

EE / CprE / SE 492 Weekly Report

February 13 - February 20, 2025

sddec25-08

Smart Home Control Unit for Energy Optimization

Faculty Advisor / Client: Md Maruf Ahamed

Team Members:

- Seth Proctor
- Alexander Ryan
- Jacob Carnesi
- Arie Kraayenbrink
- Gamage Binula Karunaratne
- Erik Schmidt

Summary of Work:

Over the last week, the team conducted research on various home automation projects. In a team meeting, we determined Home Assistant would be the best foundation for our project. Additionally, we researched using a Raspberry Pi as the hub controller and different databases we can use for storing data. We also have obtained access to the VM we will use for our database.

Work Period Accomplishments:

- Selected an open-source project, Home Assistant, as the foundation for our project.
- Conducted research on Home Assistant
 - The goal was to find information to help the group vote on what open-source project we wanted to use.
- Research Raspberry Pi as a potential system to run Home Assistant
 - Made a doc with part list, price, pros, and cons.
- Researched Databases that we could integrate into our project
 - Firebase
 - MongoDB
 - MySQL
- Set up the VM, created accounts for all team members, and made instructions to access the VM.

Plans for Coming Week + Action Items:

- Seth Proctor- Next week, I plan to continue researching important areas of the project. Doing this research will help the group understand the vision of the project and give the group a chance to learn more about home automation. This research will be hardware, software, and other key ideas for the project.
- Alexander Ryan-Next week, start researching into x86 or other software that we could integrate into home assistant. Lay out specific requirements for project to help with future research
- Jacob Carnesi- Configure access controls in the VM.
- Arie Kraayenbrink- Work on understanding the requirements for the project and how we can begin to document the project.
- Gamage Binula Karunaratne- Figuring out all the types of hardware we will need to execute the project.
- Erik Schmidt- Researched Wireless Protocols, MCUs, Home Assistant Implementation.

Pending Issues:

- Seth Proctor- No issues
- Alexander Ryan- No issues
- Jacob Carnesi- No Issues
- Arie Kraayenbrink- No issues
- Gamage Binula Karunaratne- No issues
- Erik Schmidt- No issues
- Team- meeting attendance by all members

Individual Contributions:

Team Member	Contribution	Weekly Hours	Total Hours
Jacob Carnesi	Prepared VM for use. Created user accounts for team members. Created an instructional document so everyone knows how to connect to the VM.	4.5	8.5
Seth Proctor	Research Home Assistant to find relevant information that would help the group take a vote on what open-source project we want to go with. Conducted research on the Raspberry Pi as a potential candidate for our hardware hub. Documented pros, cons,	5.5	8

	prices, models, and required parts. Connected to VM.		
Arie Kraayenbrink	<ul style="list-style-type: none"> - Further research on open source systems with a compiled table of most common systems and how they compare. - Built a powerpoint about how home automation works today. - Connected to VM and setup SSH keys 	4	9
Binula Karunaratne	Hardware Research - did research on MCUs that can be utilized for the light and temperature sensor devices. The goal was to find a low-cost, low-power SoC microcontroller with WiFi capabilities.	4.5	8
Erik Schmidt	Wireless Protocol Research, Hardware and MCU research, More Home Assistant Research, how to implement Custom Sensors in HA,	4.5	8.5
Alexander Ryan	Finished pipeline in JIRA board, researched database choices between MySQL, Firebase, and MongoDB, with specific emphasis on integration with Home Assistant. Tested VM setup by Jacob and reviewed documentation	4.5	8.5