Smart Desk

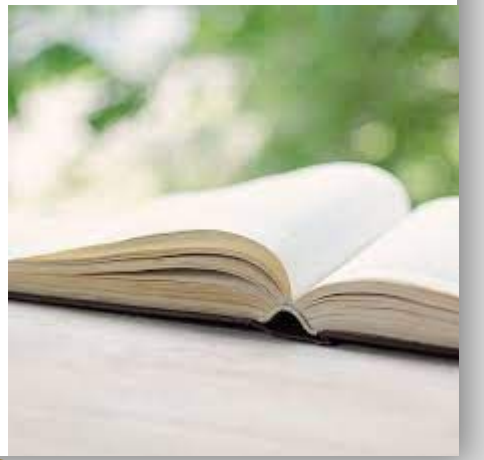
Nir Bekker
May 26, 2021
ECE196 spring 2021
Instructor : Phuong Truong

Overview

- Motivation
- Design
- Solution
- Next steps and challenges
- Project demo

Motivation

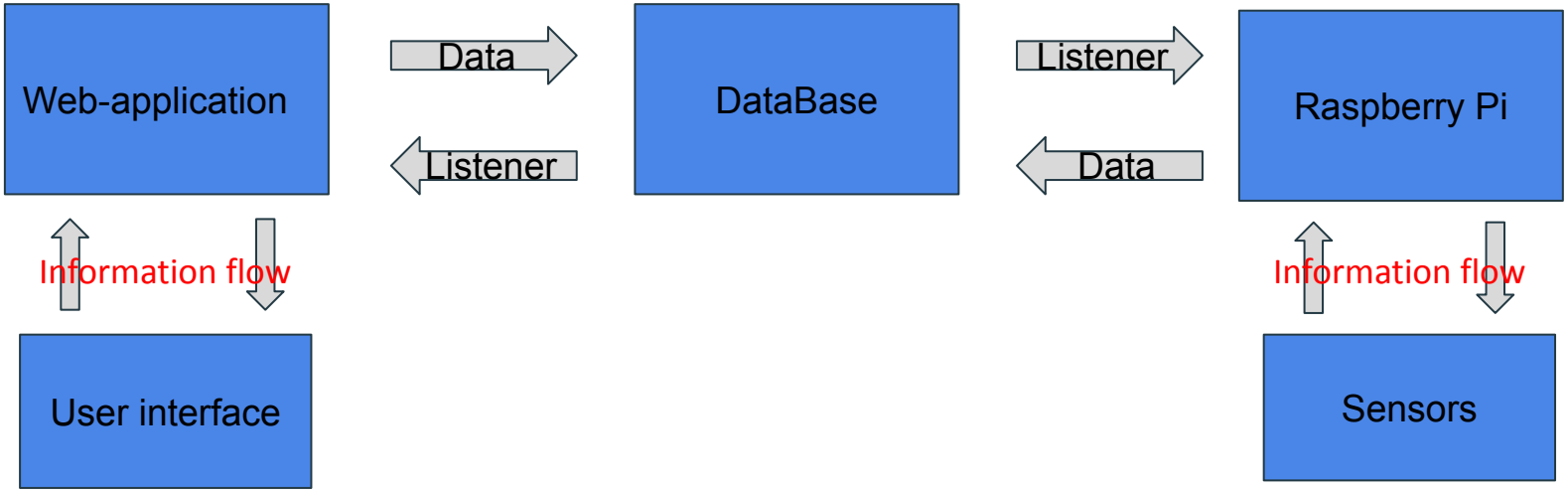
- On a daily basis we interact with some type of smart device
- As students, most of our time is spend sitting by a desk working
- The goal for this project is to create a smart desk
- A smart desk will simplify tasks and enhance productivity



Features

- Temperature
- Daily tasks
- Security
- Music
- Lights
- Fan

Design Overview



Main Components

- DHT11 Temperature sensor
  - One way communication (Pi ⇨ web application)
- IR Receiver Module
  - One way communication (Pi ⇨ web application)
- HC-SR501 PIR Motion Sensor
  - Two way communication (Pi ⇦⇨ web application)
- LCD1602 Module
  - One way communication (Pi ⇦ web application)

Sub Components

- LED’s
- Button
- Resistors
- Remote controller

Frameworks

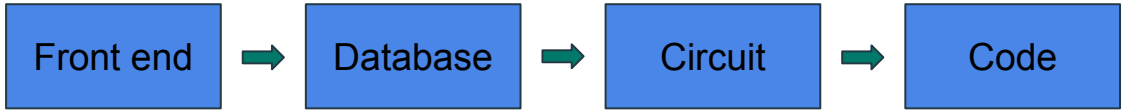
- Google firebase for database. Provides communication infrastructure
- Python libraries for sensor control on raspberry Pi
- C++ libraries for sensor control on arduino Uno
- Python libraries for raspberry Pi interactions

Sub-Systems

- Each sensor is integrated into all parts of the flow diagram
- Sensors work independently of each other

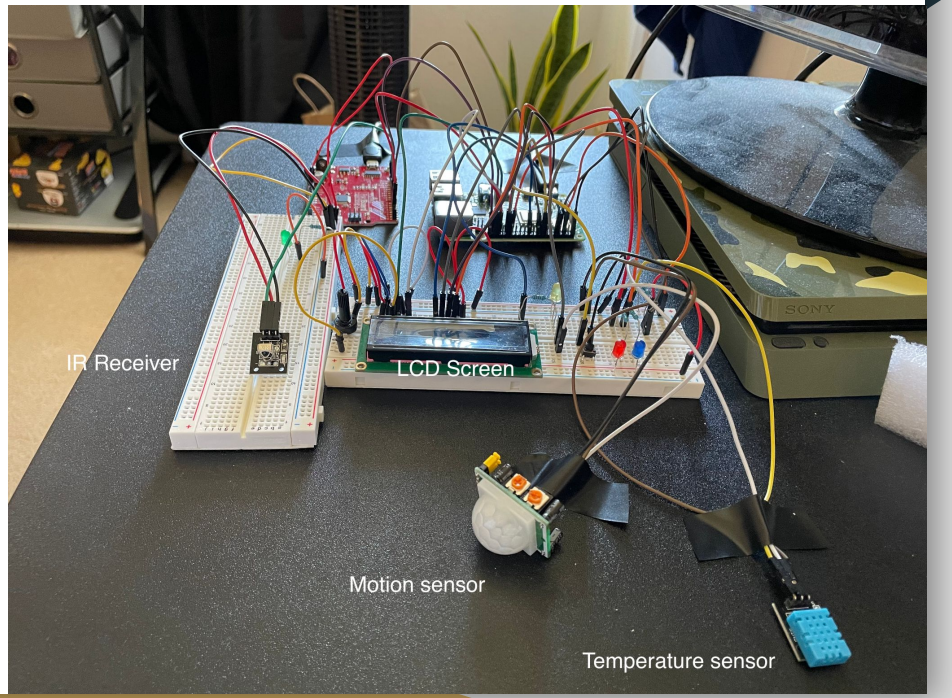
Workflow

- Front end functionality for each sensor and hookup to database
- Set up circuit for sensor
- Communicate with database from raspberry Pi
- Logic for sensor behavior
- One sensor at a time



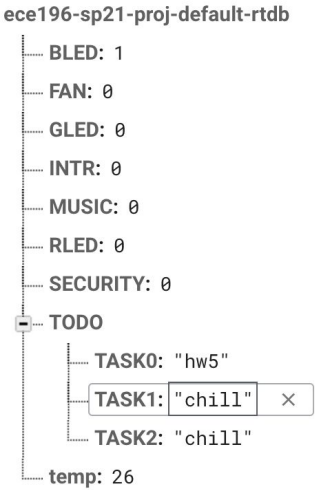
Solution

- Software
- Hardware



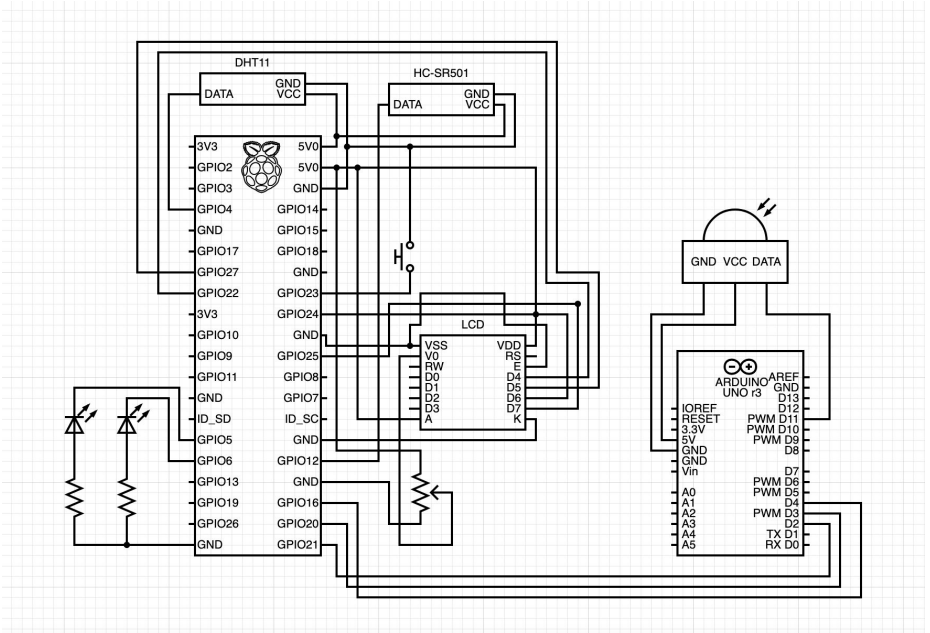
Software

- Web application and raspberry pi connected to the database
- Sensor or user update the database
- Event listener executes code
- All logic for sensor functionality is handled on the raspberry Pi



Hardware

- LCD for displaying tasks
- Button for scrolling through tasks
- IR remote for changing music
- LED’s represent desk lamp and fan
- Temperature sensor
- Motion sensor for security



Challenges

- Integration of each sensor into the software
  - MultiThreading
- Communication with database using python
  - Switching to Node.js
- Security

Future steps

- 3D printing
- Multiple users
  - Communication with host of desk
- Secure wire connections

Thank you

Presentation:
https://drive.google.com/file/d/1GYr8kERATgbxqKO2_fHCr6PM4zk2dLu6/view?usp=sharing

Demo:

https://drive.google.com/file/d/1-vvgYaEs8ZOKO43hdBxfvvesbqkVKcUJ/view?usp=sharing

Github:
https://github.com/Nir24/ECE-196-IOT-PROJ