Change the Planet with PSoC IOT Design:

Questions

1. I want to build small pods that contain a basic array of sensors such as a photodiode, thermistor, encoder, camera, etc. and connect over WiFi. The pod can be easily placed around a house, warehouse, or other building and be used for small useful tasks like checking the temperature of an area, detecting motion, checking water level of a pool or sink (if it can be waterproofed), or even possibly recognizing basic objects like packages on a doorstep. The pods will connect over WiFi to something like an Amazon Lambda pub/sub program that then connects to the user's app on their phone. From the app, the user can set alerts with a simple GUI that will tell the pods to notify the app on certain events such as reaching a specific temperature, a specific degree of rotation, detection of motion, etc. The goal is to allow users to easily integrate basic IoT functions into their homes without being constrained to expensive, specialized IoT smart devices.

2. Ideally, I would like to use at least one of each of the two PSoC 6 boards listed on the website (Pioneering and Prototyping). First, it would be nice to have at least two to experiment with using them simultaneously with a single app, as well as having them interact with each other to expand their individual capabilities (i.e. a Master and Slave setup for complex tasks). Also, each of the boards seems to have different features that would all benefit the project. The Pioneer board has the Arduino Shield header that would allow me to add on additional sensors. One great option would be the Arduino LUCKY Shield (A000125). Also, the TFT display would be useful for displaying data directly on the pod, and it comes with extra sensors that would be good to use. The Prototyping board provides a Pmod interface that would be perfect for adding such

expansions as sensors for light, gas, moisture, collision, and ultrasonic ranging. A camera expansion could also be used for object recognition or color detection.

3. AWS IoT is perfect for this project as it provides the link between the pods and the user's app. Through an AWS link, pods and the app can communicate with each other to provide alerts, commands, and verification practices. Not only do we want the range of internet communication over Bluetooth, so alerts can be received out of the house, but we also want a server that can direct traffic to the correct pods and apps. We want to make sure secure connections are maintained between a user and their specific pods without any privacy concerns.

4. Although I do not have much experience specifically with Embedded IoT, I do have experience programming Cypress PSoCs, FPGAs, mobile apps, and back-end server code. I think I would be able to merge all those experiences together in order to complete this project in its entirety. I also have limited experience with Cypress's WICED Wi-Fi board (shout out to Alan Hawse) through a one-week course at MIT. Besides that, I have taken Professor Steven Leeb's 6.115 Microprocessors course at MIT in which I created an entire final project using a PSoC 5 Development Board and wrote approximately a thousand lines of code for it. We also had to use the PSoC 3 and PSoC 4 Pioneering Board.