

**IoT Based Pet Tracker:**  
**Amy Ideozu**  
**Evan Lingo**  
**Richard Taylor**  
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**Sponsor: Souryendu Das**

# IoT Based Pet Tracker

Problem statement:

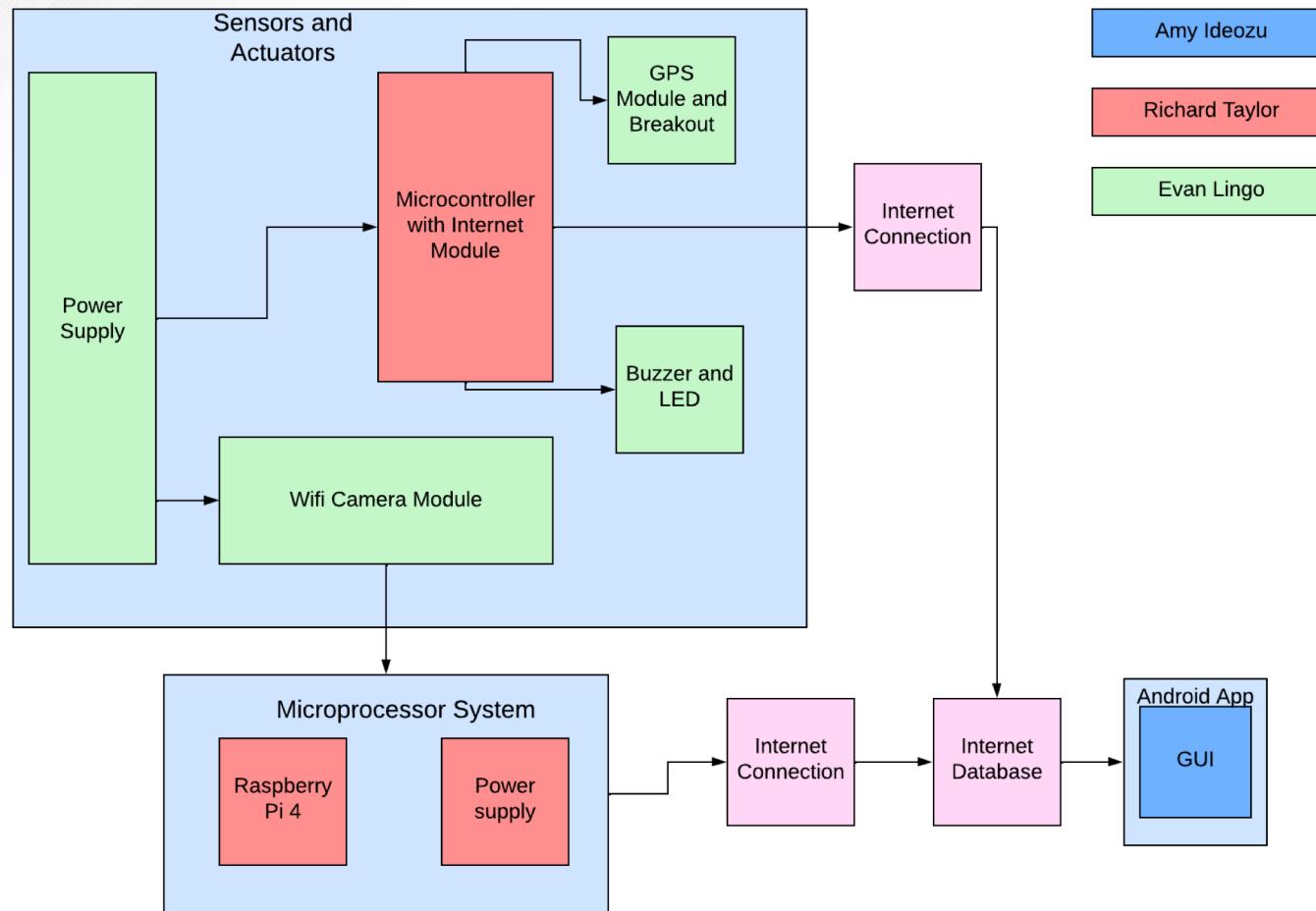
- Losing track of your pet is a heartbreaking event that may happen to many pet owners
- At times it can be difficult to keep track of your pet

# IoT Based Pet Tracker

Solution proposal:

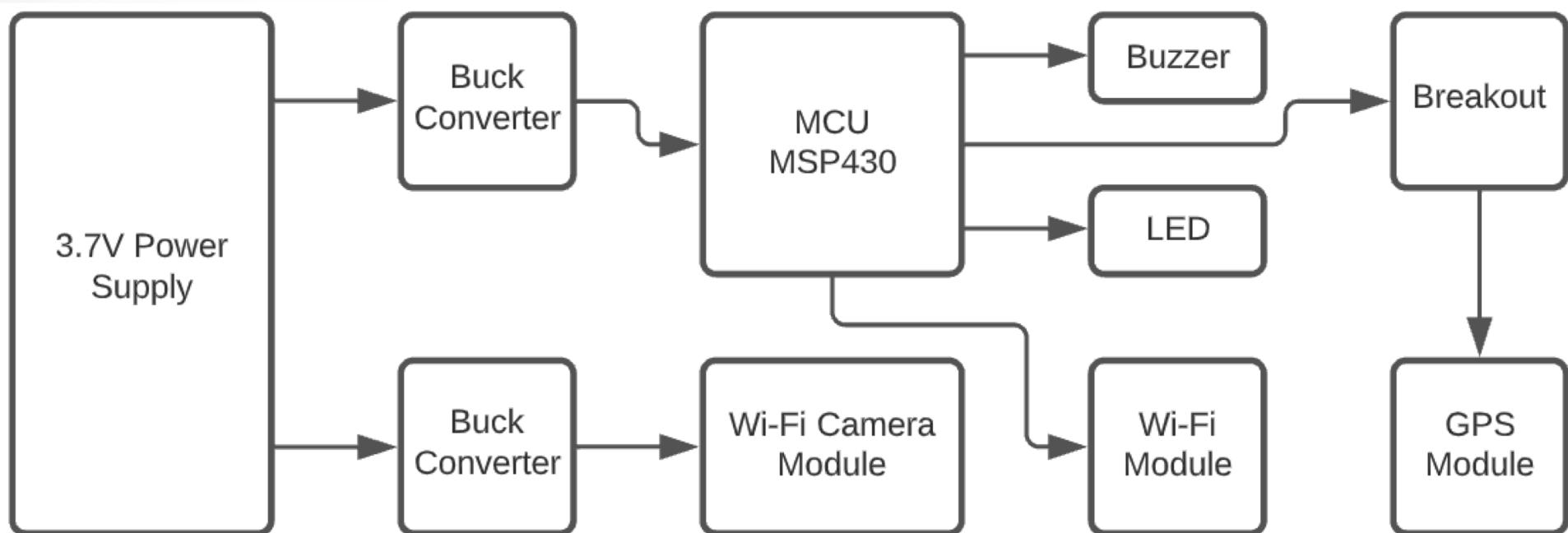
- Develop an IoT Based Pet Tracker to keep knowledge of your pets location via GPS and video feed through the use of an android app

# Diagram of Subsystems and Interface



# Subsystem #1: Sensors and Actuators

- Owner: Evan Lingo



# Subsystem #1: Sensors and Actuators

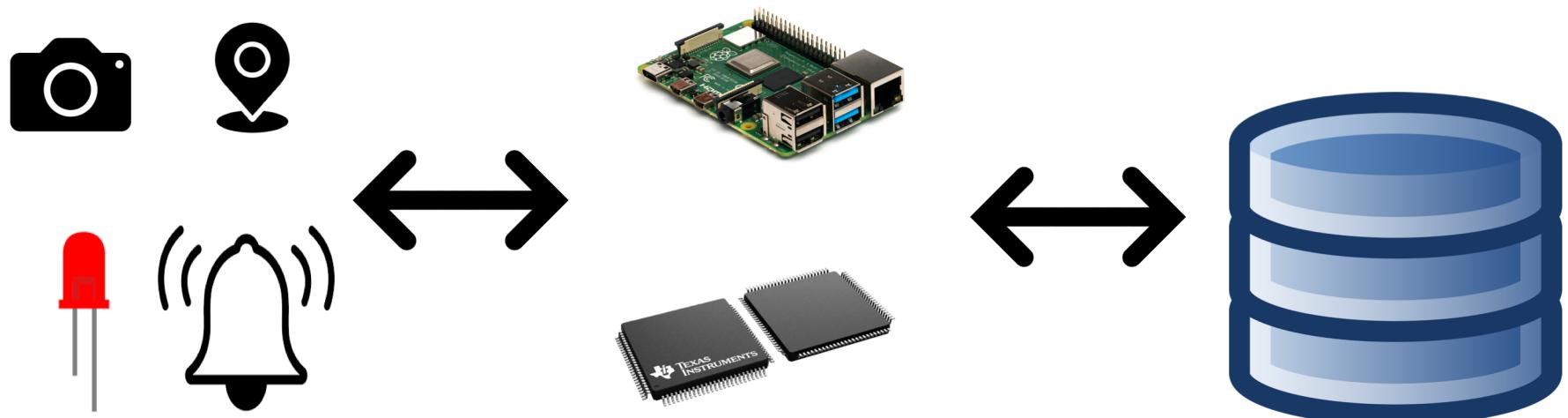
- Power IPT long enough for normal work day (8 - 10 hours)
- Consist of 2 buck converters to power different components from our 3.7V battery
- Size of 1.5 in x 2 in x 3 in
- Mass of 213 g ~ 0.47 lbs

## Subsystem #2: MCU and MPU

- Owner: Richard Taylor
- Develop microcontroller and microprocessor programs to send data between the internet database and hardware
  - receive: gps data from microcontroller and video feed from video camera, geofence data from internet database
  - send: video feed and gps data to internet database
  - activate: buzzer and led on collar when outside gps safe zone

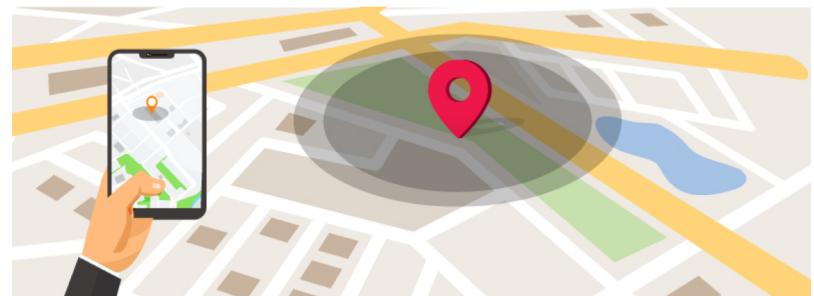
## Subsystem #2 MCU and MPU

- Microcontroller is located on circuit board whereas raspberry pi 4 is located in a stationary location in the user's home



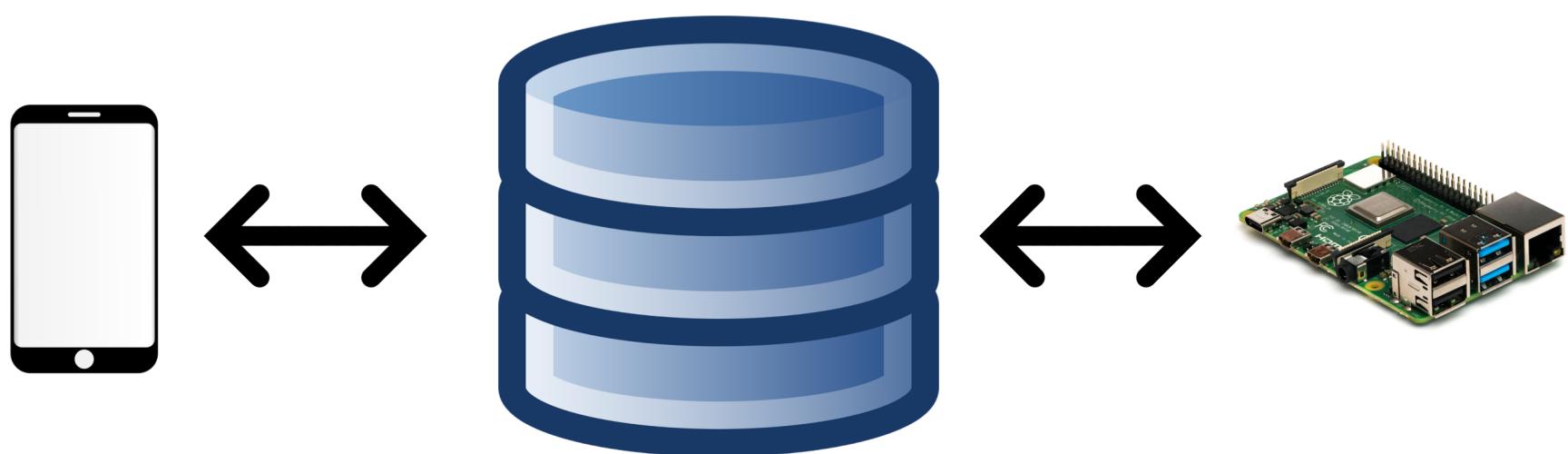
## Subsystem #3: GUI

- Owner: Amy Ideozu
- Android Application
- Features:
  - Add pet(s) to be monitored
  - View location/location history of pet(s)
  - Add geofence(s), “safe area”
  - Notify user when pet(s) leaves “safe area”



## Subsystem #3: GUI

- Communicate with Raspberry Pi 4 via MySQL server
  - User won't always be near Raspberry Pi



# Execution Plan

# Validation Plan

Paragraph #	Test Name	Success Criteria	Methodology	Status	Responsible Engineer(s)
3.2.1.1	Battery Operating Life	Battery last for 8 hours	IPT is put in default operating state and left to run for 8 hours. Power will be monitored with connection on IPT	Not Tested	Evan Lingo
3.2.1.2	Time to Alert	One minute of pet exiting geofence	MCU program	Not Tested	Richard Taylor
3.2.1.2	Time to Alert (GUI)	Notification sent to user's phone within one minute	Use stopwatch to measure the amount of time between pet leaving geofence/safe zone and the user being notified on their device	Not Tested	Amy Ideozu
3.2.1.3	Geofence Size	Geofence size is >=100 sq ft <=3600 sq ft	Phone application lets user choose a geofence size with a minimum radius of 100 sqft and maximum radius of 3600 sqft	Not Tested	Amy Ideozu
3.2.1.4	Video Stream quality	Stream quality of 480p	MPU program	Not Tested	Richard Taylor
3.2.2.1	Mass of IPT	Mass of maximum 213 grams	Measure system of sensors and actuators with a digital scale	Not Tested	Evan Lingo
3.2.2.2	Size	Volume should be 1.5 inches in height, 2 inches in width, 3 inches in length	Perform measurements for the enclosure created for the IPT	Not Tested	Evan Lingo
3.2.3.1.1	Power consumption	Max 2.12 W consumption	Use multimeter to determine the power consumption	Not Tested	Evan Lingo
3.2.3.1.2	Input Voltage Level	Input voltage level of 1.8V to 3.6 V	Use multimeter to validate input voltage levels	Not Tested	Evan Lingo
3.2.3.1.3	Video stream command	Successfully streams video to user's device	Phone application should have an activity where the video stream will be visible; the video stream will be taken from an IP address from camera module	Not Tested	Amy Ideozu
3.2.3.1.3	Data output	Sends data from MCU and MPU to database	MCU and MPU program	Not Tested	Richard Taylor
3.2.3.2.2	Diagnostic output	Control interface	MCU and MPU program	Not Tested	Richard Taylor
3.2.3.2.3	Raw Video Output	Streams video to users android app	MPU Program	Not Tested	Richard Taylor
3.2.4.1	Thermal Heat Sinks	Thermal heat sinks on PCB to maintain a temperature of the whole system at 90°F ± 5%	Use of external thermometer to measure heat of IPT while active	Not Tested	Evan Lingo
3.2.5.1.1	Failure detection	Detects failure and notifies internet database	MCU and MPU program	Not Tested	Richard Taylor

# Part order status

Part Description	Status (order approved/order placed/part received)
Wifi Module - ESP8266 x 2	Order Placed
GPS Breakout x 2	Order Placed
GPS module EM 506	Order Placed
Microcontroller MSP430FR60371IPZ	Order Placed
Tenergy Li-Ion 3.7V Battery x 2	Order Placed
Tenergy Li-Ion 3.7V Battery Charger	Order Placed
ESP32-CAM WiFi Bluetooth Camera Module	Part Received
Total Wireless - Galaxy A01 - Black	Part Received
5mm LED	Part Received
Buzzer	Part Received
Raspberry Pi 4 x 2	Part Received