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"Air Quality Monitoring System Inside The Cabin Using IOT".

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Abstract: This paper describes the development of an IoT-based air quality monitoring system for controlling the levels of carbon dioxide and carbon monoxide gases in a cabin. The system aims to address the dangers associated with high concentrations of these gases, such as gas leakage leading to fatalities and increased carbon dioxide causing driver fatigue and sleepiness. The system utilizes IR Sensor (motion sense), MQ-6 (carbon monoxide sensor, alcohols), and DHT 11 (temperature, smoke) 1209 temperature controller. The gas level decisions are communicated to the IoT application, triggering LED indicators, power window motor, buzzer,

Key Words: IR Sensor, MQ-6, IOT.

Introduction:

The importance of air quality monitoring systems has grown significantly, with a particular focus on monitoring the air quality inside vehicle cabins. Prolonged exposure to poor air quality in vehicle interiors can have adverse effects on occupant's health and well-being. To address this concern, an advanced monitoring system utilizing Internet of Things (IoT) technology can provide real-time monitoring and analysis of cabin air quality. This paper aims to present a comprehensive IoT-based system for monitoring and evaluating air quality inside a vehicle cabin. The system integrates various sensors capable of measuring key air quality parameters, including particulate matter (PM), volatile organic compounds (VOCs), carbon dioxide (CO2), temperature, and humidity. These sensors continuously collect data, which is wirelessly transmitted to a central control unit. The IoT architecture facilitates seamless data collection, transmission, and analysis. Collected air quality data, enabling the identification of patterns, trends, and potential air quality issues. Real-time monitoring data can be conveniently displayed on a user-friendly interface, accessible to both vehicle occupants and relevant authorities responsible for maintaining healthy indoor environments. Moreover, the system incorporates advanced features such as automatic alerts and notifications, which promptly inform occupants and stakeholders about hazardous air quality conditions. In critical situations, appropriate mitigation strategies can be implemented promptly, ensuring the safety and well-being of vehicle occupants. The benefits of an IoT-based air quality monitoring system inside the cabin are manifold. It allows for proactive air quality management, enabling timely interventions to maintain a healthy environment. Furthermore, occupants are empowered with knowledge about their immediate surroundings. Additionally, the collected data can be utilized for long-term analysis, identifying trends and insights to optimize cabin air quality in the future. In conclusion, this paper introduces a novel approach to monitoring air quality inside vehicle cabins using IoT technology. By leveraging the capabilities of IoT, the proposed system provides a comprehensive solution for real-time monitoring, analysis, and management of air quality. The potential impact of this system extends to various domains such as transportation, workplaces, and public spaces, where ensuring healthy indoor environments is of utmost importance.

Existing System:

Currently, there is a lack of air monitoring systems, which poses significant challenges for both the inhabitants of an. Without proper monitoring, the impact on the health of individuals remains uncertain. The existing system fails to provide easy and convenient access for people to assess the detection of

air toxicity levels their surroundings. Furthermore, the absence of clear contamination levels makes it difficult to gauge the extent of detection that has occurred, and this lack of comprehensive monitoring hampers the early detection of any problems. Overall, the current situation limits ability to effectively address air quality concerns and take timely actions.

System Proposal:

The proposed system aims to monitor the air quality, motion, temperature status and provide real-time updates. The pollution data collected by the system will be regularly updated on an application, allowing users to monitor the detection levels from anywhere using an internet connection. Additionally, the system incorporates tracking and monitoring of cabin air levels in different areas. By utilizing these features, users can conveniently access data and stay informed about the current air quality status.

Function:

Sensors are utilized to detect the current state of air quality. These sensors are connected to a controller, which receives the sensor values and converts them into a digital format. Default values for pollution levels are already stored on the cloud. The current sensor data is compared with these default values to analyze the pollution levels. The pollution data is uploaded to the cloud, enabling users to access and monitor it from anywhere via the Internet When the system displays the total amount of specific gases present in a cabin, such as indicating their percentages. The fundamental principle behind this system is that IoT devices collect information from the cloud, including data on existing pollution in the environment. The key microcontroller employed in this system is the microcontroller , which provides 6 outputs and 6 inputs. This allows multiple sensors to be connected and integrated, transforming the setup into a comprehensive detection and monitoring device that can be monitored remotely through IoT devices.

Processing of Sensors:

The main process of a sensor involves combining multiple sensors into a single device. This device incorporates various types of sensors, temperature, gas, and smoke sensors. The integration of these sensors is facilitated by utilizing the IoT cloud, which enables the device to gather data on the existing air quality levels in the area.Each sensor operates according to its specific functionality, detecting and measuring different aspects of the cabin. The collected data from these sensors is processed and analyzed to determine the percentage of contamination present. This information is then displayed on a screen or user interface, allowing users to easily interpret and understand the pollution levels.By combining multiple sensors into a single device and utilizing the capabilities of the IoT cloud, this system enables comprehensive monitoring and analysis of various pollutants in the cabinet. This integrated approach enhances the accuracy and effectiveness of detection and provides users with valuable insights into the contamination levels present.

IOT Functions With the Cloud:

Cloud-to-IoT offers a comprehensive managed service that handles device management effectively. This encompasses various essential aspects, such as enrolling devices securely, implementing authentication and authorization mechanisms within the cloud-based resource hierarchy, storing device metadata in the cloud, and facilitating the seamless transmission of device configurations to the devices. Enrollment ensures a secure and streamlined process for registering and on boarding devices, guaranteeing that only authorized devices can connect to and access the cloud services. Robust authentication and authorization mechanisms are implemented to verify device identities and control their access to the resources within the cloud environment. Device metadata, which includes important information specific to each device such as unique identifiers and configuration settings, is stored centrally in the cloud. This centralized storage simplifies device management and allows for easy retrieval and tracking of device-related data. Additionally, the service enables the cloud platform to send device configurations to the connected devices. This functionality empowers administrators to remotely update device settings and configurations without the need for manual intervention, enhancing the efficiency and control of device management. Overall, Cloud-to-IoT provides a comprehensive and managed solution for device management. It covers key aspects such as secure enrollment, authentication, and authorization, along with centralized storage of device metadata and the ability to remotely configure devices. These features contribute to a robust and efficient device management framework within the IoT ecosystem.

Benefits of the Proposed Project:

Possibility:

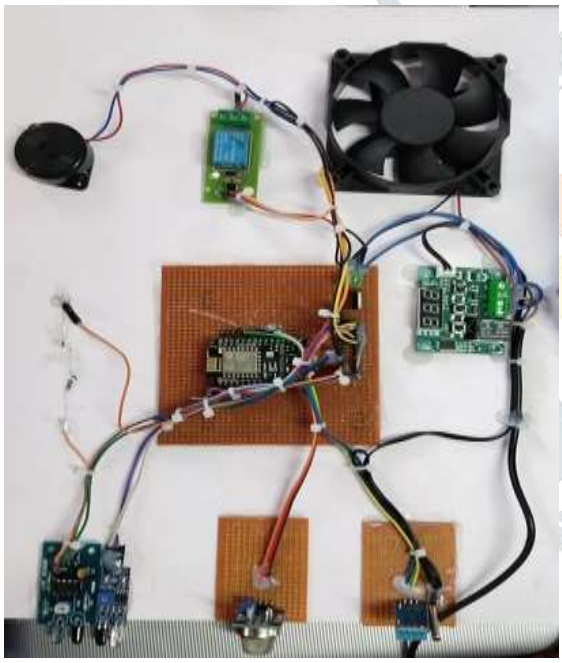
This compact device integrates multiple sensors and utilizes the power of the Internet of Things (IoT) to connect and communicate with the cloud. By combining various sensors with IoT technology, the device is capable of collecting and transmitting data to the cloud for further processing, analysis, and storage. This seamless integration of sensors, cloud, and IoT enables efficient data monitoring, analysis, and management, leading to enhanced functionality and capabilities for various applications.

Protect:

To avoid visiting a specific location with poor air quality, individuals can consider rerouting their travel plans or taking necessary safety precautions. These precautions may include wearing a mask or other protective gear to minimize exposure to pollutants. By being aware of the air quality conditions in different areas, people can make informed decisions to protect their health and well-being. In addition to personal measures, efforts can be made to reduce excessive waste in specific local areas. This can involve implementing proper waste management practices, promoting recycling and reuse, and raising awareness about the importance of reducing waste generation. By adopting sustainable practices, communities can minimize environmental pollution and contribute to the overall improvement of air quality.

Value: Because many sensors are combined with IoT and microcontrollers, it is more cost-effective than other options.

Results Sample of working board :



Conclusion:

This project proposal related to the welfare of society will benefit everyone by preventing accident. The microcontroller includes 6 inputs and 6 outputs, which simply give better results. It comes with several types of sensors like gas sensor, humidity sensor, temperature sensor. Considering the massive impact of pollution in our society, this can lead to another dimension of prevention of accidents in society. That is why we decide that our project proposal is to prevent that lifes of people.

Future Scope:

The goal of the future is that the device at our disposal can be compact by reducing the size of the device. It is possible to determine the amount of gas or alcohol produced by the vehicle for further processing or modification. In the future, the range can be extended according to the available high frequency bandwidth. Further research can be done to guide people in the right direction for their happiness. Therefore, it is another advantage to use this device in one application, so that the whole can be used for daily updates in ones, increasing their coverage

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