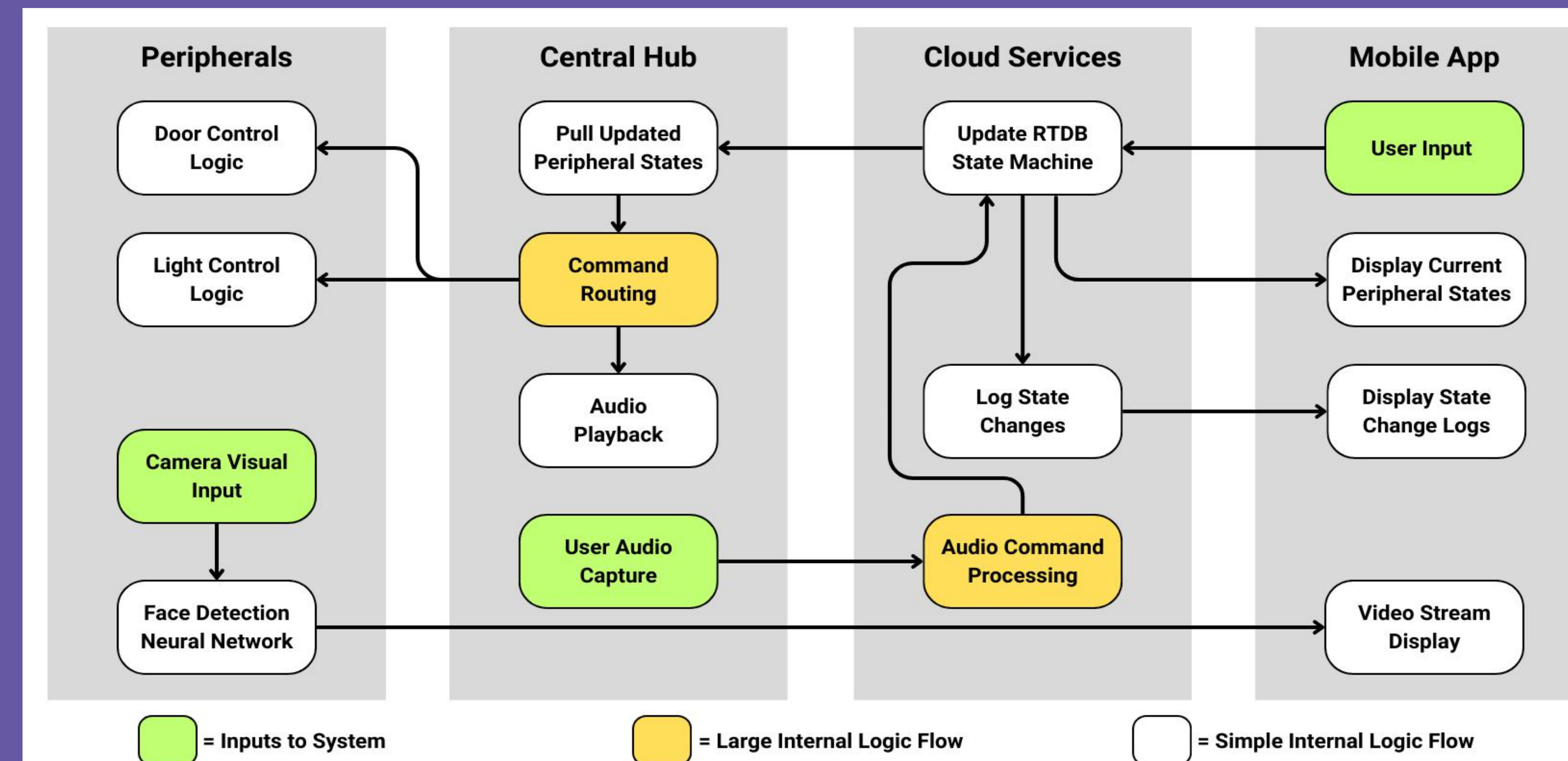
ABSTRACT

In today's rapidly evolving technological landscape, smart home devices have become ubiquitous, offering convenience and efficiency in various aspects of everyday life. However, the proliferation of proprietary controls and centralized systems has posed significant challenges to interoperability and user experience. This project presents a solution to this problem by introducing an open-source framework for smart home connectivity. By eliminating reliance on proprietary software and embracing open standards, our project aims to create a seamless ecosystem where diverse smart devices can communicate and be controlled through a unified interface on users' smartphones.

BLOCK DIAGRAM



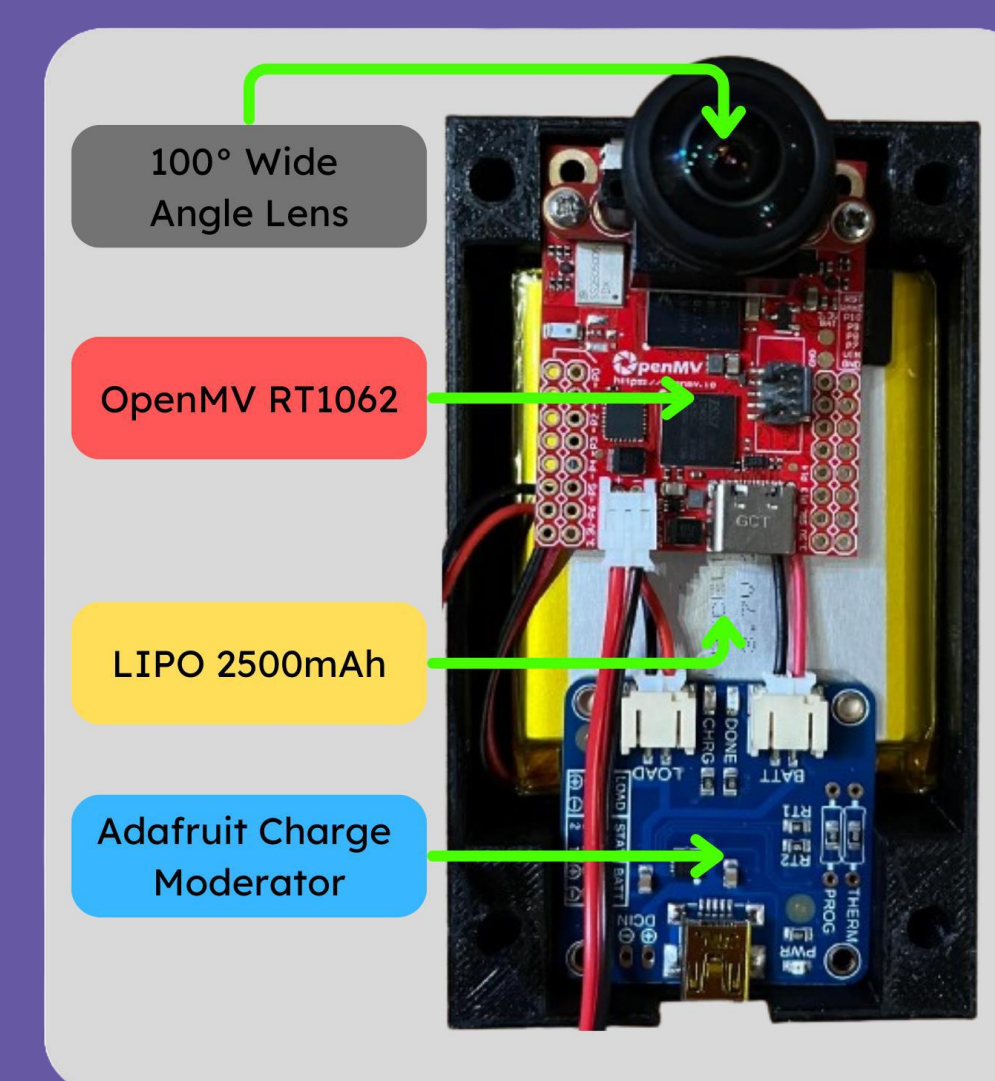
SOFTWARE FLOW



Command Routing: Manages all concurrent Bluetooth and WIFI connection states and routes commands to appropriate endpoint

Audio Processing: Converts audio commands to text and pushes relevant peripheral state updates to DB

SMART CAMERA

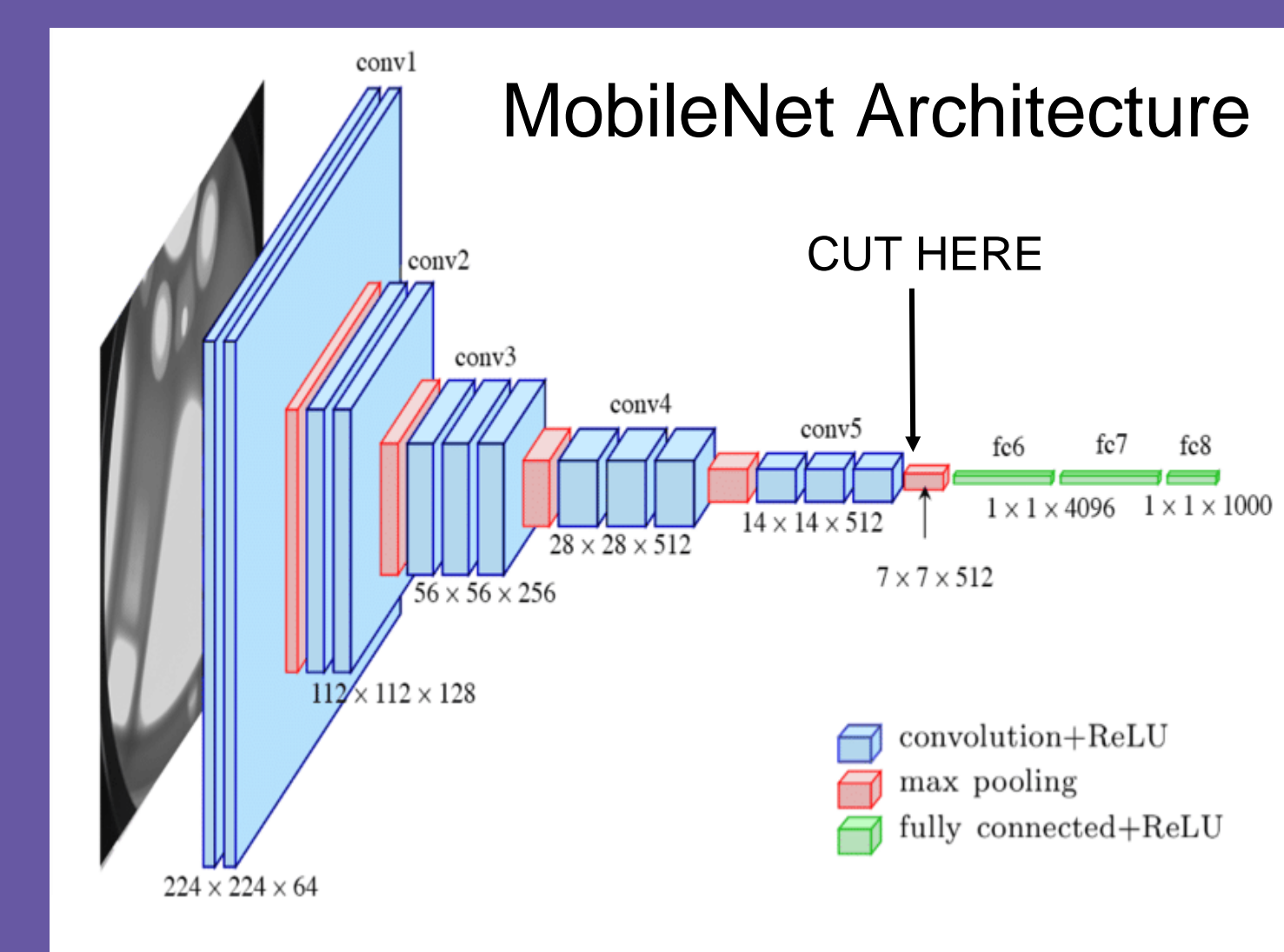


Hardware and Enclosure

The OpenMV camera board, charge moderator board, and the battery pack all fit into a 3D printed enclosure measuring 58mm x 100mm for the base and is only 23mm deep.

Face Detection

The FOMO CNN model (variation of MobileNet) where the downstream layers after a 1:8 area reduction are cut out and replaced with conv layers with custom loss.

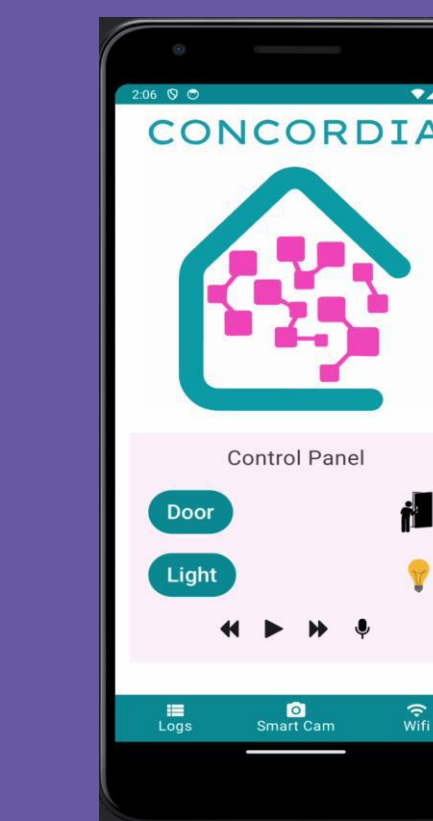


KEY COMPONENTS

Firestore Cloud

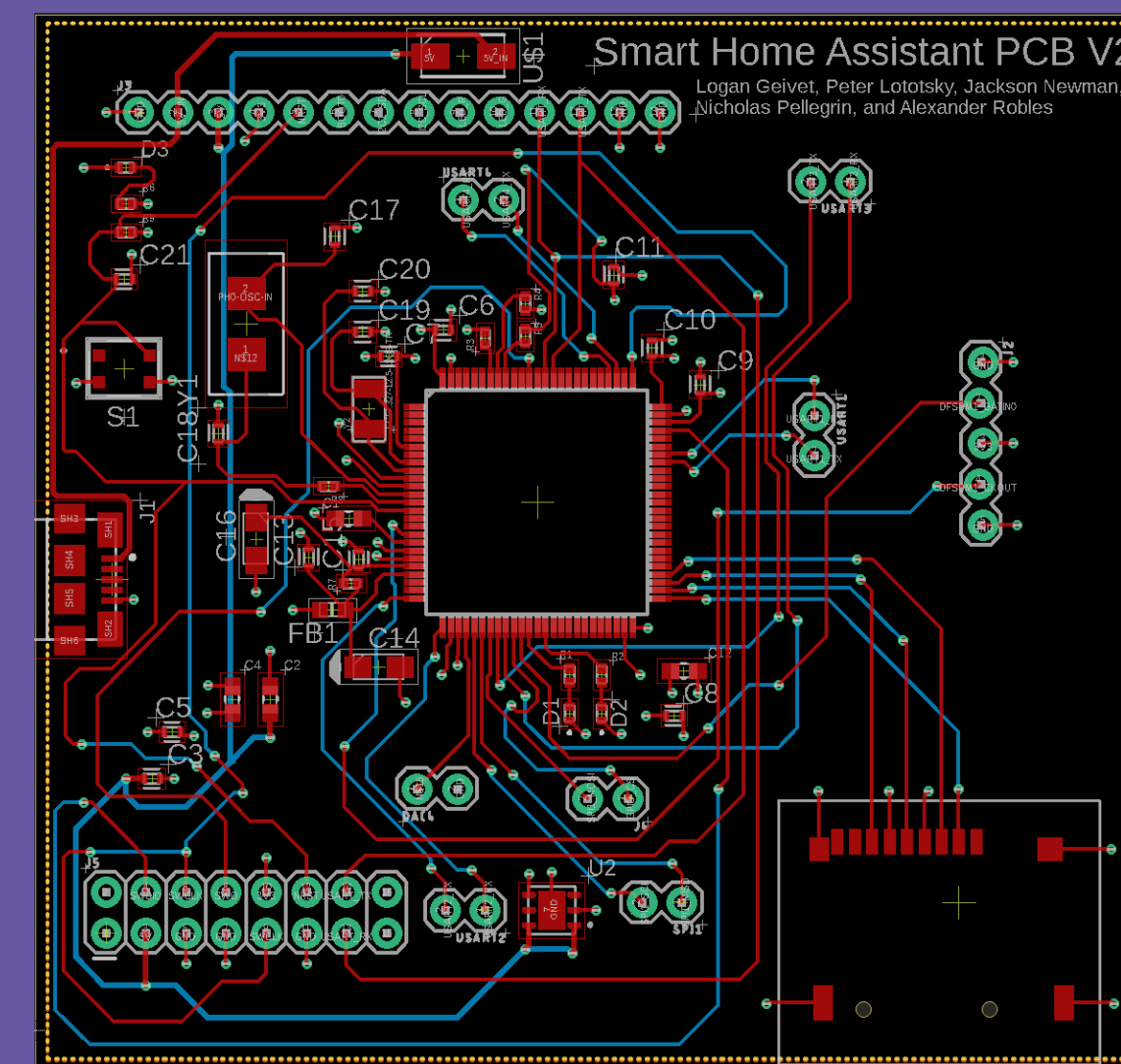
Audio processing and command routing from app to central hub

```
https://smart-home-assistant-dead-default-rtdb.firebaseio.com/.json
{
  "cloud_voice_result": "consecutive_previous_presses: 0",
  "consecutive_previous_presses": 0,
  "door_locked": false,
  "file_uploaded": false,
  "light_on": true,
  "play_music": false,
  "previous_button_state": false,
  "skip_button_state": false,
  "smart_cam": "http://172.20.10.11:8080",
  "voice_command": "open the door"
}
```



Android Application

Easy to use UI makes the phone application easy to control their devices

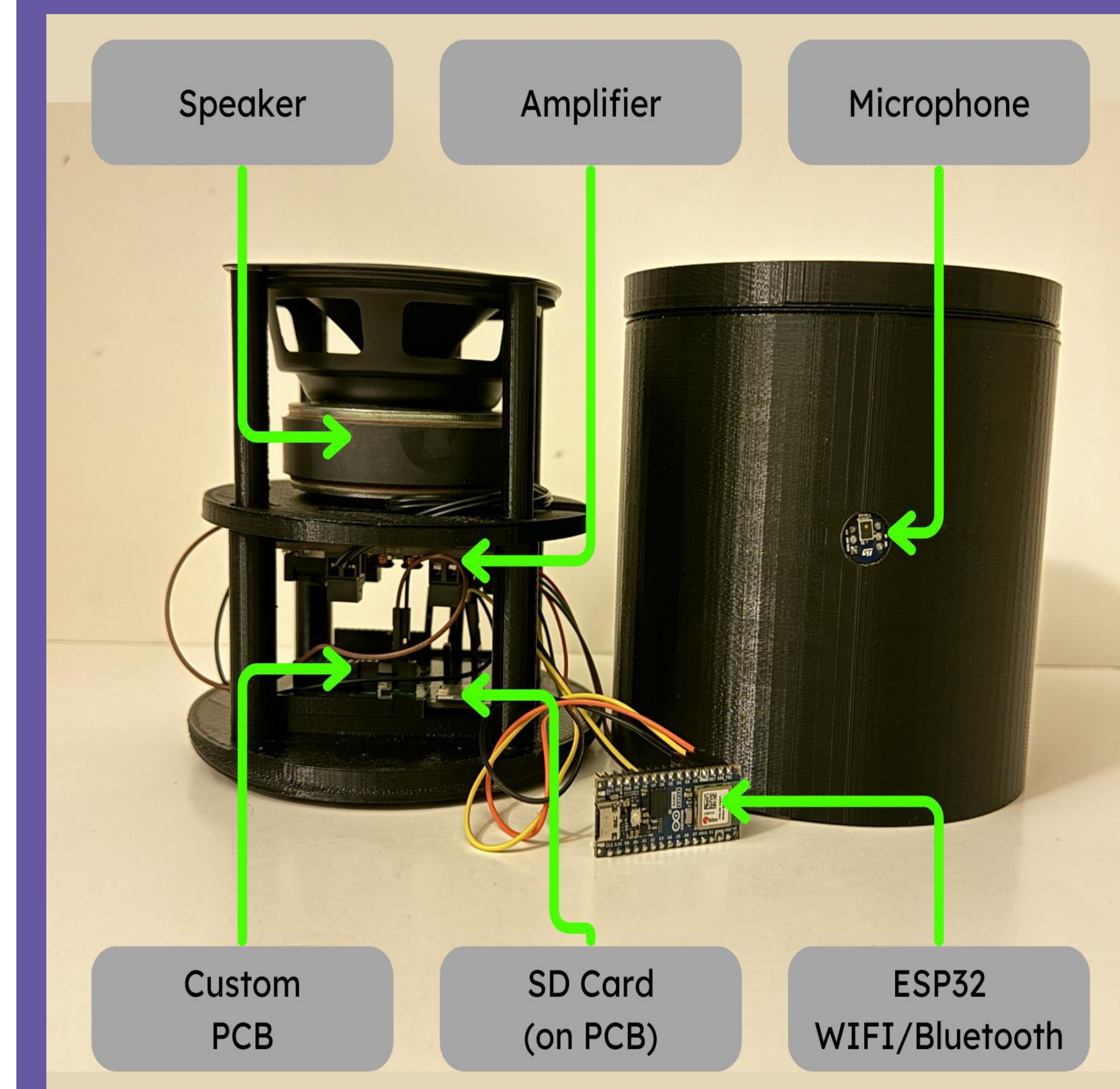


Central Hub

Custom made PCB for audio processing, audio storage, and interfacing with the Firebase cloud

FINAL PRODUCT

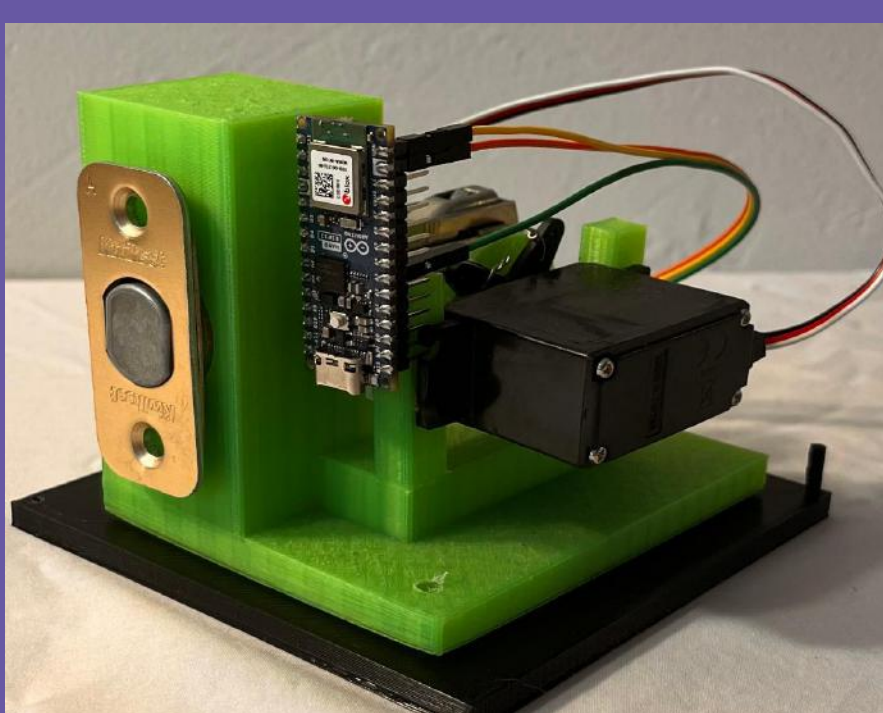
Central Hub



Smart Light



Smart Lock



Smart Camera



Special thanks to
Yogananda Isukapalli
Brian Li