

WEATHER STATION

By Abdullah Almaayoof



MOTIVATION

To monitor the temperature and humidity levels of my room to ensure a comfortable sleeping environment.

STEPS TAKEN SO FAR

1

Researched and identified the necessary hardware components

2

Acquired and set up the Raspberry Pi, and installed the necessary software

3

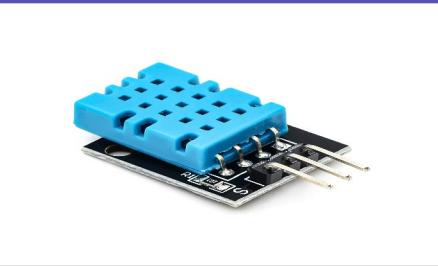
Wrote a Python program to read and display the sensor data

Sensors and Hardware Sourced



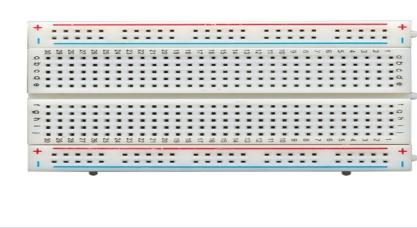
Raspberry Pi

Low cost computer that allows for easy integration with sensors



DHT11 Sensor

Low cost sensor that provides accurate temperature and humidity data



Breadboard

Used for prototyping and connecting multiple components

3 Layer IoT Model

Perception Layer

The perception layer consists of the temperature and humidity sensors which collect the data

Network Layer

The networks layer consists of the Raspberry Pi which processes and sends the data to the application layer

Application Layer

The application layer consists of the Python program, which displays the data

Steps moving forward

Setup the Pi

Setup the Raspberry Pi and connect all the sensors

Collect data

Collect the data from the sensors and display on terminal

Website to show data

Create a website to visualize the collected data

Thank you!

Any questions?



Alarm Clock Activated Coffee Machine

Making Everyday Electronics Smart

By Saif Alzaabi

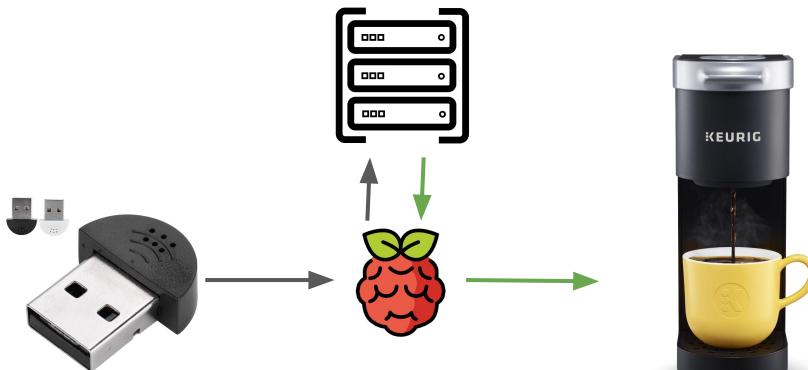
System Design

Microphone listens to audio stream.

If it detects set alarm sound, raspberry pi sends signal to coffee machine

Coffee machine is activated using gpio signal

The same function can be activated remotely by api



Three Layered System:

- **Perception Layer:** Microphone Connected to Raspberry Pi
- **Network Layer:** Flask Server receives audio stream from raspberry pi to detect alarm signal
- **Application Layer:** App analyzes audio and activates coffee Machine when the alarm is detected.

Project Flex



Reduced Pain

Reduced Pain

Reduced Pain

Reduced Pain Re

ed Blood Flow

Increased Blood Flow

Increased Blood Flow

Improved Balance

Improved Balance

Stress Relief

Stress Relief

Stress Relief

Reduced Muscle Soreness

Reduced Muscle Soreness

Improved Posture

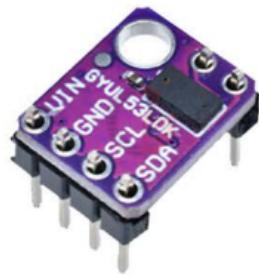
Improved Posture

Lowers Risk of Injury

Lowers Risk of Injury

Increased Physical Performance

Increased Physical Performance



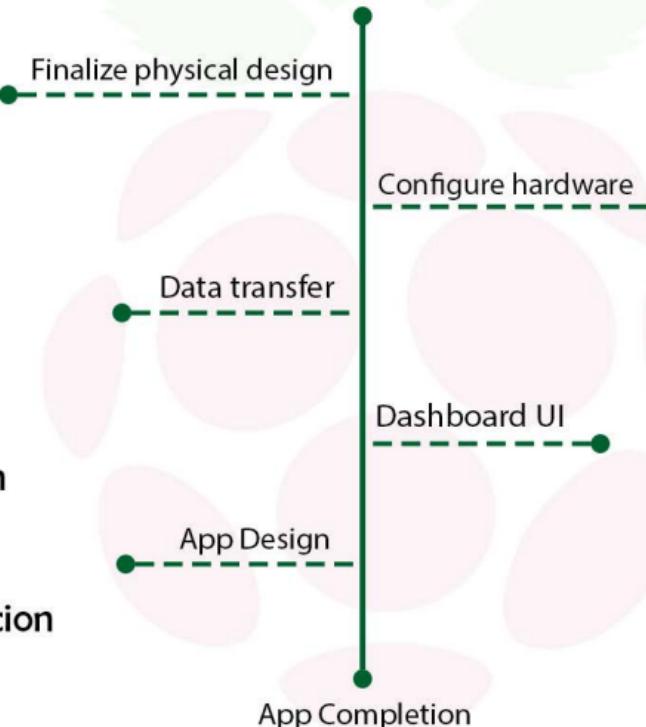
Laser Distance
(VL53LoX)

- **Accuracy:** high resolution
- **Range:** 2 meters.
- **Size:** small form-factor
- **Efficiency:** low consumption



Bluetooth Module
(HC-06)

- **Simple:** easy setup
- **Value:** low cost.,
- **Size:** small form-factor
- **Efficiency:** low consumption



PROJECT FLEX



Plant Environment Monitor

Isaac Bilsel
CS 3907

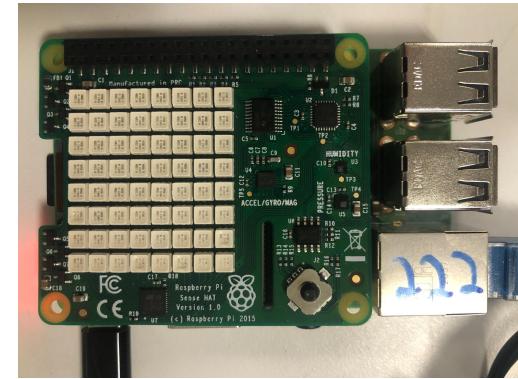


A cheap and efficient way to monitor environmental statistics for optimal plant growth

Perception SenseHat: Temperature and Humidity sensors, LEDs

Network Text Messages using smtplib

Application User receives texts and LED data display



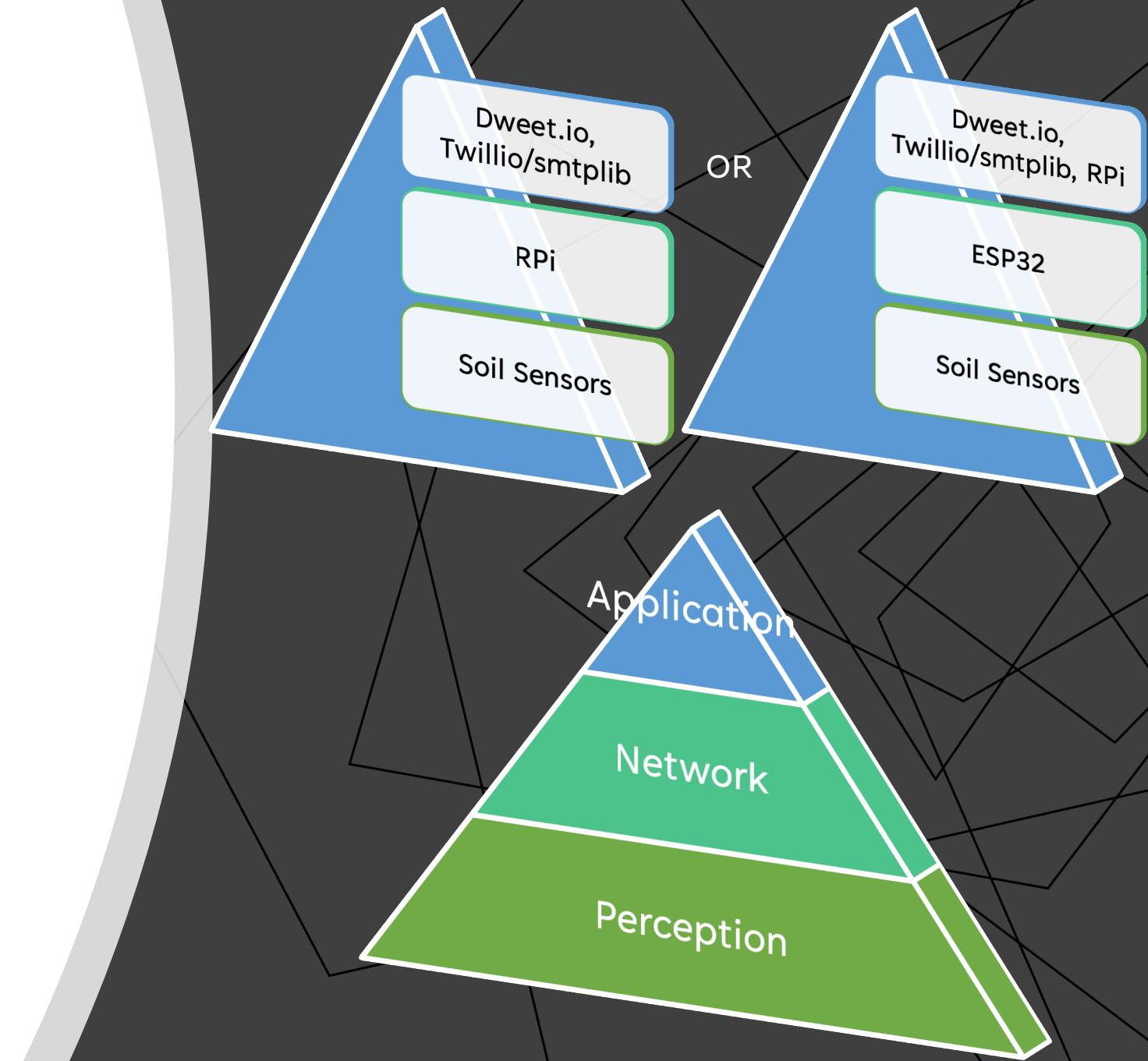
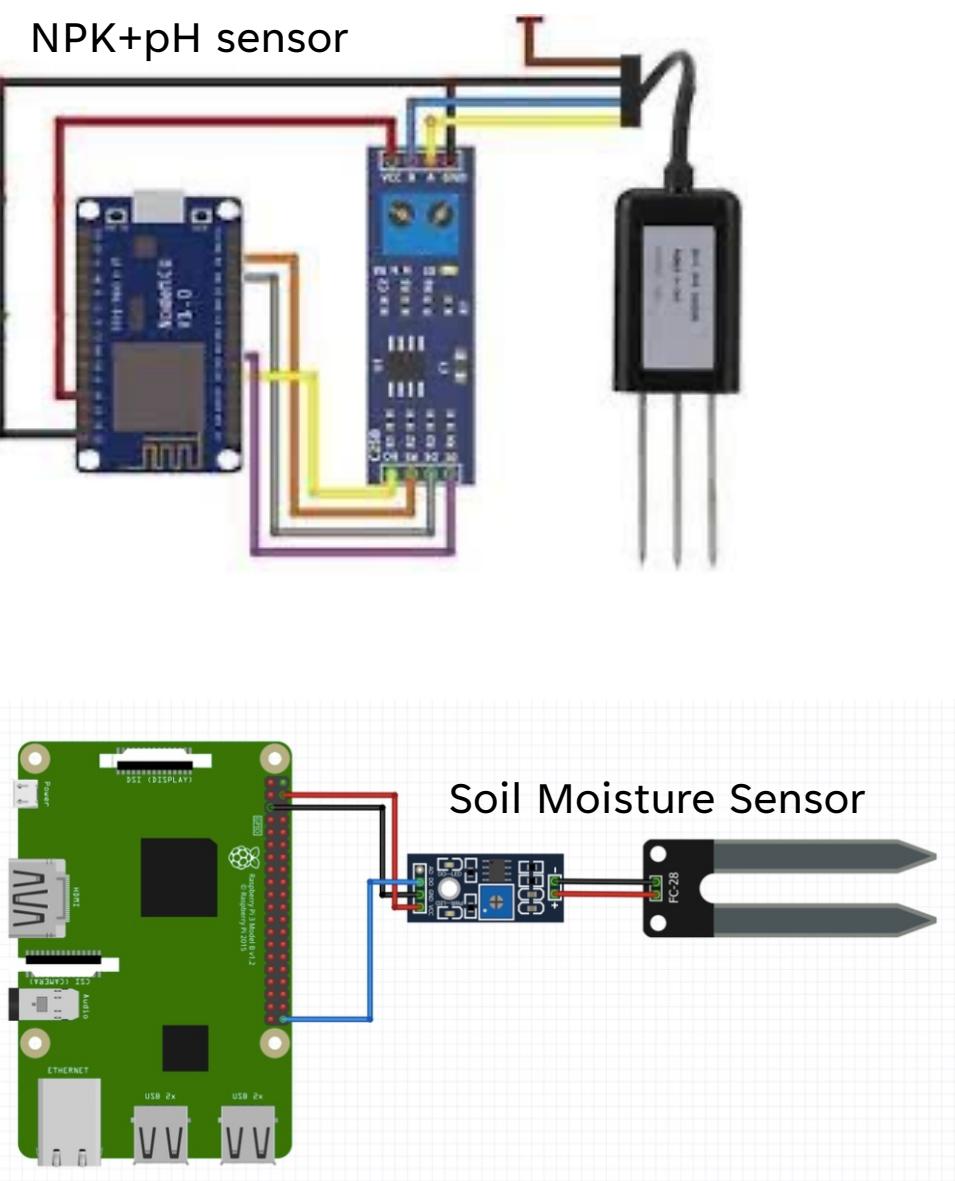
Timeline:

- Tie in the application layer to the other two layers.
- Add additional features and complexity

HOUSE PLANT SOIL HEALTH



Ryah Carpenter



NEXT STEPS

Completed:

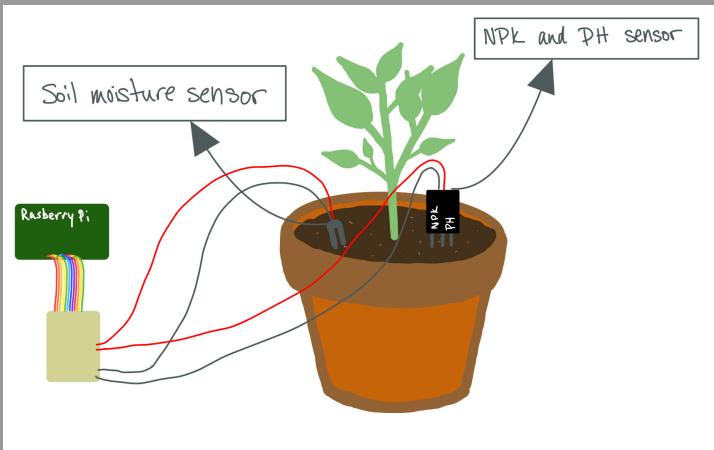
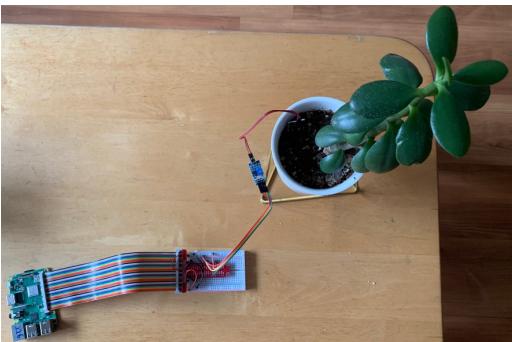
- Soil moisture sensor setup
- Soil moisture code

Next Week:

- Test moisture sensor (3/4-3/5)
- Add user alert (3/6)

As soon as arrives:

- Setup NPK+pH sensor
- Test
- Add user alert





THANK YOU

Happy Friday ☺

Air Quality & Ventilation System

Dania Abdalla

Why? Indoor Air Quality can have major effects on health as most people spend most of their time indoors. According to the EPA, indoor air pollution levels are typically 2-5 times higher than outdoor pollution levels.

Steps Taken so far and Timeline?



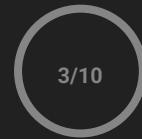
Identify needed hardware



Python Code



Complete Hardware Setup



Project Demos

Hardware Setup and 3 Layer IoT Model?



Application

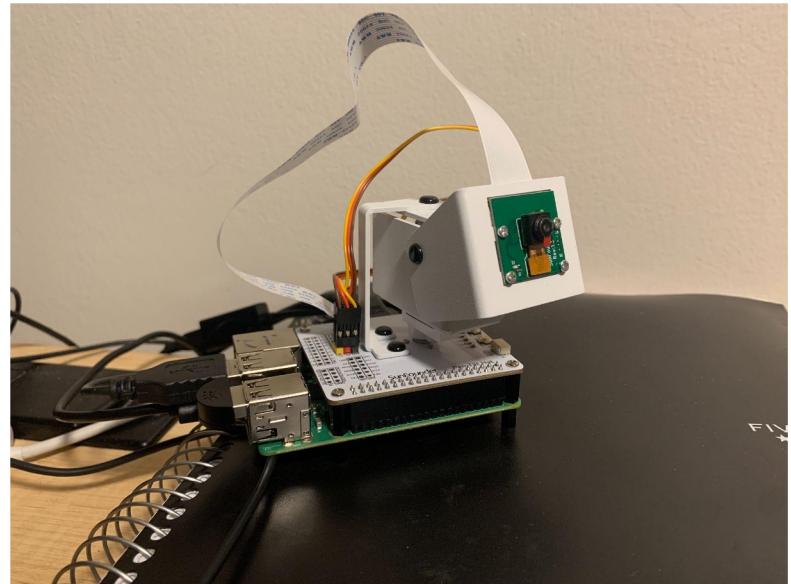
Network

Perception

THE ASSISTANT

BY RENAUD FRED NOUBIEPTIE

- Motivation - -> helping
People with trouble hearing
And trouble speaking
- Sensors: Pan Tilt camera
USB microphone
- The layers
 - Pan Tilt Camera, USB microphone
 - -> Rpi to Phone -> User receive data

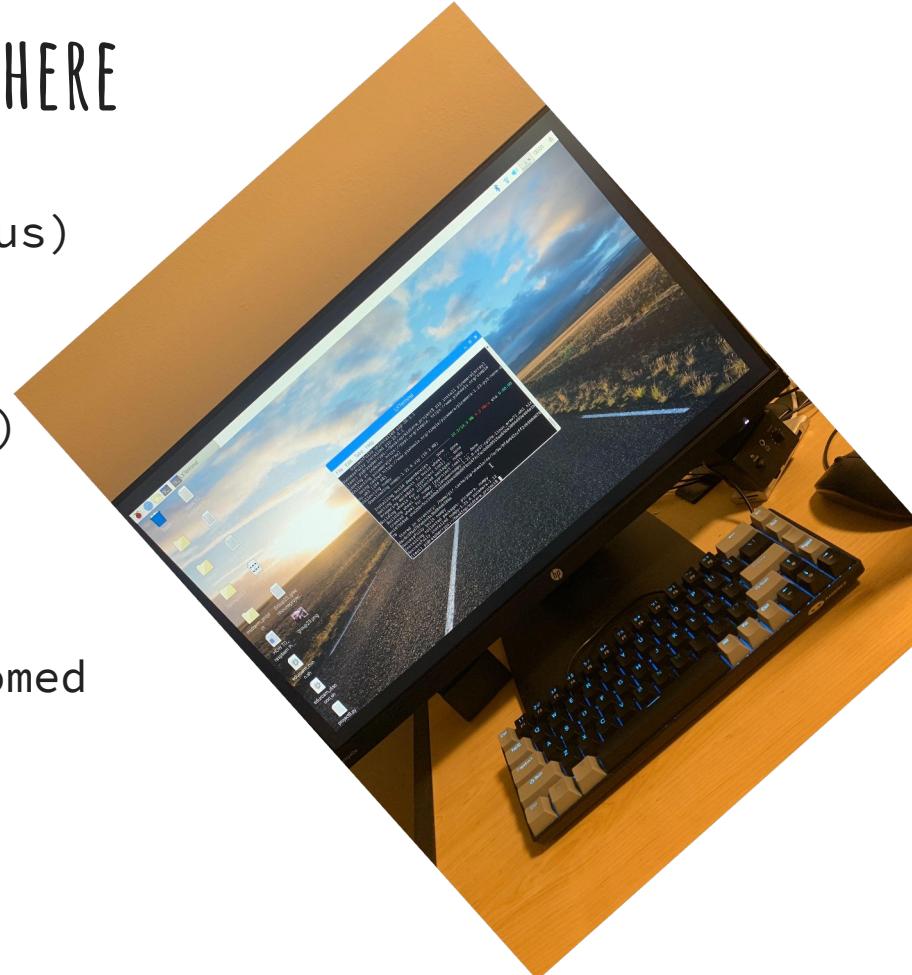
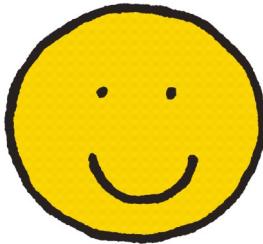


HOW TO GET THERE

- Image Recognition (current focus)
- Audio Recognition (3/ 4-5)
- Audio Processing (3/6-8)
 - If time allow NLP
- Sending data from Rpi (3/ 8-10)

To cellular device

Questions and critique's are welcomed





Plant Mate

Smart Watering System

Kessa Crean
CSCI 3907-14

Motivations

Automating and improving plant care for gardeners of all levels

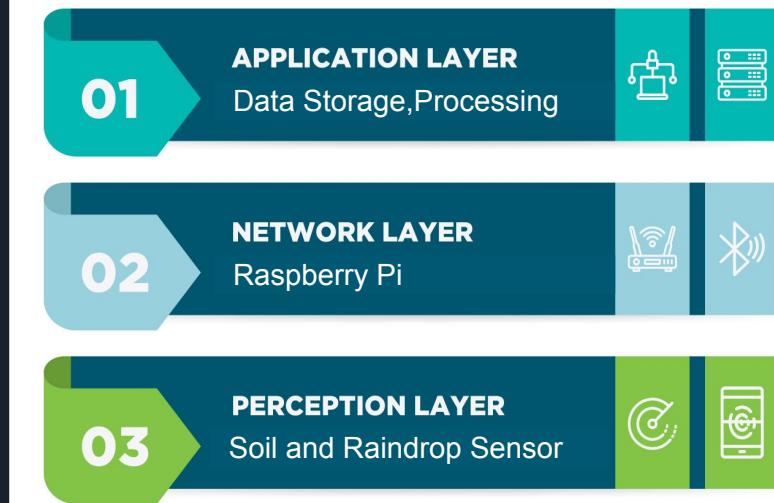
Timeline

Coding and Implementation: 3/4-3/5
Sensor Tuning: 3/6-3/9
Project Complete: 3/10

Sensors and Hardware

- Raspberry Pi
- Sunhat Raindrop Sensor
- Submersible 3V DC Water Pump
- Soil Sensor - Capacitive Moisture Sensor

3 Layer IoT Model



Peripheral Detector for Deaf/HOH

Motivation: a common issue in deaf culture is deaf anxiety, a factor contributing to this feeling are people or objects out of sight, difficulty detecting what is behind an individual also leads to injury when a dangerous object is approaching

Steps taken:

- Attached ultrasonic sensor and LED to Pi
- Started script to coordinate different LED pulses to different readings from ultrasonic sensor

3 Layer IoT

Steps left:

- Test LED corresponding to different ultrasonic measurements
- Connect email/text to send out organized data and/or an alert
- Attach needed sensors

[Information layer]

Data collected is if an object is detected in space and if it is approaching or passing through

[Communication-layer]

User can communicate with device to send alert text out and receive stats from use of device

[Sensor-layer]

Sensors applied are the ultrasonic sensor, LED, and vibration switch

Grid Optimized EV Charging

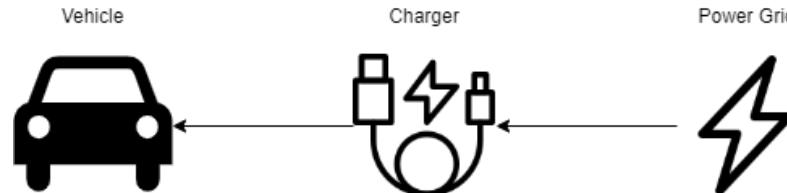
Benjamin Marasco

About the Project

Electric car chargers are often very simple! They connect the vehicle to the grid, and the car mediates charging.

What if we could help the car mediate charging, using the charger, depending on the price of electricity?

This project focuses on creating a smart charger!



Technical Components

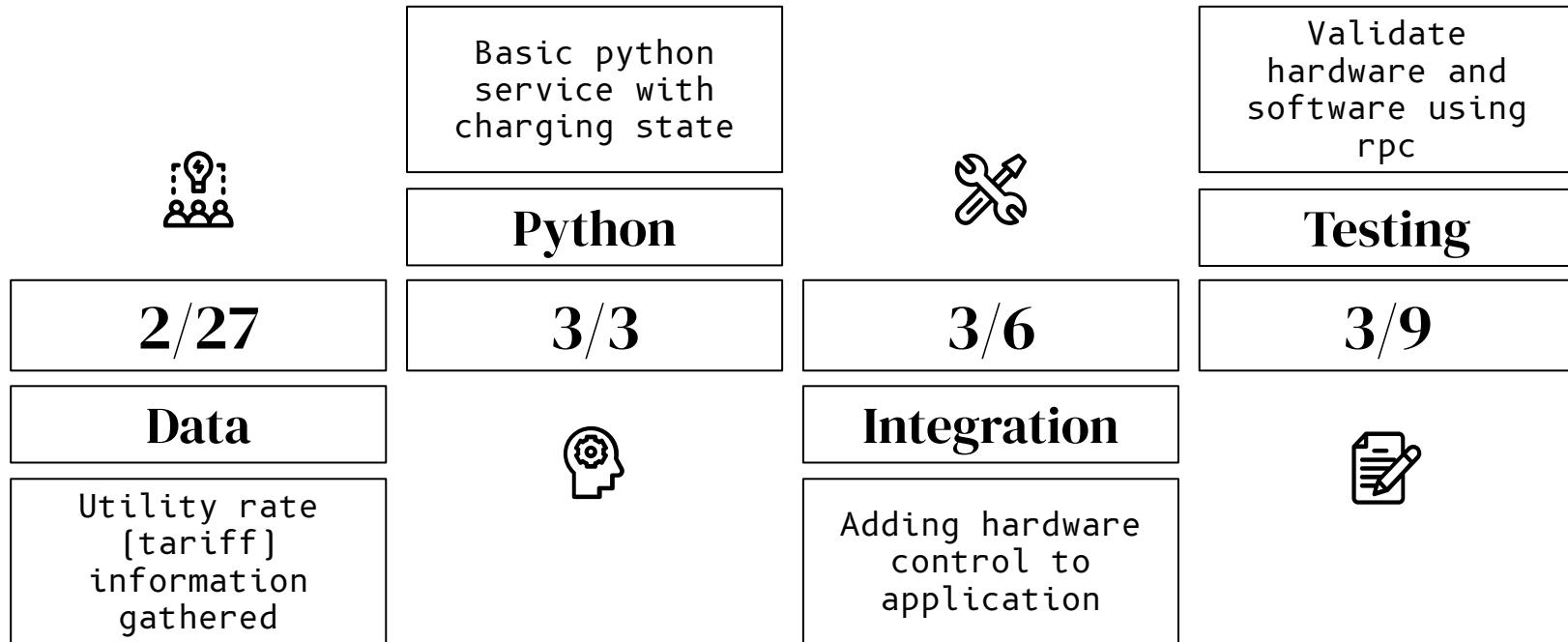
Wiring up an EV charger is complex, 240V at 30A of electricity is scary.

This project uses a PiHat and Raspberry Pi, and simulates a connected EV to avoid the dangers of 30A current.

IoT architecture:

- Thing: Smart EV Charger [RPi, PiHat]
- Connectivity: Remote control of charging
- Data: Electric Grid information

Timeline



Thanks!

Chipotle Efficiency

By Jonathan Nguyen

The problem

Wasted time,
Dissatisfied Customers
and Stressed Workers

Customers aren't given
any freedom or choice

There is a lack of
knowledge and data



The Chipotle Solution



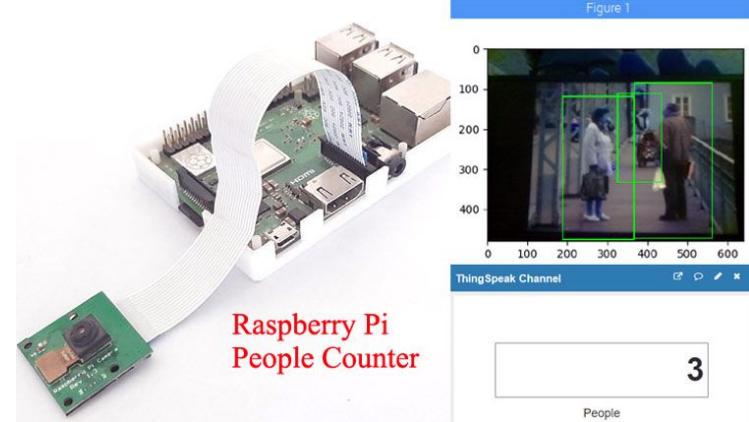
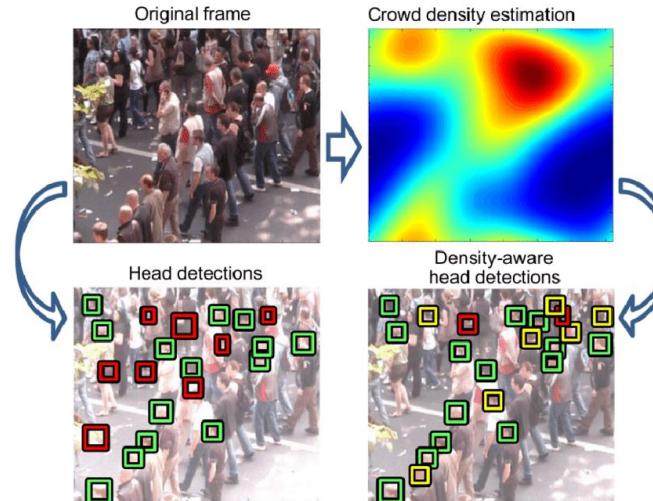
Crowd Estimation and
Population data for every
restaurant in Foggy Bottom

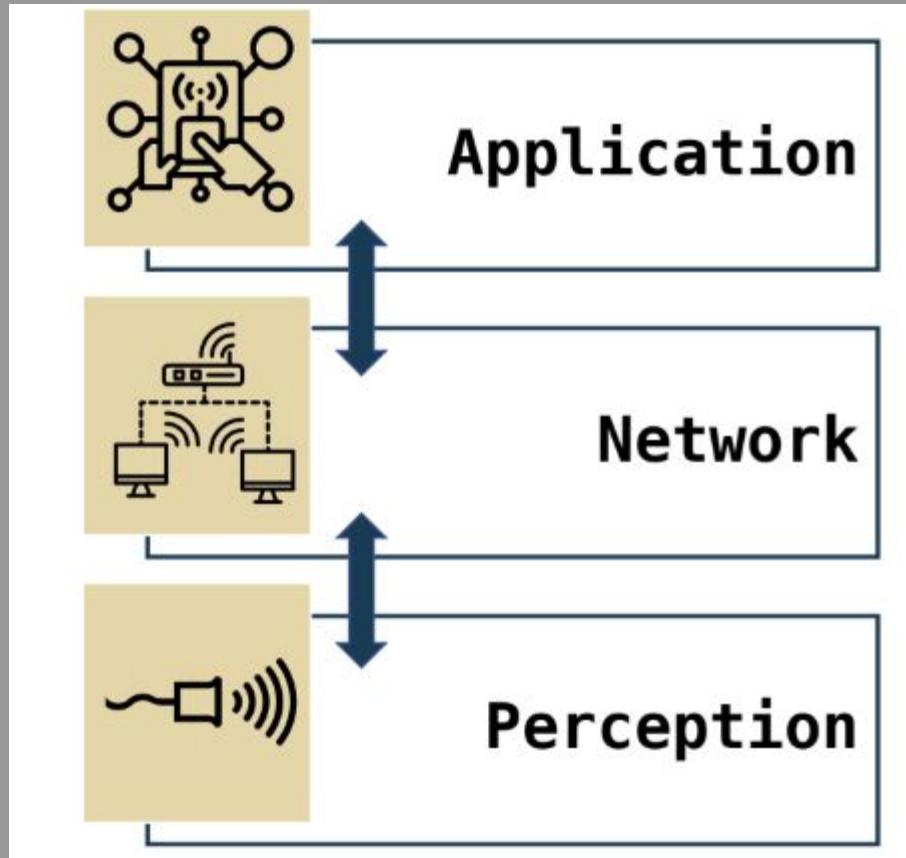
The Solution

Place a Raspberry pi's equipped with Pi Camera v2 into Restaurants

Users interact with an application that will inform multiple restaurants information

The user will be able to know how crowded restaurants are then choose where to go





?

?, ??,
? ?
hungry ??,
??, ??

12:25

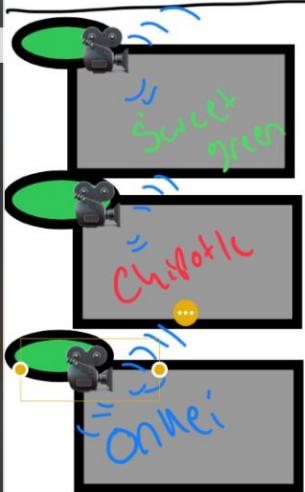
Sweet
green

Charlotte

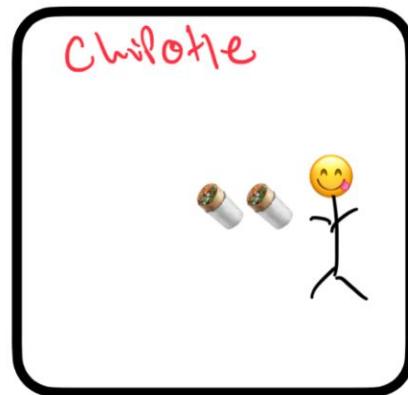
Onhei

12:30

?, ??,
? ?



Sweet	10
green	2
Charlotte	1
Onhei	



Steps Taken so far

Set up Camera, install libraries (libhdf5 , opencv).

Following Tutorial for Crowd Estimation -

(<https://circuitdigest.com/microcontroller-projects/crowd-size-estimation-using-opencv-and-raspberry-pi>)

- issues with using ThingSpeak, Trying to get code to work through terminal

Timeline

Get hardware to read and count 3 people using stock photos by this weekend.

Next Week work on using outside application to read information either ThinkSpeak or Canyenne

A large, abstract network graph occupies the left half of the slide. It consists of numerous small, semi-transparent circular nodes of varying sizes and colors (white, light orange, light red) connected by a dense web of thin, light gray lines. The background behind the graph has a warm, circular gradient from yellow-orange on the left to red-pink on the right.

NFC Attendance System

Tommy Riffe



Set Up

- The 3 layer iot model is seen by three main components
- The sensor layer is the nfc sensor
- The communication later is the pi
- The information later will be website that will display when users logged in or join the class.

Information-layer

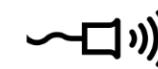


Communication-layer



Data

Sensor-layer

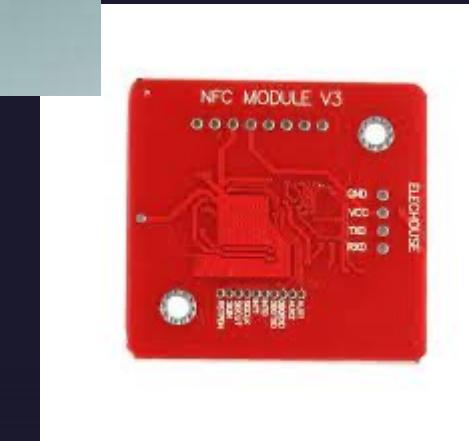


Connectivity

Things

Plan

Build a website that will show currently logging in users
Each user will have their own NFC tag assigned to them through the website
The initial plan was to make the system using apple wallet but due to time it is out of scope.



IoT Midterm Project: Smart Doorbell System

Ryan Rosica

Motivation

A simple solution for identifying who is at the door from your phone.

- Security
- Convenience



Someone's at
the door!

Setup

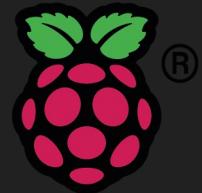
Perception Layer



Ultrasound Sensor: Detect motion when someone arrives at the door



Camera: Take a picture of the person to perform facial recognition



Network Layer / Message Broker



Application Layer

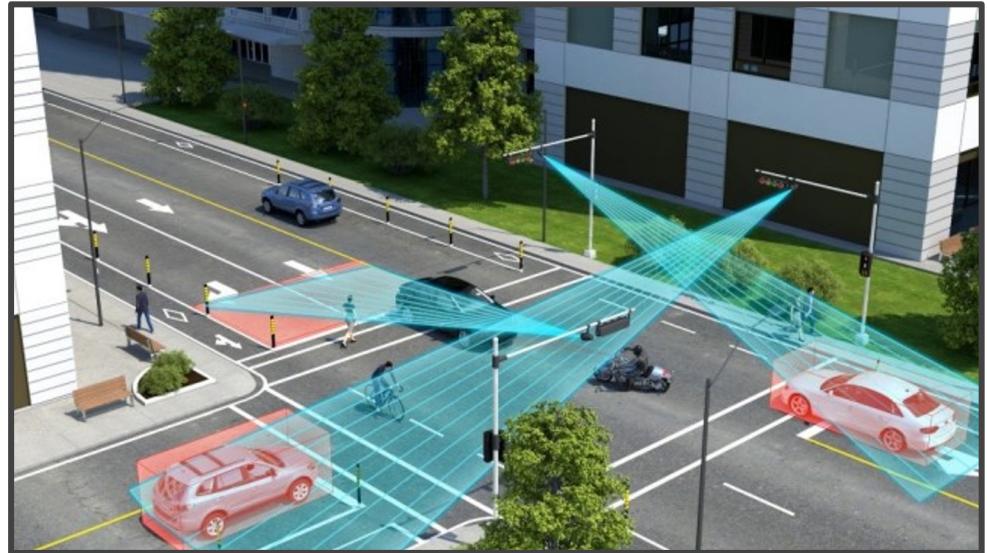




CrossEye: A Vision for Smart Infrastructure

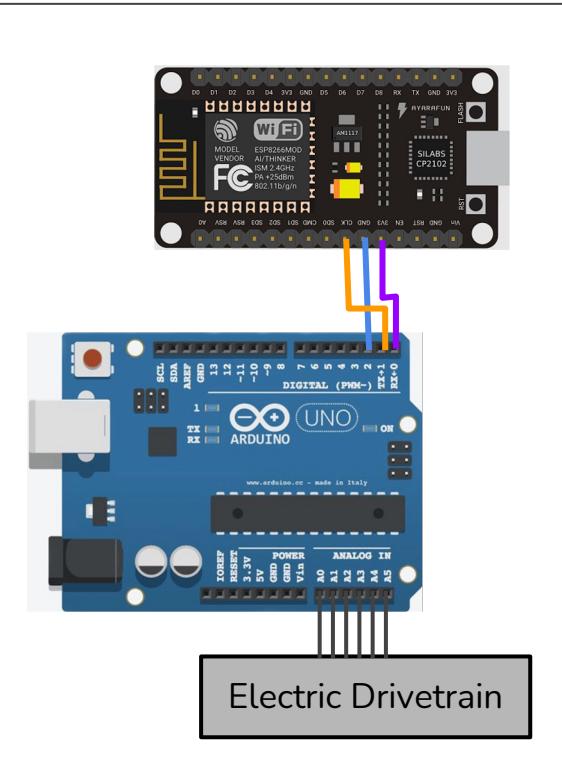
By Evan Stella

- Smart infrastructure will be key to the widespread, sustainable adoption of autonomous vehicles
- CrossEye:
 - A system of smart “Intersection Nodes” that sense obstacles and traffic and relay information to nearby AVs
 - Enables better decision-making for AVs by extending their perception range
 - Could be used to make large scale, distributed traffic routing decisions
- Proof of Concept:
 - An Intersection Node that can send an emergency notification to a nearby simulated-AV when an obstacle is detected



Prototype System Design

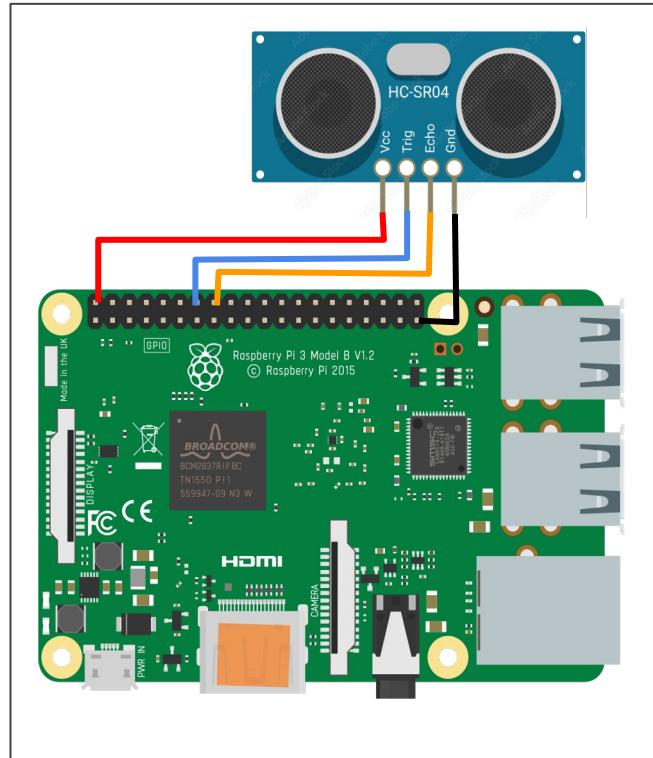
APPLICATION LAYER



NETWORK LAYER



PERCEPTION LAYER

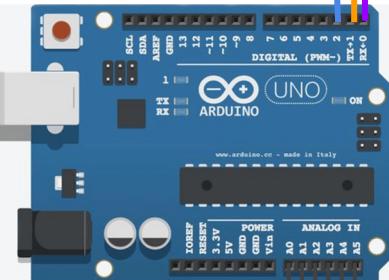
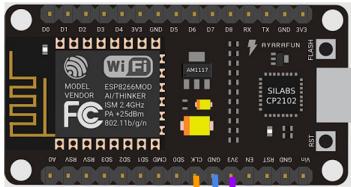


Prototype System Design

Autonomous Vehicle(s)

MQTT-SN over Wireless Link

Intersection Node



Electric Drivetrain

