Felinal Demeow

Cat Monitor

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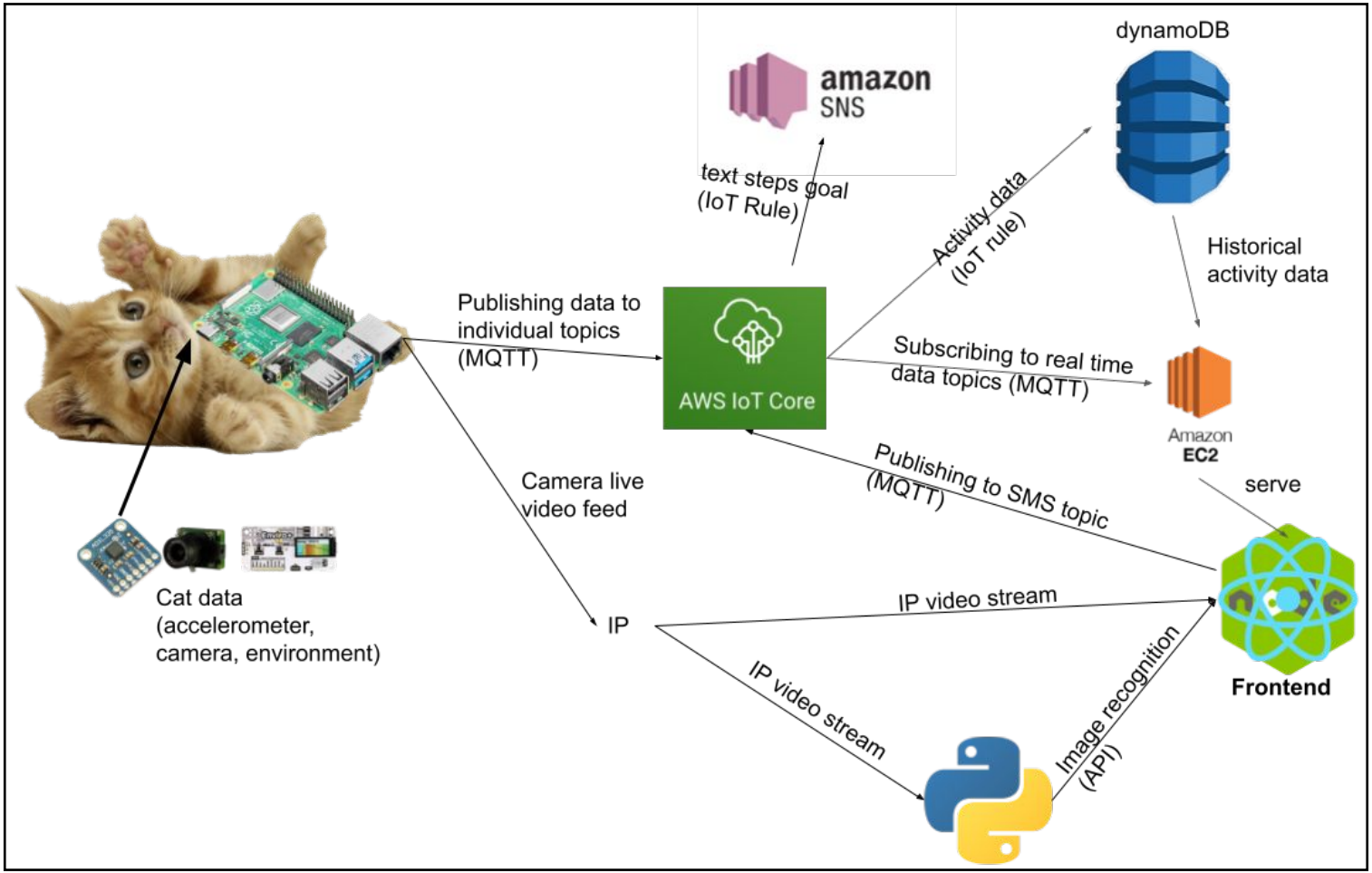
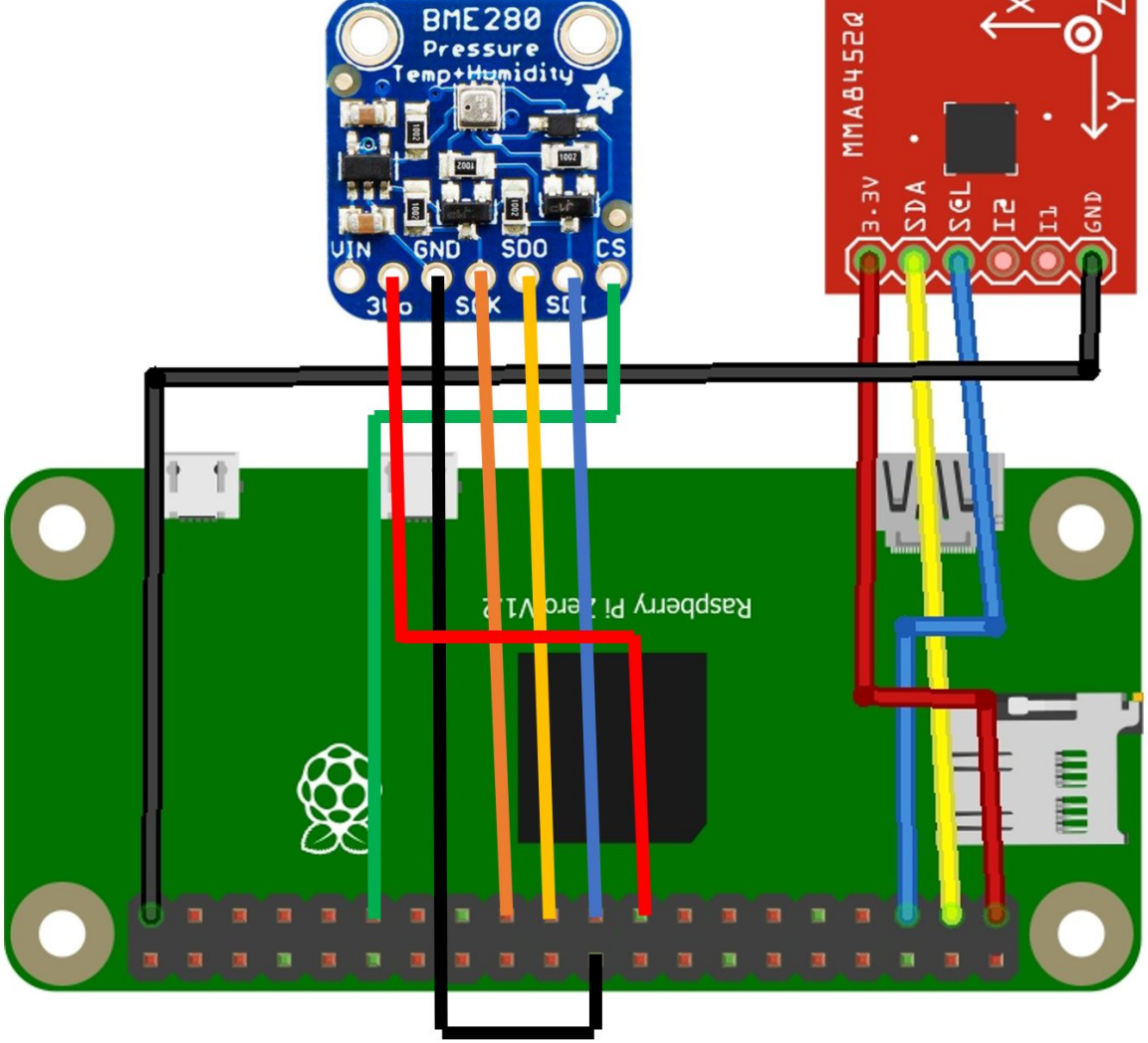
Arcatecture Diagram



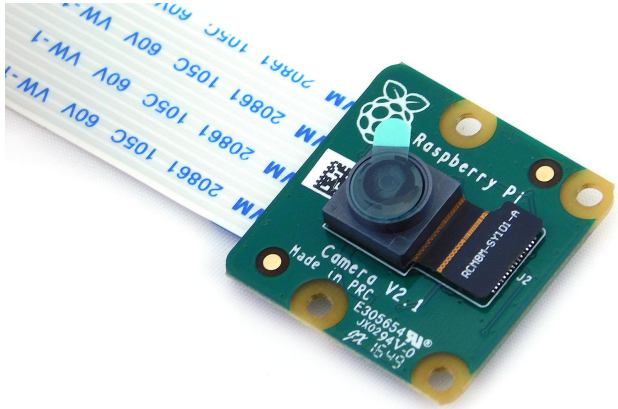

BME280
Pressure
Temp+Humidity
VIN
GND
SDO
CS
MMA8452Q
3.3V
SDA
SCL
GND
Raspberry Pi Zero V1.2

Video Streaming

- Hardware: Raspberry Pi Camera Module (wow!)
- Pi → IP
- IP → Frontend

Alternatively:

- Pi → Kinesis WebRTC
- Kinesis → HLS

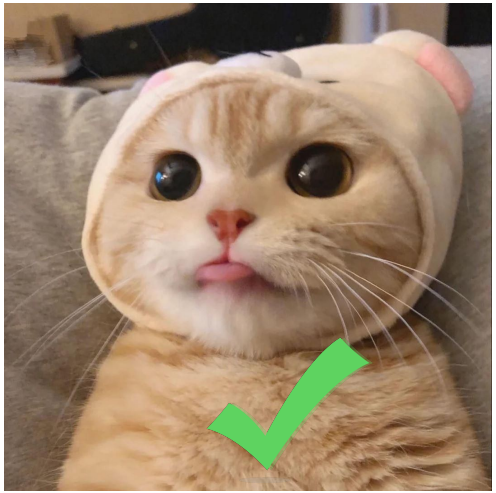


WebRTC

amazon Kinesis

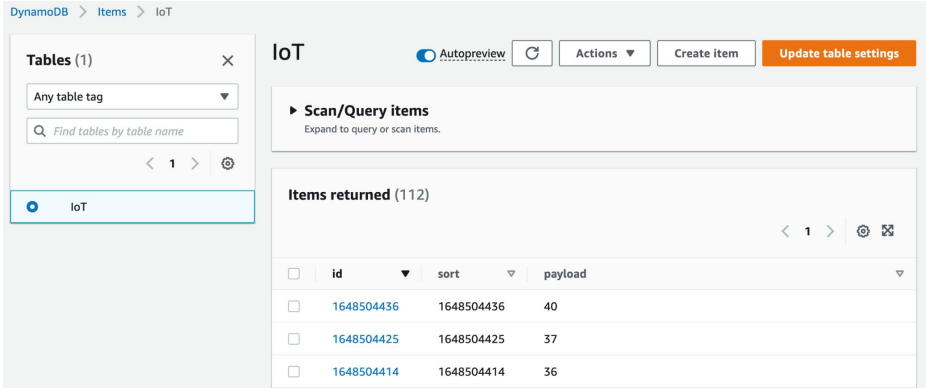
Video Streaming - Cat Facial Recognition

- Video stream is pulled by an external server
- Every second, the latest frame is pulled and sent through cat facial recognition to see if cat face is present.
- If sees cat, uses API call to tell backend that cat is seen
- Increases friendship points - displayed on dashboard



Step Count Visualizations

- Topic published to every minute, rule adds entry to DynamoDB
- Web client pulls data from DynamoDB, line plot with daily steps created with recharts

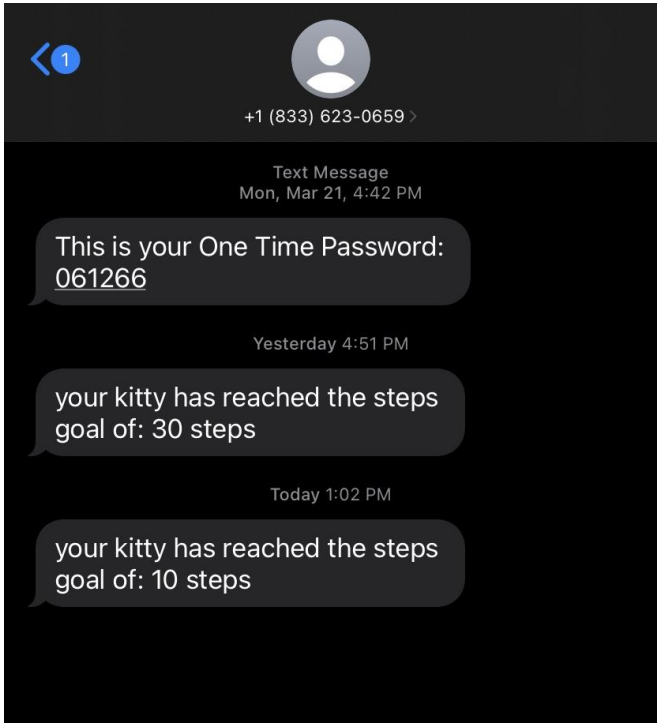


Phone Notification

- Amazon SNS
- MQTT message published to topic
- Rule to send message as SMS message to subscribed phone numbers

Step Goal

- Can set a daily step goal for your kitty
- Text is sent to you when step goal is reached
- Node backend publishes MQTT message to topic



Phone Notification

- Amazon SNS
- MQTT message published to topic
- Rule to send message as SMS message to subscribed phone numbers

Temperature Warning

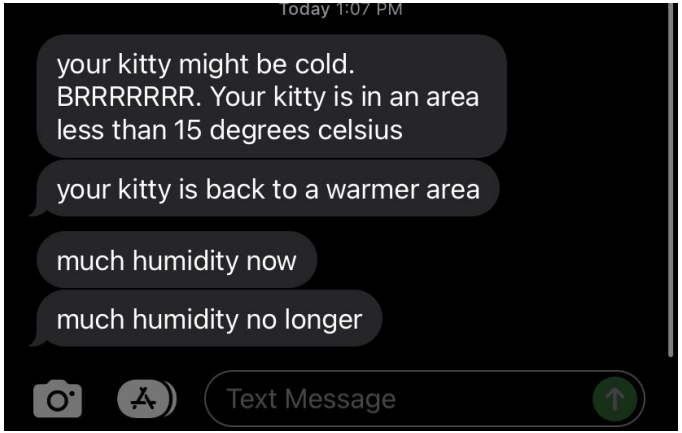
- If cat is in an environment below comfortable temperature
- SMS message sent to you
- Another message sent when cat returns to warmer temperature

Phone Notification

- Amazon SNS
- MQTT message published to topic
- Rule to send message as SMS message to subscribed phone numbers

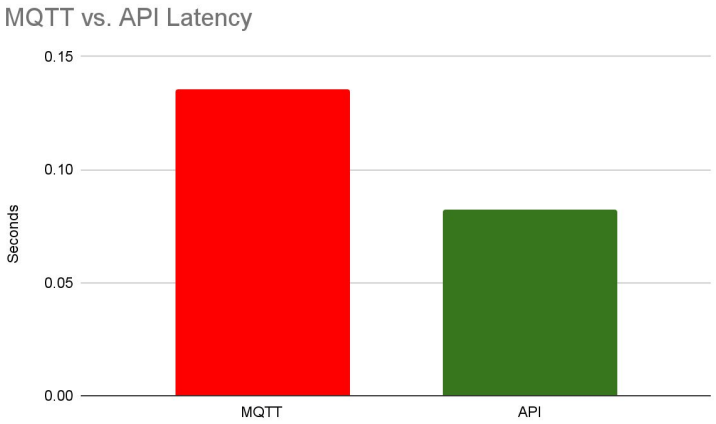
Humidity Warning

- If cat is in an environment with high humidity (proxy for air quality)
- SMS message sent to you
- message sent when humidity returns to normal



Latency Analysis

- HLS vs. IP for video stream
  - HLS: Pi -> kinesis -> HLS -> frontend, average 4.2 s delay
  - IP: Pi -> IP -> frontend, average .65 s delay
- MQTT vs. API for sending data
  - MQTT: Pi -> topic -> backend -> topic -> pi, .135733 s round-trip delay
  - API: Pi -> API request, .082437 s round-trip delay

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ROZ

Challenges & Lessons Learned

- Sensor troubles - we had to replace Enviro+ w/ BME280
- It’s difficult and expensive to measure air quality
- Latency analysis/comparison
- Soldering hard :(
- Packaging/logistics issues