Know It's Off

Executive Summary

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1 Executive Summary

Project at a Glance
This project will be used to develop an Internet of Things (IOT) device that will detect the status light on a stove without obstructing the light from the view of the end-user. From there, the device will send this data to an online SQL database and can be checked remotely via a React web-app where multiple devices with different status monitors and battery life can be seen. The device will be designed to operate continuously for three months on a single charge.

Project Purpose
This project hopes to provide a way for the average individual with an internet connection and a phone the ability to check if they left their stove on. Because of this system's security and user profile component the device can be accessed from either within their home or when on the go. No longer does one have to drive to work questioning whether or not they will return home to a pile of smoldering embers caused by they absentmindedly left their stove on after cooking an omelette. We hope to provide the user with an increased peace of mind afforded by the ability to know the status of your stove from almost anywhere.

Technology Used

- Light sensing: Photo-resistor and voltage divider circuit
- Power: Rechargeable Lithium-Polymer battery and charging circuit
- Smart Home: Google Assistant Webhook Support
- API: Flask
- Database: MySQL with SQLAlchemy
- Multiple Access Method: Web with ReactJS
- WiFi Compatible: Embedded System with on-board WiFi

Project Goals

- Design a light sensing device that does not obstruct the status light on a stove.
- Test the current draw of the device circuit and select a battery that will allow for a 3 month operating time.
- Design and create a custom and compact printed circuit board (PCB).
- Create and implement a low-profile recharging circuit on the PCB/
- Develop an enclosure and mounting technique for the device.

- Using the Google Home API, develop Smart Home Integration.
- Create a sleek and smooth UI/UX using ReactJS.
- Allow for future devices and system integrators to adapt our product.

Our Team

We are a 4 person team made up of an even mix of Electrical and Computer Engineers and Computer Science majors. We are driven and are looking forward to developing all aspects of this system from the hardware to the software, and integrating the two as smoothly as possible.

- Kiernan Canavan: 5th year Electrical and Computer Engineering student
- Tyler Titsworth: 5th year Applied Computer Science student in Machine Architecture with a Minor in Education
- Aaron Garcia: 4th year Electrical and Computer Engineering student with a focus in integrated circuits
- Douglas Wilson: 5th year Computer Science (Systems) student with a Minor in Chemistry.

Lessons

Over the course of this project, 9 long months has allowed for a lot of learning to occur, here are some of the things that we consider to be valuable lessons that we've learned over this journey:

- Tyler: Microservices create a bad integration policy where you close the scope of your project the more you rely on them for their mobility. Try to use all-encompassing projects or just write your own code if you want to be expansive in your software design.
- Douglas: Whenever possible, develop with a database local to your project. This prevents issues with remote connections and better insulates your project from database failures.
- Kiernan: When working with surface mount devices it is important to order doubles of everything. It is extremely easy to lose track of or drop a component and then not be able to find it. To avoid this it is prescient to have one or more backups of critical components in case of this. The extra price is worth the time saved waiting for the replacement's shipping time.
- Aaron: Ensure that all work is of the utmost quality. Debugging clean hardware is much easier than messy prototypes.

2 Project Timeline

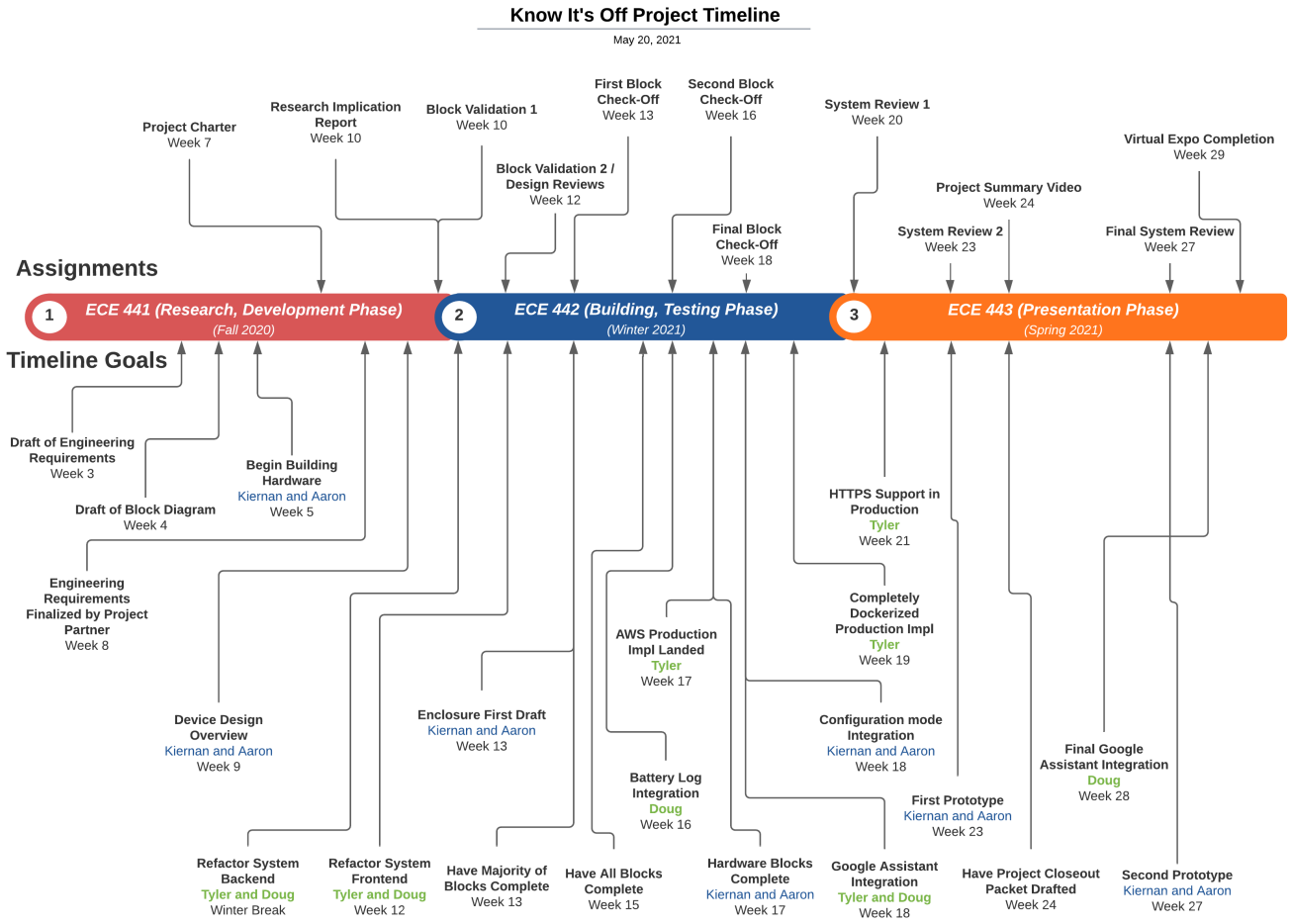

Figure 1: Internal Timeline