Personalised Air Quality Monitoring using Wearable Sensors

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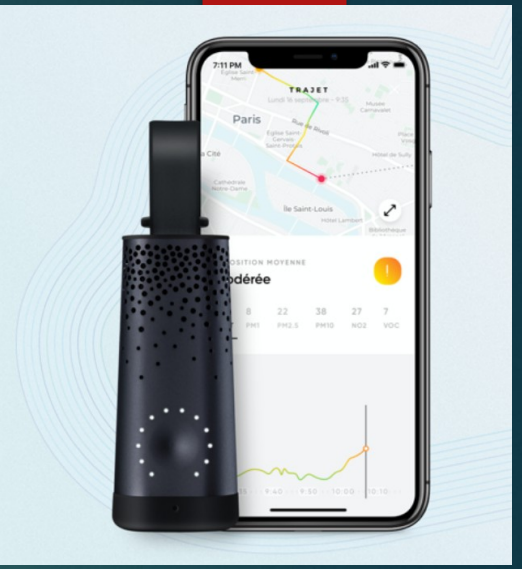
Problem Definition

- Air pollution is a global health hazard and contributes to climate change.
- There are stations monitoring air quality in local areas, datasets provided by private companies and commercial products available.
- This project will look to expand on the available data and research to implement an air quality monitor for personal use with the use of wearable sensors.



dpd

AirDiag® Dublin
Air quality at your doorstep

epa
Environmental Protection Agency
An Ghníomhaireacht um Chaomhnú Comhshaoil

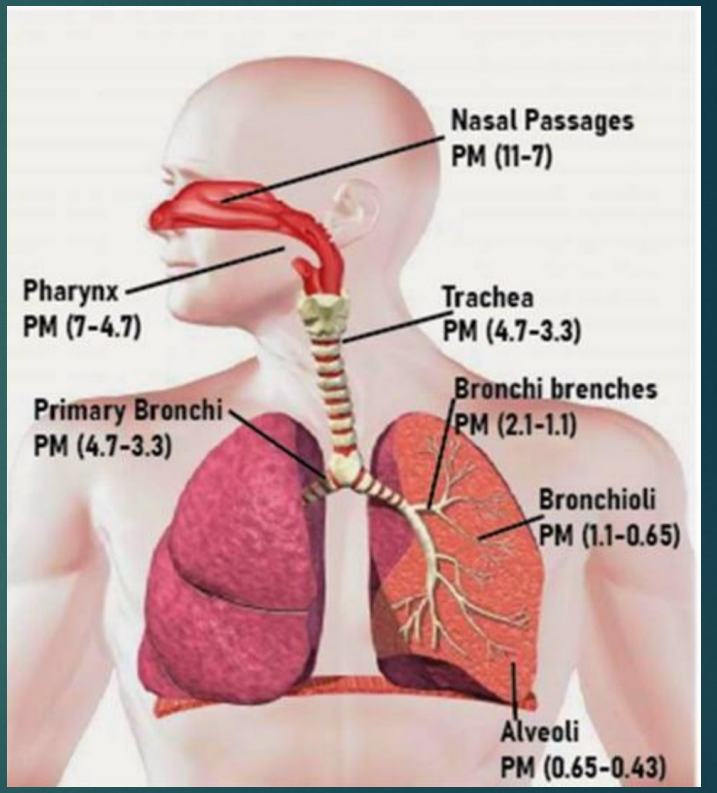
Project Overview

- The main goal of this project is to use wearable sensors to implement a system design to monitor air quality, to do this:
  1. Pollutants affecting Air Quality definition.
  2. Scales of representing the data collected.
  3. Existing implementations.
  4. Initial design and selection of sensors.
  5. Experiments curated to be performed.

- Following this the project plan will be discussed.

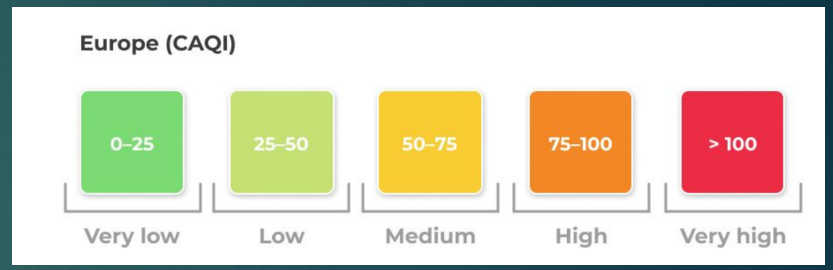
1. Air Quality Pollutants

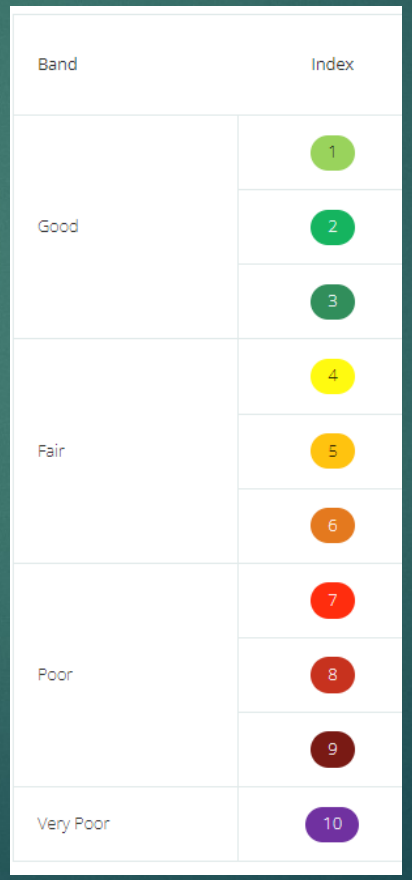
- Some relevant contaminants:
  1. Particulate Matter (PM),
  2. Ozone (O3),
  3. Volatile Organic Compounds (VOC).



2. Air Quality Indicator (AQI)

- Raw data being displayed to a user may result in confusion.
- There are differing standards for AQI to represent contaminants measured.

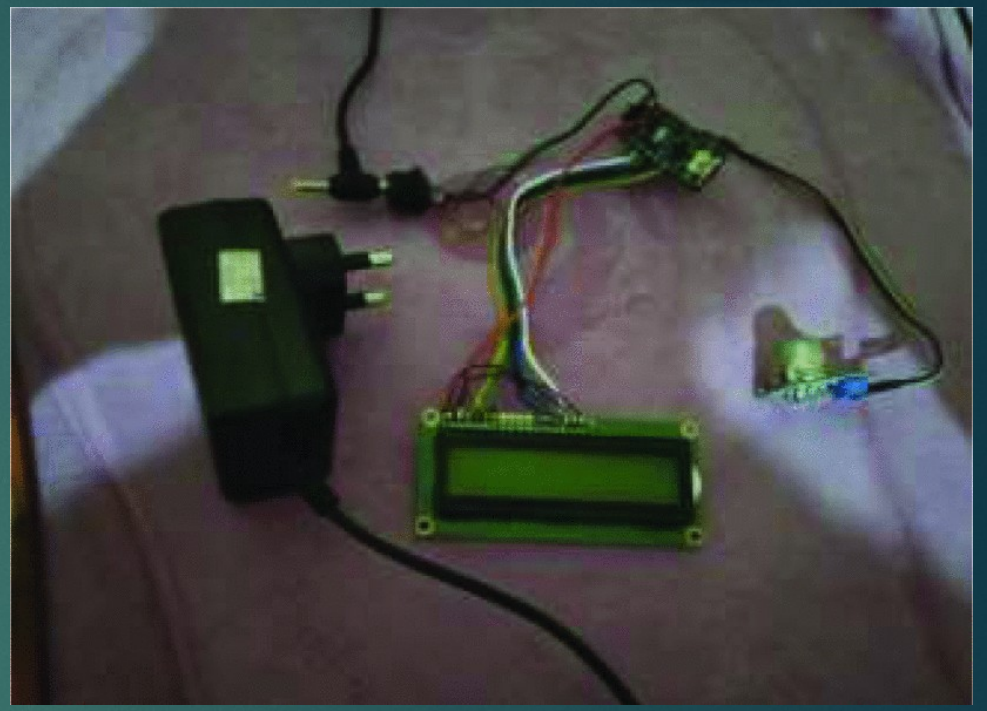


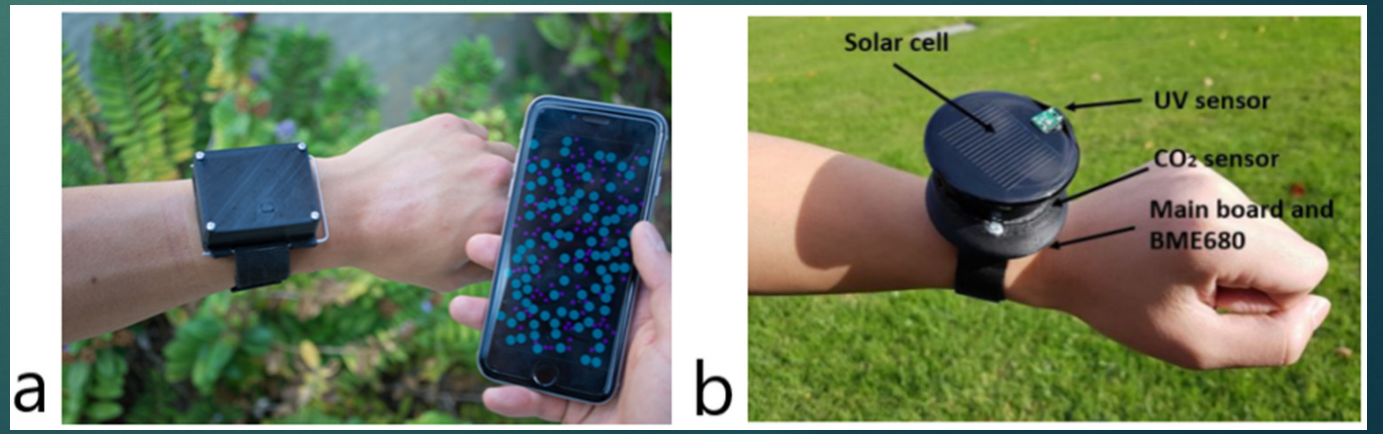


3. Existing Implementations

- Commercial products are available from PlumeLabs and Atmotube.

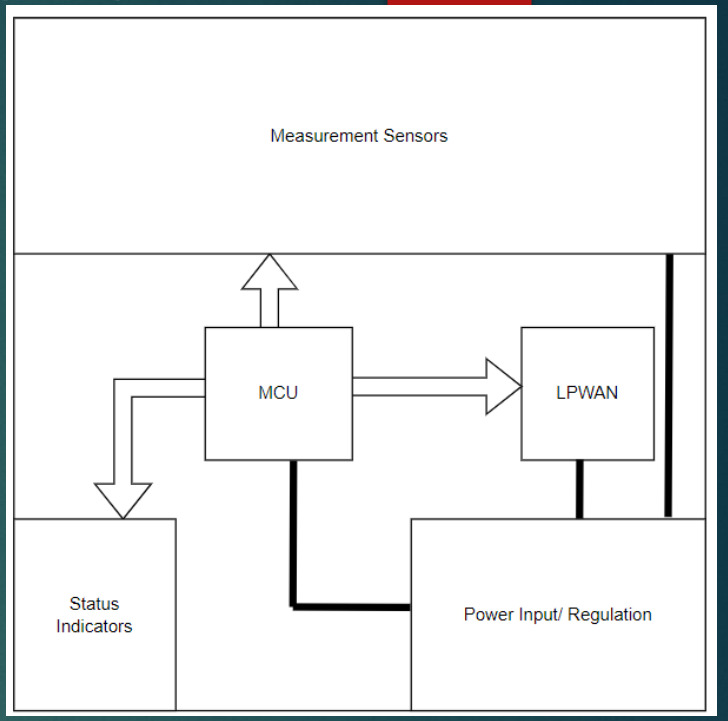
- Research papers varying in methods to design and implement a system.
  - Crude to sophisticated implementations.



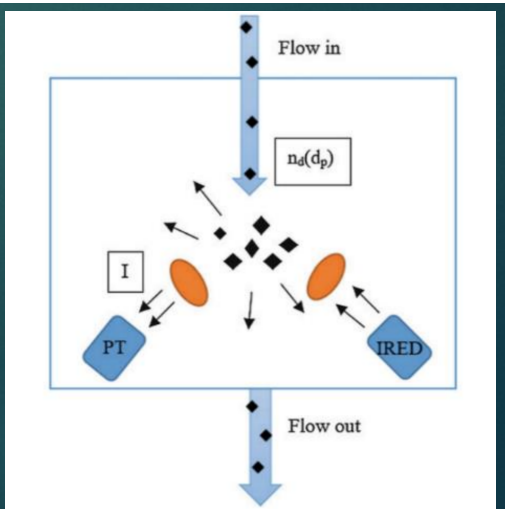


4. Initial Design and Sensor Selection

- The goal of the initial design is to breakdown the elements of the project into sections:
  1. Measurement Sensors,
  2. Low Power Wide Are Network (LPWAN),
  3. MCU,
  4. Status Indicators,
  5. Power Input/Regulation.



- Sensirion SPS30 PM detector.
  - Uses laser scattering technique.



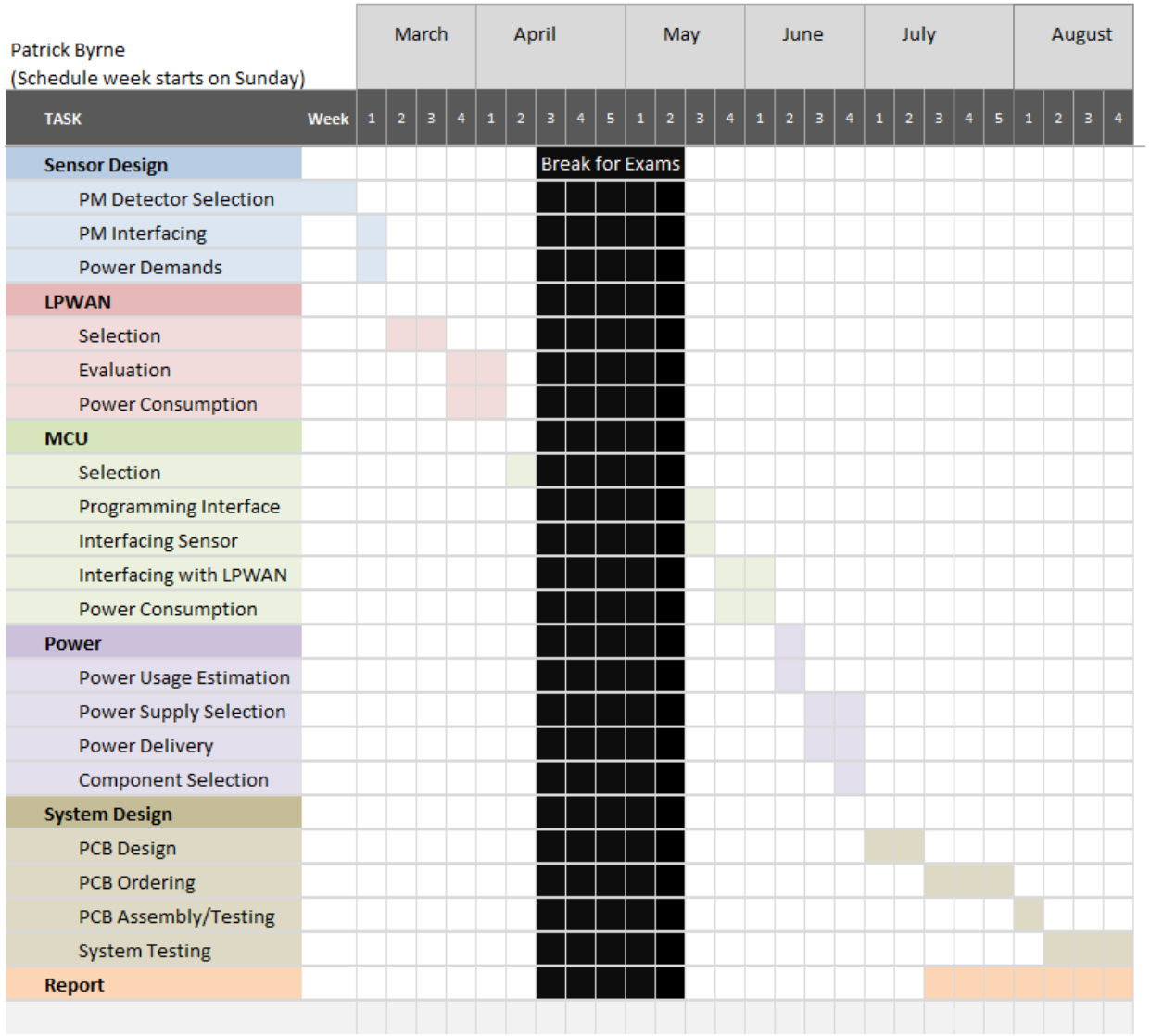
5. Planned Experiments

- Initially use an Arduino to interface with SPS30.
  1. Measure background PM.
  2. Light a match to create PM.
  3. PM reading should jump to indicate interface and sensor is working correctly.
  4. Monitor the current using ammeter to gauge power consumption.

Project Plan

Personalised Air Quality Monitoring using Wearabe Sensors

Patrick Byrne
(Schedule week starts on Sunday)



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