

Smart Dormitory - Node-RED



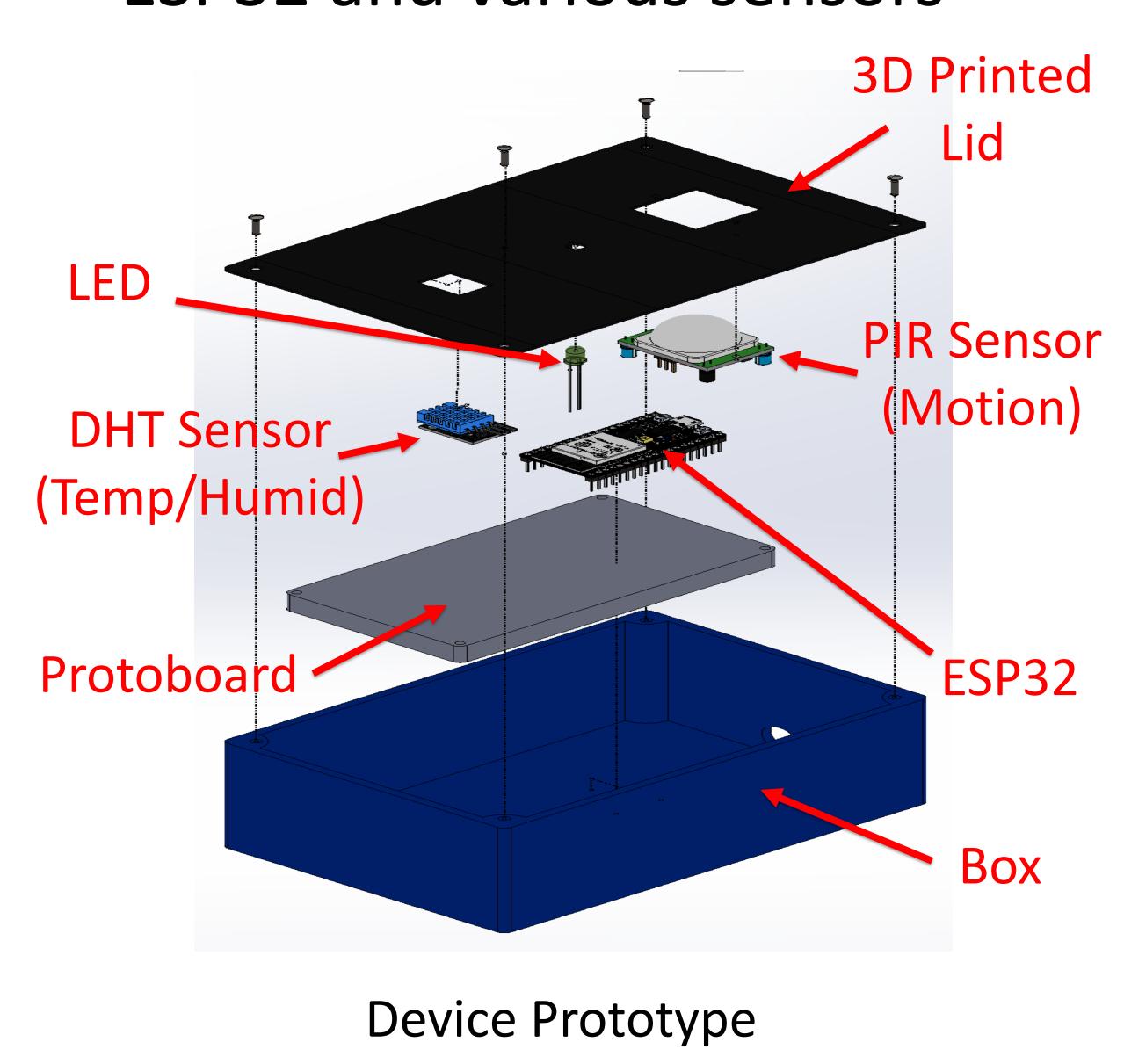
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Purpose

Develop an IoT network for a "Smart Dormitory" to improve energy efficiency, enhance building security, and optimize configuration for scalability

Project History

- Developed device prototype
- Implemented MQTT communication protocol
- Created Node-RED user interface
- Assembled several devices with ESP32 and various sensors



Semester Objectives

- Improve Node-RED user interface with visualizations of historical data
- Install devices in target locations in the JEC
- Update user documentation for operating and maintaining devices/user interface

Technical Approach Server (Node-RED) Database (MySQL) User Interface **Slot Options** MQTT MQTT Sensor •DHT •PIR Device(ESP32) Device(ESP32) Photoresistor •AQS Slot 1 Slot 1 Actuator Slot 2 Slot 2 •LED Slot 3 Slot 3 HVAC (relay) System Architecture Sensors/Locations Upload Lid Legend: Dimensions to CAD = Input Run Configurator = Physical 3D Print Lids Setup Upload configuration = Software **Assemble Devices** code to ESP32 Setup (Sensors, Wires, Lid) Configure Devices in Node-RED **Customer Process Flow**

Accomplishments JEC-Lab-2: ambTemp JEC-Mark's_Office-1: Temperature 82°F 80°F 78°F 76°F 74°F 72°F 70°F 68°F Monday 7:00pm – Tuesday 7:00pm Graph of temperature (°F) in the Capstone Lab and Mark's Office over a 24-hour period Information Dashboard Configuration Dashboard Gauge/Chart Room Model Heatmaps

Configure all devices using a table

Logs

 Configurable individual sensor polling rate to decrease network load

Sitemap of Node-RED user interface

Documentation for developers and users

Future Work

- Overlay spatial heatmaps on building floor plans to compare sensor readings in a building
- Package Node-RED code into libraries

Sponsor Mentor: Dennis Shelden (EBESS); Project Engineer: Mark Anderson (CORE); Chief Engineer: Prabhakar Neti (ECSE)