**SMOKE DETECTOR**

## The pitch:

After doing some basic trend analysis and research on the impact of air quality on human life, we decided to develop a durable air quality sensor, integrated with smoke detection in air and raising alarm in case of fire.

The project itself is split into multiple modules:

 Developing the air quality sensor

 Using air quality data from weather stations as a control for real time sensor data for fire alarm.

## The setup:

The internet of things suggests a simple concept: everyday objects used for all sorts of different activities can be connected to the internet (and with each other). Everything ranging from cars, machines, appliances and even things like roads and humans are also a part of this network.

#### **Gas Sensor**

Gas sensor is an SNO2 heating sensor, which is highly sensitive to alcohol and mildly sensitive to Benzene components. These hardwearing sensors make a good choice for a project such as this.

The heating tube is made of aluminium oxide and is covered by SnO2. When the current passes through the tube it heats up and the tin dioxide acts like a semiconductor. This allows a large number of electrons to flow through and increases the current flow. When alcohol molecules and the sensor come into close proximity, the ethanol burns transforming into acetic acid, creating a higher current across the sensor. The current change alters the values of the sensor.

Analytics:

Once the setup was completed, the sensor data was streamed directly to a firebase mobile platform. A simple mobile application was developed to get the data from the platform and provide real time readings to the user. The mobile application also features threshold adjustments for the air quality index according to the user’s health data.

# Code

 Initially place the sensor in clean air and reset the controller. It will calibrate the sensor and give the message as calibration done.

 Then place the sensor in smoke affected area, it will detect the smoke and will output a gas concentration in ppm and also sensor LED will glow.

 For calculating the concentration of gas in ppm take two points from the curve of particular gas from the graph shown below. Then calculate a slope of that line.

**int buzzer = 8 ;**  
**int LED = 7 ;**   
**int flame\_sensor = 4 ;**  
**int flame\_detected ;**  
   
**void setup()**  
 **{**  **Serial.begin(9600) ;**   
 **pinMode(buzzer, OUTPUT) ;**   
 **pinMode(LED, OUTPUT) ;**   
 **pinMode(flame\_sensor, INPUT) ;**  
 **}**   
   
**flame\_detected = digitalRead(flame\_sensor) ;**   
   
**if (flame\_detected == 1)**   
**{**   
**Serial.println("Flame detected...! take action immediately.");**  **digitalWrite(buzzer, HIGH);**   
**digitalWrite(LED, HIGH);**   
**delay(200);**   
**digitalWrite(LED, LOW);**   
**delay(200);**   
**}**  
 **else**   
**{**  
**Serial.println("No flame detected. stay cool");**  **digitalWrite(buzzer, LOW);**   
**digitalWrite(LED, LOW);**   
**}**   
**delay(1000);**