AIR QUALITY MONITORING

INTRODUCTION:

The air we breathe is essential for sustaining life, and ensuring good air quality is crucial for our well-being. To address the growing concerns surrounding air pollution, an air quality monitoring project plays a vital role in assessing and managing air pollution levels.An air quality monitoring project involves the systematic collection, measurement, and analysis of various pollutants present in the atmosphere. These pollutants can include particulate matter, ozone, nitrogen dioxide, sulfur dioxide, carbon monoxide, and volatile organic compounds. By monitoring these pollutants, we gain valuable insights into the quality of the air and its potential impact on human health and the environment.The project typically utilizes a network of sensors strategically placed in different locations to capture air pollution data. These sensors measure pollutant concentrations and transmit the data to a central database or cloud-based platform. Through data analysis, air quality indices and pollution trends can be derived, providing valuable information for decision-makers, environmental agencies, and the general public.

One of the key objectives of an air quality monitoring project is to raise awareness about air pollution levels and promote informed decision-making. By providing timely and accurate air quality information, individuals can make informed choices to protect their health and reduce exposure to pollutants. Policymakers can also use this data to design effective regulations and policies to mitigate air pollution sources and improve overall air quality.

NEED OF PROJECT:

1.Health impact , Environment impact

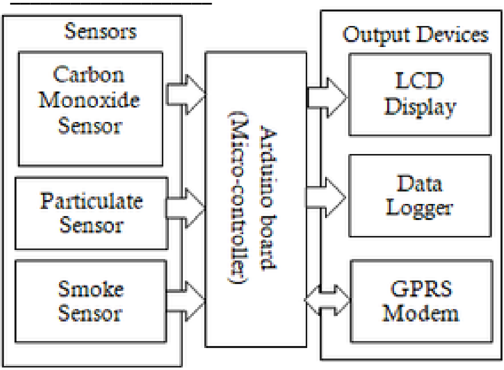
2.To maintain the Air quality is necessary

3.pollution source identification

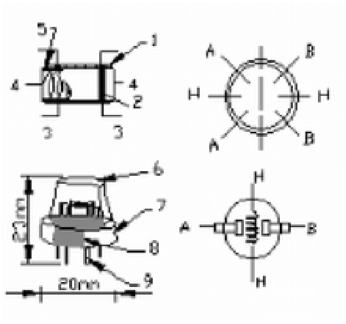
4.Decision-Making and Policy Formulation

5.Public Awareness and Empowerment

BLOCK DIAGRAM:



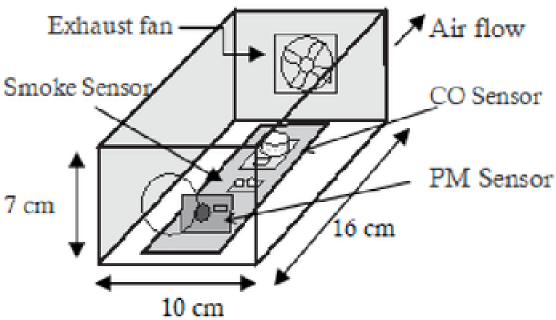
The Structure of MQ-7 Sensor (Hanwei Electronics co., ltd)

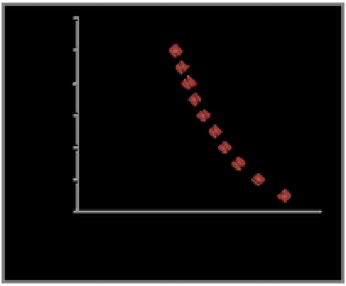


Information

	Parts	Materials
1	Gas sending layer	SnO_2
2	Electrode	Au
3	Electrode line	Pt
4	Heater coil	Ni-Cr alloy
5	Tubular ceramic	Al_2o_3
6	Anti-explosion network	Stainless steel gauze (SUS316 100-mesh)
7	Calmp ring	Copper plating Ni
8	Resin base	Bakelite
9	Tube pin	Copper plating Ni

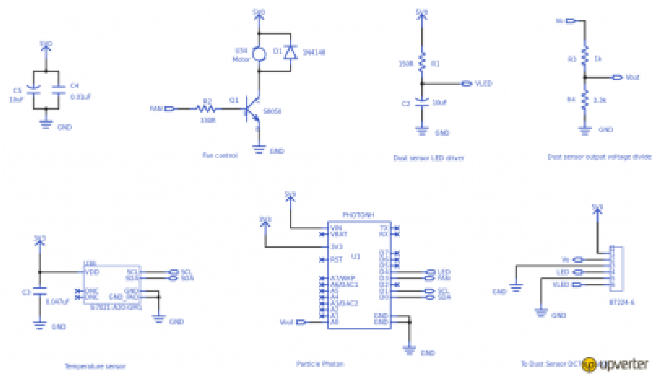
Measurement Chamber Design Sensor testing is done by exposing the sensor with



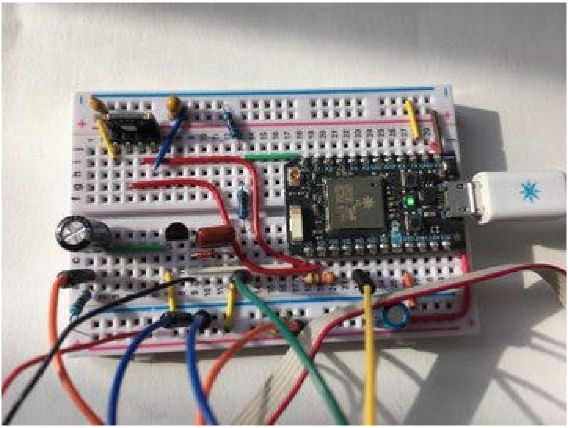


The Mq-7 Test Results (a) Relationship between Rs with CO Concentration.(b) Rs/ Ro and CO Gas Concentrations.

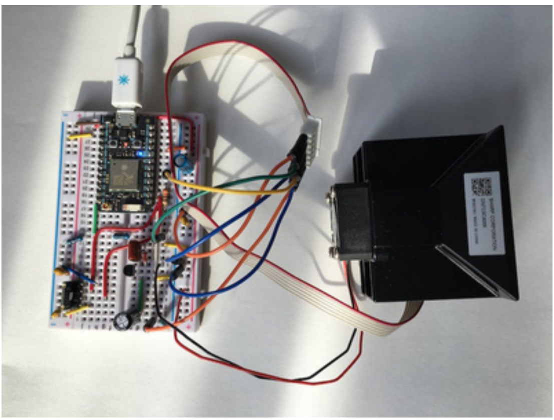
SCHEMATIC:

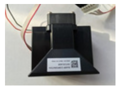


Circuit Diagram and Explanation:

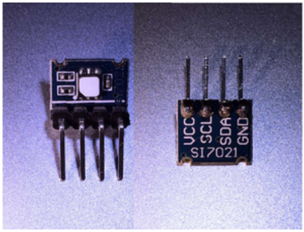


Weather Station v4 and the Sharp Dust Sensor





Sharp Dust Sensor



Sensor Module using the Silicon Labs SI7021 (Front and Back)

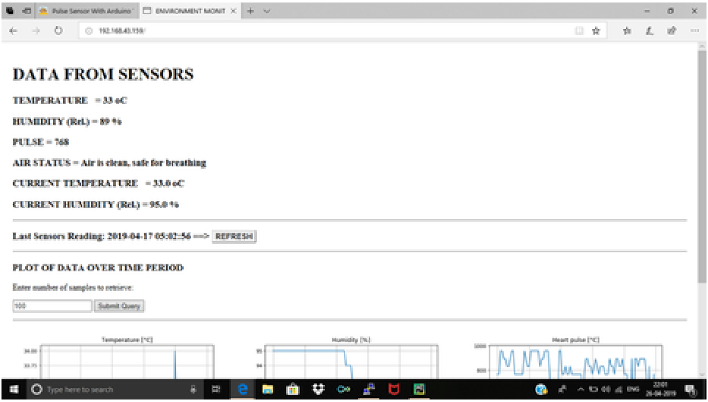
IAQ: Indoor air quality

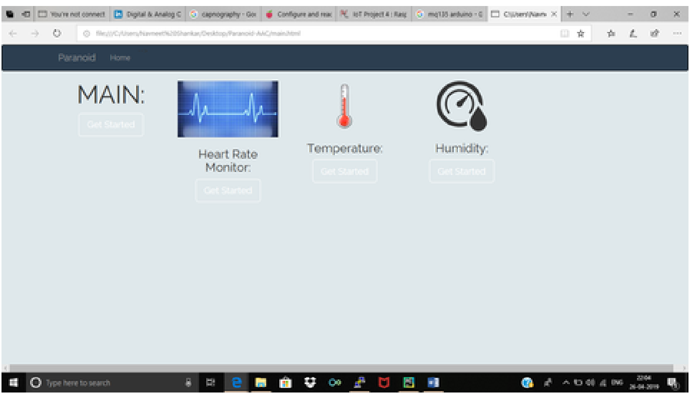
Carbon Dioxide (PPM)	Effect on Human		TVOC Concentration (PPB)	Effect on Human
<500	Normal		<50	Normal
500-1000	A little uncomfortable		50-750	Anxious,uncomfortable
1000-2500	Tired		750-6000	depressive, headache
2500-5000	Unhealthy		>6000	headache and other nerve problems

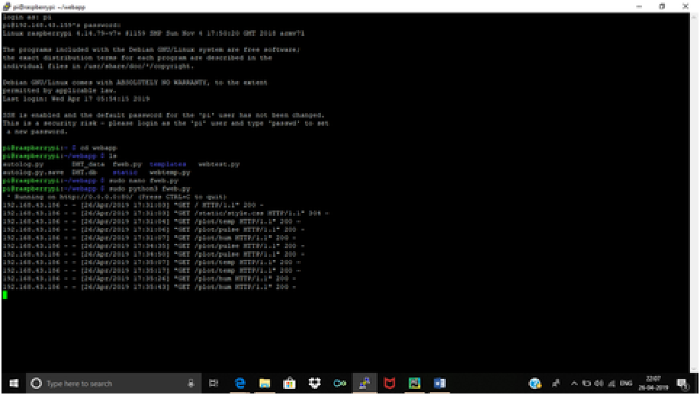
entration	mg/m3	Mass of pollutants contained in the air per cubic meter
ion	ppm	Part per Million: the volume of pollutants in one million volumes
	ppb	Part per Billion: the volume of pollutants in a billion volumes of a

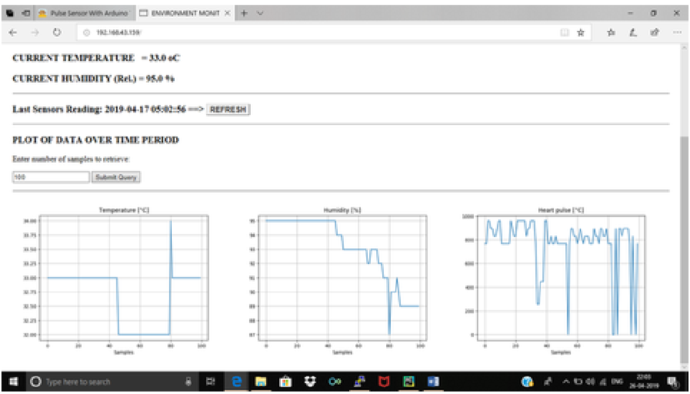
projectImage
Just like % and ‰, separate ppm
ppb is not a unit. 1ppm=1000ppb,
1ppb=1000ppt

Environment	Representation Method	Conversion
Water	mg/L ug/L ppm (Part per Million) ppb (Part per Billion) ppt (Part per trillion)	1 ppm = 1 mg/L 1 ppb = 1 ug/L
Air	mg/m^3 ug/m^3 ppm (Part per Million) ppb (Part per Billion) ppt (Part per trillion)	➢0 C, 101.325 kPa: 1ppm= molecular ➢20 C, 101.325 kPa: 1ppm= molecular ➢25 C, 101.325 kPa: 1ppm=- molecular
soils, food, bios	mg/m^3 ug/m^3 ppm (Part per Million) ppb (Part per Billion) ppt (Part per trillion)	1 ppm = 1 mg/kg 1 ppb = 1 ug/kg


DATA FROM SENSORS
TEMPERATURE = 33 oC
HUMIDITY (Rel.) = 89 %
PULSE = 768
AIR STATUS = Air is clean, safe for breathing
CURRENT TEMPERATURE = 33.0 oC
CURRENT HUMIDITY (Rel.) = 95.0 %
Last Sensors Reading: 2019-04-17 05:02:56 ==> REFRESH
PLOT OF DATA OVER TIME PERIOD
Enter number of samples to retrieve:
100
Submit Query
Temperature [°C]
Humidity [%]
Heart pulse [°C]


Paranoid
Home
MAIN:
Get Started
Heart Rate Monitor:
Get Started
Temperature:
Get Started
Humidity:
Get Started




CURRENT TEMPERATURE = 33.0 oC
CURRENT HUMIDITY (Rel.) = 95.0 %
Last Sensors Reading: 2019-04-17 05:02:56 ==> REFRESH
PLOT OF DATA OVER TIME PERIOD
Enter number of samples to retrieve
Submit Query
Temperature [°C]
Humidity [%]
Heart pulse [°C]
Samples

Working:

Sensor Deployment: The project begins with the strategic deployment of air quality sensors in various locations. These sensors are responsible for collecting data on different pollutants present in the air, such as particulate matter, gases, and volatile organic compounds. The sensors may be installed in urban areas, near industrial sites, or in proximity to pollution sources to capture a comprehensive picture of air pollution levels.

2. Data Collection: The deployed sensors continuously measure pollutant concentrations in the air. They capture data at regular intervals, ranging from seconds to minutes, depending on the specific monitoring requirements. The sensors provide real-time or near-real-time data, ensuring that the air quality information is updated and accurate.

3. Data Transmission: The collected air quality data from the sensors must be transmitted to a central storage or processing facility for further analysis. This can be done through various means, such as wired connections, wireless communication technologies (e.g., cellular networks, Wi-Fi), or Internet of Things (IoT) protocols. The data transmission can occur in real-time or periodically, depending on the capabilities of the monitoring system.

4. Data Processing and Analysis: Once the air quality data reaches the central facility, it undergoes processing and analysis. This step involves the conversion of raw sensor data into meaningful information regarding pollutant concentrations. Various algorithms and statistical techniques are employed to analyze the data and derive insights such as air quality indices, pollution trends, and source identification.

5. Visualization and Reporting: After the data analysis, the air quality information is typically visualized and reported to make it easily understandable for stakeholders. This can involve graphical representations, maps, dashboards, and reports that highlight pollutant levels, trends, and spatial distributions. The visualization and reporting components enable decision-makers, policymakers, and the general public to comprehend and interpret the air quality information effectively.