



ENVIROGUARD

Indoor Air Quality Monitoring System.

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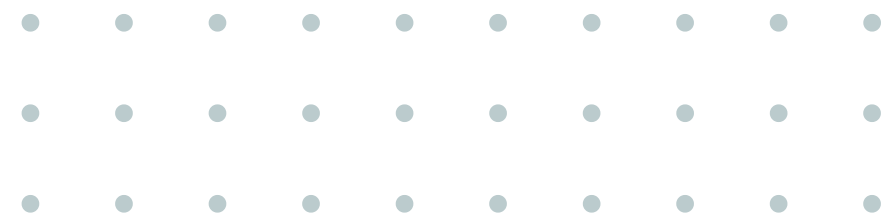


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01.

PROBLEM VS SOLUTION



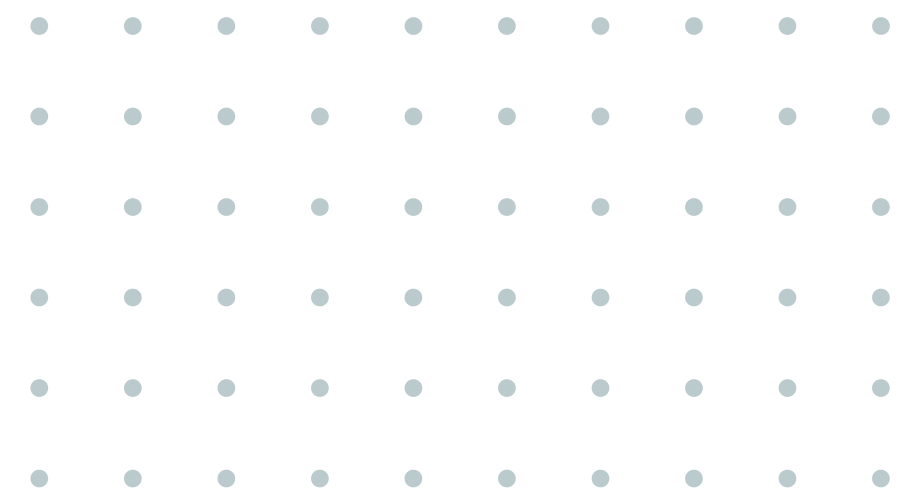


SOLUTION

Our project aims to create a cost-effective indoor air quality monitoring system by utilizing inexpensive IoT sensors to measure crucial air quality parameters. By developing a user-friendly app, we aim to provide real-time data insights to users, enabling them to monitor and predict air quality within their indoor environments. The system will also incorporate a simplified yet efficient machine learning model for air quality prediction.

PROBLEM

Existing indoor air quality monitoring solutions are often expensive and inaccessible to a wide range of users, limiting the ability for many individuals to monitor and predict air quality in their indoor spaces. The cost of sensors, data processing, and app development often poses a barrier to entry for those seeking affordable and comprehensive air quality monitoring systems.

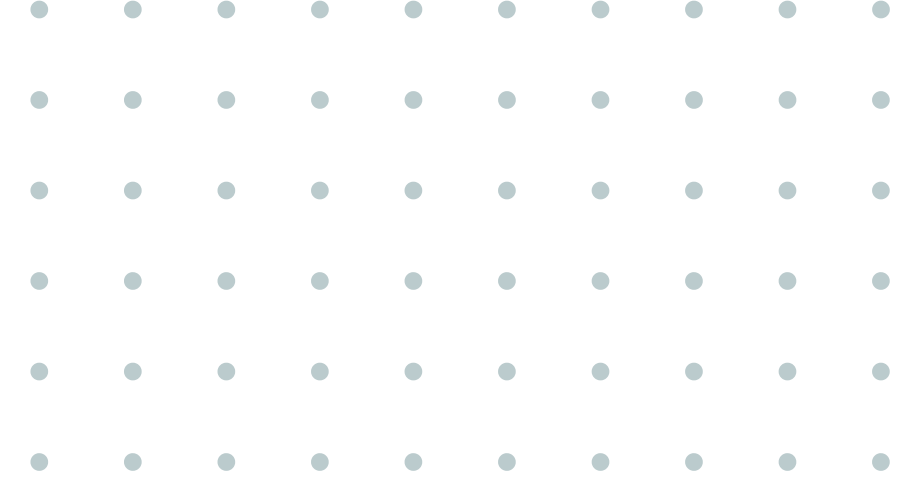


02.

HARDWARE



MICROCONTROLLER USED



RASPBERRY PI 4

- Supports all type of Codes
- Vast Peripheral Support
- Faster Processor
- Multiple Sensors

SENSORS USED



BME680:

For temperature, humidity, pressure, and VOC (volatile organic compounds) measurements.

Journal : LSTM-Based IoT-Enabled CO2 Steady-State Forecasting for Indoor Air Quality Monitoring

GROVE-MULTICHANNEL GAS SENSOR:

For detecting multiple gases and air quality parameters.

Journal : Internet of Things (IoT) Based Indoor Air Quality Sensing and Predictive Analytic A COVID-19 Perspective(JAN-2021,MDPI)

FS00202 LASER DUST SENSOR (PM2.5):

For particulate matter measurement.

Journal : A Design of Indoor Air-Quality Monitoring System (J. Phys. – Conf. Ser. – 2022)

FIRE DETECTION SENSOR(FLAME SENSOR MODULE):

A suitable smoke or fire detection sensor, such as a smoke detector or a heat sensor, to provide early fire detection capabilities.

MQ-7 OR MQ-9:

For Carbon Monoxide (CO) monitoring.

Journal : AI powered IoT based Real-Time Air Pollution Monitoring and Forecasting

MQ135 :

For a wider range of gases, including NH₃, NO_x, and various volatile organic compounds.

Journal : Development of an IoT-Enabled Air Pollution Monitoring and Air Purifier System, Journal of Metrology Society of India (September 2023)



CLOUD AND SOFTWARE



THINGSPEAK:

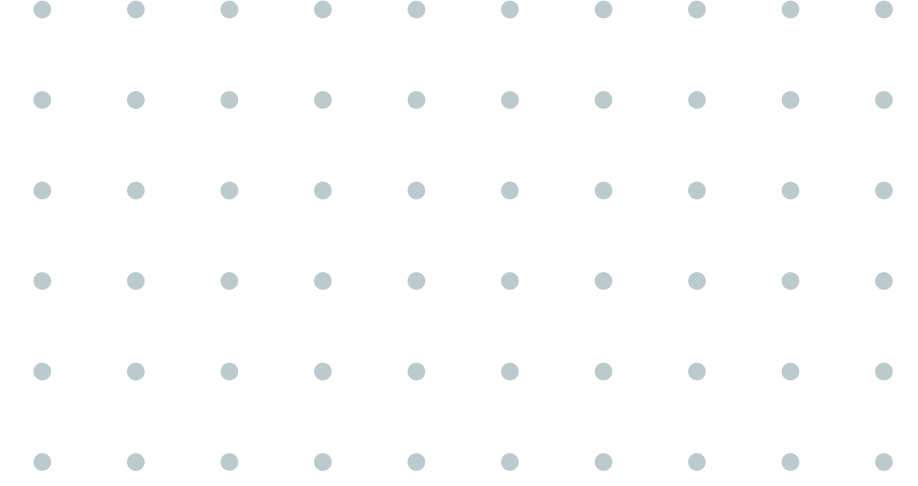
For data collection, visualization, and analysis.(Journal : Development of an IoT-Enabled Air Pollution Monitoring and Air Purifier System,Journal of Metrology Society of India (September 2023)

MQTT:

For efficient IoT communication. (Journal : LSTM-Based IoT-Enabled CO2 Steady-State Forecasting for Indoor Air Quality Monitoring)

NODE-RED:

For workflow creation and data processing. (Journal : LSTM-Based IoT-Enabled CO2 Steady-State Forecasting for Indoor Air Quality Monitoring)



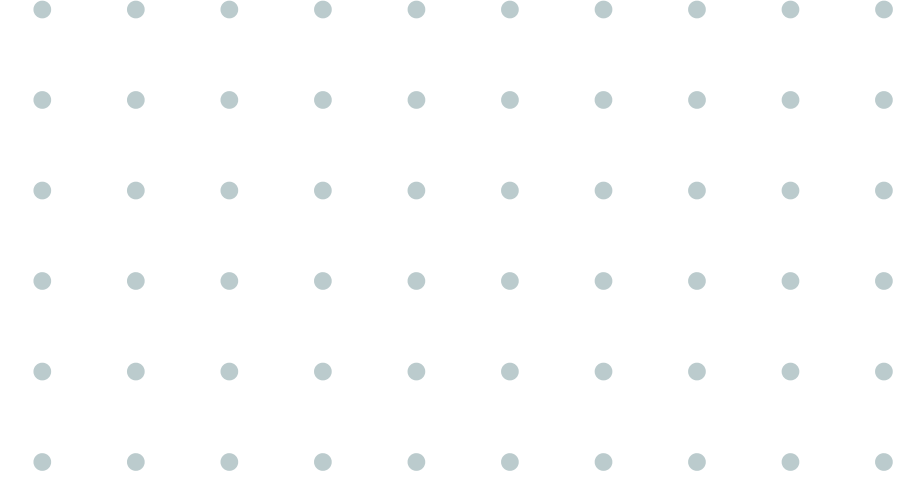
INFLUXDB:

For time-series data storage. (Journal : LSTM-Based IoT-Enabled CO2 Steady-State Forecasting for Indoor Air Quality Monitoring)

GRAFANA:

For creating data visualizations and dashboards. (Journal : LSTM-Based IoT-Enabled CO2 Steady-State Forecasting for Indoor Air Quality Monitoring)

ADD ONS:



HUMIDIFIER:

A humidifier is connected to the Raspberry Pi via a compatible relay or smart plug. The Raspberry Pi is programmed to control the humidifier based on the humidity readings from the humidity sensor. An additional sensor is also integrated to monitor the water level in the humidifier's reservoir and send alerts when it's running low.

HEPA FILTER :

High-Efficiency Particulate Air Filter: The HEPA filter is a key component for removing fine particles from the air, including dust, pollen, mold spores, smoke, and other allergens.

Journal : Development of an IoT-Enabled Air Pollution Monitoring and Air Purifier System, Journal of Metrology Society of India (September 2023)

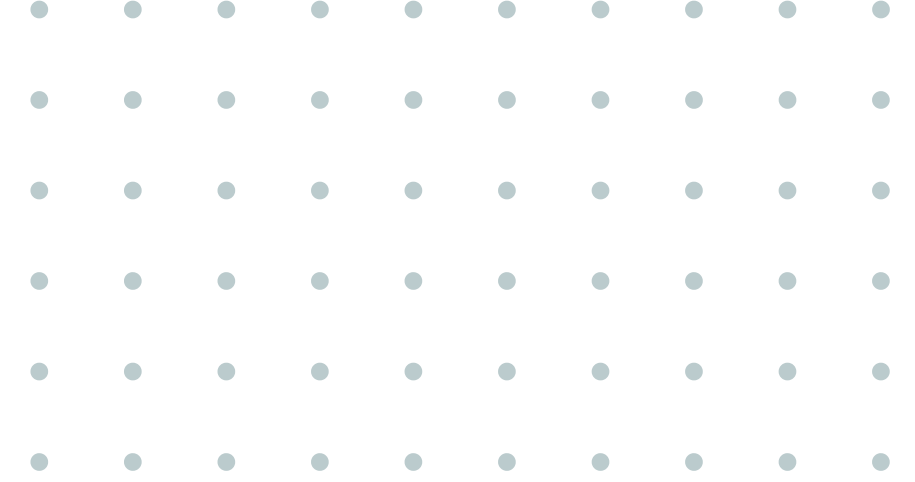
03.

SOFTWARE

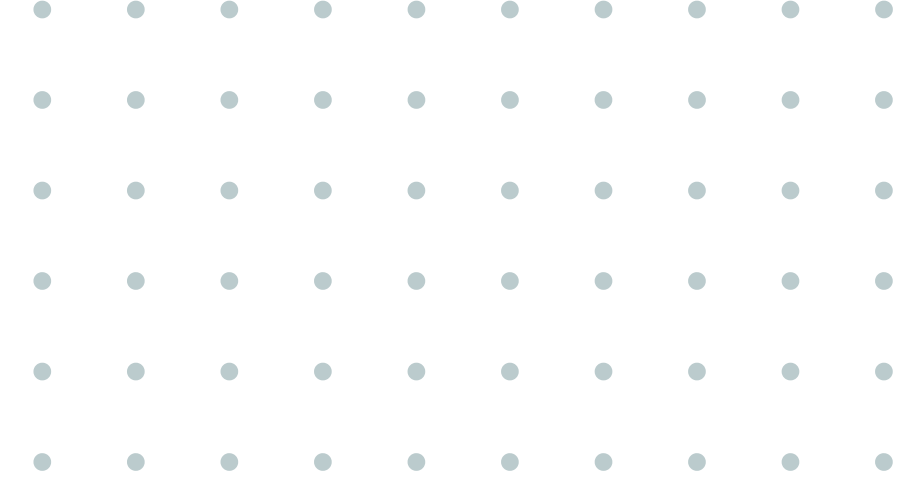


APPLICATION:

- Flutter is used to develop the application
- Dashboard
- Alerts and Notifications
- Historical Data
- Control Functions
- Updates and Maintenance



MACHINE LEARNING:

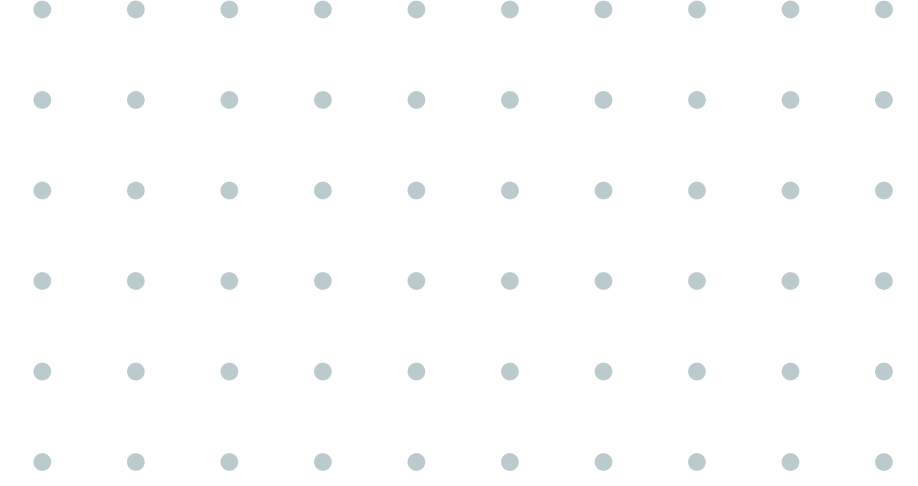


- Application also uses ML to predict the quality of air.
- Using IAQ, different labels are assigned such as "Good", "Moderate", "Unhealthy", "Hazardous,"
- Multiple Linear Regression Model is used.
Journal: Using Machine Learning Methods to Forecast Air Quality: A Case Study in Macao(MDPI, September 2022)
- Python libraries like Numpy, Tensorflow etc are used.

04.

CONCLUSION





THANK YOU!