

Developing a Smart Wearable Air Detector

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Introduction

This system design refers to a smart watch and air detector. The smart watch almost has the ability to monitor steps, heartbeats and timing. Although its diversification is less than a smart phone, people like that it is lightweight and portable. As for air detectors, it is generally bigger and heavier than a mobile phone. For portability, it has more improvement in terms of weight. Of course, smart phones cannot detect the air detector by the general specification. Moreover, the price range is very different according to manufacturers.

Research Objectives

- Connection between Apps and Arduino via Bluetooth
- Apps development for collect data and data visualization
- Gas data Collection
- Record data from sensors

Methodology

Indoor air quality (IAQ) is a measurement of human health and comfort inside the home, office and other indoor environments. EPD pointed out that common indoor air pollutants include Carbon Dioxide (CO₂), Volatile Organic Compounds (VOCs), Environmental tobacco smoke, and Airborne particles.² In order to count the relevant pollutant units, the system calculation unit uses parts per million (ppm) to count the current pollutant concentration.

The feature of each component in a Smart Wearable Air Detector:

- Arduino Uno R3 : the "brain" of each component and is responsible for processing data
- MQ5: LPG(液化石油氣), Natural gas(天然氣), Town gas(煤氣), Alcohol(酒精)

- MQ135: Ammonia(氨), Sulfide(硫化物), Benzene(苯), Alcohol(酒精)
- DHT-11: Temperature and Humidity
- HC-05: Bluetooth Module

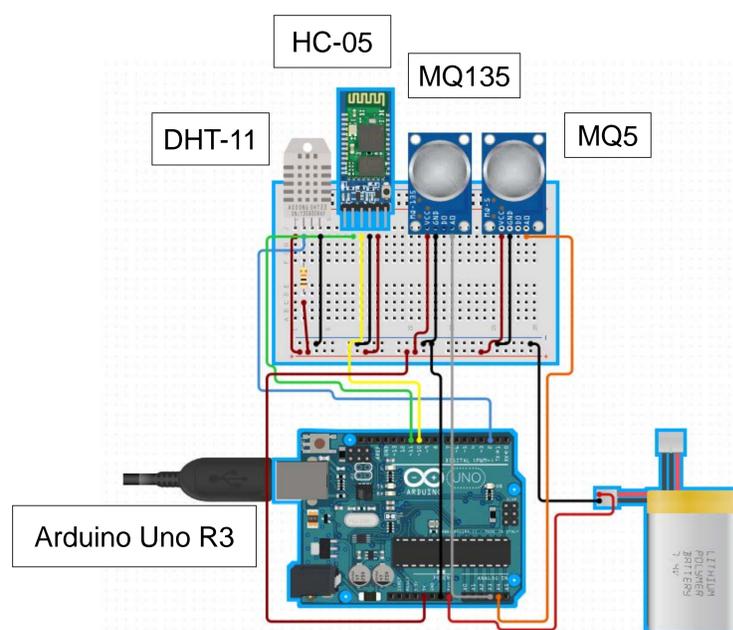


Figure 1: Hardware diagram of Smart Wearable Air Detector

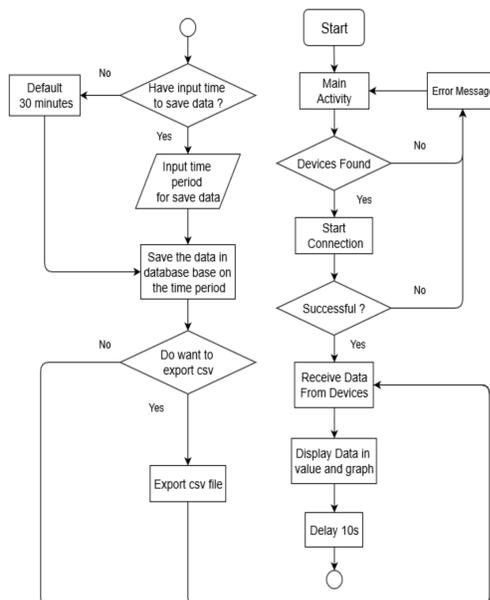


Figure 2: Software diagram of state transition

Expected Findings

This system comprehensively utilizes sensor technology and automatic monitoring technology, which develops a simple and practical automatic monitoring system for monitoring the mobile air quality.

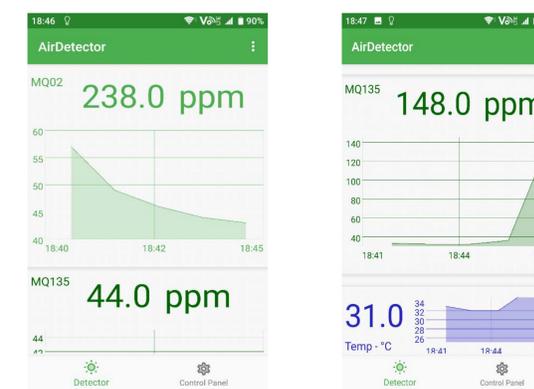


Figure 3 & 4: Apps shows changing data

Conclusion

My aim is to develop smart detectors that can be used anytime and anywhere. In no doubt, this must be a time-consuming project, but I have tried my very best to work on it in order to complete the product. It is a valuable experience for me, as I had to do everything individually and think about the product by myself. For example, during component testing and the interface design, this used the most time to develop how everything fit into the system. Before the development, there were no similar examples to the difficult parts available for our learning. We could only refer to the explanation of the component's function from the official website. This has deepened my experience of how to identify problems and find related solutions.