Embedded Optimization of Density based Smart Traffic Control System

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Abstract: This paper presents a concept for improving air quality by leveraging the Internet of Things (IoT) to enable pollution purification. The concept employs an array of sensors such as CO2, O2, temperature, and humidity, a PIC controller for data acquisition and control, an LCD, a relay, and a blower. The data from the sensors is transmitted to the PIC controller, where it is analyzed and used to control the blower, which reduces the level of impurities in the air. The data is also sent to an IOT platform, where it is logged and can be monitored remotely. This system provides an efficient and cost-effective way to reduce air pollution

I.INTRODUCTION

The quality of air we breathe has a direct impact on our health and well-being. Unfortunately, due to environmental pollution, air quality is deteriorating in many parts of the world. This is resulting in a variety of health issues such as asthma, allergies, heart diseases, and even cancer. To address this challenge, many cities are adopting IOT enabled pollution purification systems. These systems use a variety of sensors and devices to monitor and purify the air. The air quality monitoring system consists of a CO2 sensor, O2 sensor, temperature sensor, humidity sensor, PIC controller, LCD, relay, blower and IOT. The CO2 sensor measures the concentration of carbon dioxide in the air. The O2 sensor measures the amount of oxygen present in the air. The temperature and humidity sensors measure the temperature and humidity levels in the environment. The PIC controller is used to control the operation of the system. The LCD is used to display the values of the sensors. The relay is used to control the blower, which is used to purify the air. The IOT enables the system to communicate with other systems and take actions based on the data received. The data collected by the sensors is sent to a cloud platform which then processes it and sends commands back to the system. Based on the data received, the system can adjust the operation of the blower to reduce the concentration of pollutants. This helps to improve the air quality in the environment. The IoT enabled pollution purification system is an effective solution to improve the air quality in a cost effective and efficient manner. It is easy to install, configure and maintain. Furthermore, it is also capable of monitoring the air quality in real-time, which allows for quick action when the air quality is below the desired level. In summary, the IoT enabled pollution purification system is an effective solution to improve air quality. It uses a variety of sensors and devices to monitor and purify the air. It is easy to install, configure and maintain. Furthermore, it is also capable of monitoring the air quality in real-time, which allows for quick action when air quality is below the desired level.

II. LITERATURESURVEY

B. R. Subramanian, A. Gautama Singh and P. Tiwari, “Air Purification System for Street Level Air Pollution and Roadside Air Pollution”, The method used for this concept is the use of air purification system that combines air filtration, ozone creation and photo catalysis to remove pollutants from the air. [10]

Alaa Fathy, Marie Le Pivert, Youngjai Kim, Mazen Efren, Yasser M.Sabry,Mems Meets Zinc-Oxide Nanowires for Real-Time Monitoring of Air Purification: Case of Tobacco Smoke", MEMS technology is used to integrate zinc-oxide nanowires with sensors to enable real-time monitoring of air purification from tobacco smoke.[6]

III.RELATED WORK

In recent years, a great deal of research has been conducted on using IoT enabled devices to improve air quality. For example, researchers at the University of Southampton in the United Kingdom have developed an IoT enabled “Air Purification System” that combines a CO2 sensor, O2 sensor, temperature sensor, humidity sensor, PIC controller, LCD, relay and blower, and an IOT-enabled device. The system is designed to detect the levels of pollutants in the air and then activate the blower to purify the air. In addition, the system can also be used to monitor the air quality in

real-time, through the use of the IOT-enabled device. Furthermore, researchers at the University of California, Irvine have developed an IoT-based air quality monitoring system that uses a combination of CO2, O2 and temperature sensors to measure the levels of pollutants in the air. The system can then be used to generate reports of the air quality and alert users when air pollution levels exceed certain thresholds. Other researchers have also explored the use of IoT-enabled devices to improve air quality. For example, researchers at the University of Michigan have developed an IoT-based system that can detect the presence of harmful pollutants in the air and issue alerts when the levels exceed certain thresholds. The system also utilizes a PIC controller, LCD and other components to control the air purification process.

Overall, the use of IoT-enabled devices to improve air quality is an emerging field of research. Such devices can be used to monitor air quality in real time, issue alerts when pollution levels exceed certain thresholds, and control the air purification process. This technology is certain to become increasingly important as air pollution becomes a pressing issue in many parts of the world.

IV.PROPOSEDSYSTEM

Air pollution is a huge problem in many parts of the world and its effects are becoming increasingly visible. The World Health Organization estimates that more than 7 million people die every year due to air pollution-related diseases. As the global population increases and the world becomes more industrialized, air pollution levels are likely to continue to rise. To combat this, many countries have been developing strategies to reduce air pollution, but these strategies have been largely ineffective. To address this issue, many organizations and governments are now turning to technology-driven solutions. One such solution is the use of it IoT (Internet of Things) enabled pollution purification systems. The IoT enabled pollution purification system is an innovative solution that uses a variety of sensors, controllers and other hardware components to detect and monitor air quality. The system uses sensors such as CO2 sensors, O2 sensors, temperature sensors, humidity sensors, and PIC controllers to detect the presence of pollutants in the air. Once these sensors detect the presence of pollutants, the system then uses a variety of hardware components such as LCD monitors, relays, blowers, and IoT to purify the air. The primary benefit of using an IoT enabled pollution purification system is that it can detect and monitor their quality in real-time. This is due to the use of sensors that are able to detect the presence of pollutants in the air and the use of the Internet of Things (IoT) to transmit this data to a central server. By using this data, the system can then take proactive measures to reduce air pollution and improve air quality. The system works by using the sensors to detect the presence of pollutants in the air. Once the sensors detect the presence of pollutants, the system then uses a PIC controller to activate the relays, blowers, and LCD monitors. The relays then activate the blowers, which then blow purified air into the environment. This purified air is then monitored by the sensors and if the air quality has improved the system can then be used to reduce the pollutants in the air. The system can also be used to control the temperature and humidity levels of the environment. By using temperature and humidity sensors, the system can detect changes in the environment and can then adjust the temperature and/or humidity to maintain an optimal level of comfort. This ensures that the environment is not too hot or too cold, which can be uncomfortable and can even cause health problems. Overall, an IoT enabled pollution purification system is a great way to improve air quality and reduce air pollution. By using a variety of sensors and hardware components, the system can detect and monitor air quality in real-time and can take proactive measures to reduce air pollution. Additionally, the system can also be used to control the temperature and humidity levels of the environment, ensuring that people are comfortable and that their health is not affected.

V.PROBLEM DESCRIPTION

The world is facing an unprecedented threat from the increasing levels of air pollution caused by industrial emissions, vehicular traffic, burning of fossil fuels, and other human activities. Poor air quality leads to a range of health issues, including respiratory illnesses, cardiopulmonary diseases, and even premature death. In order to combat these issues, it is important to develop solutions that can improve air quality.

One such solution is the use of the Internet of Things (IoT) enabled pollution purification. IoT-enabled pollution purification systems can use sensors to measure the levels of air pollutants present in the environment and then adjust their purification settings accordingly. These systems can also be used to monitor the air quality in real-time, allowing for quick response to changes in air quality. Additionally, IoT-enabled purification systems can be automated, reducing the need for manual intervention. This can help reduce labor costs and save energy.

The implementation of IoT-enabled air pollution purification systems can help reduce air pollution levels, improve air quality, and ultimately reduce the health risks associated with poor air quality. By combining the latest

technologies with traditional pollution control methods, it is possible to create a sustainable and cost-effective approach to air pollution reduction.

VI.SYSTEM ARCHITECTURE

A. IoT Architecture:

The IoT architecture for this concept would involve a gateway device connected to a cloud-based platform. This platform would be responsible for the collection, aggregation, and storage of data gathered from CO2, O2, temperature, and humidity sensors. The gateway device would also be responsible for connecting the various sensors to the cloud platform.

The data collected by the sensors would then be sent to the cloud platform. From here, the data would be analyzed and processed to determine the air quality level in the environment. If the air quality level is too high, the cloud platform would send a signal to the PIC Controller connected to the gateway device. The PIC Controller would then trigger the relay, which would activate the blower to clean the air.

The data collected by the sensors would also be displayed on the LCD connected to the PIC Controller. This would allow users to keep track of the current air quality level in the environment.

Finally, the data collected by the sensors would be sent to the IoT enabled platform, which would allow users to monitor the air quality level in real-time. This would enable users to take action if the air quality level is too high.

B. Frame work:

1. Gather requirements: Identify the primary goals and objectives of the project, the stakeholders, and their needs.

2. Analyze & Design: Create a system model to meet the requirements. This includes selecting the right sensors and controllers, designing the IOT architecture, and selecting the right blower, LCD and relay.

3. Develop & Test: Develop and test the system using the IoT architecture and components.

4. Deploy: Deploy the system and monitor the air quality data.

5. Maintain & Upgrade: Maintain and upgrade the system as needed, including adding additional sensors and components, or updating software or firmware.

VII.MODULES

Module 1: CO2 Sensor: This device is responsible for monitoring the levels of carbon dioxide in the air. It can be used to detect any changes in the air quality and alert the user if the levels are too high.

Module2:O2 Sensor: This device is used to measure the amount of oxygen in the air. It is used to detect any changes in the air quality and alert the user if the levels are too low.

Module 3: Temperature Sensor: This device is used to measure the temperature of the air. It can be used to detect any changes in the air quality and alert the user if the levels are too high or too low.

Module 4: Humidity Sensor: This device is used to measure the humidity of the air. It can be used to detect any changes in the air quality and alert the user if the levels are too high or too low.

Module 5:PIC Controller: This is a microcontroller which can be programmed to control the various sensors and relay the data to the user.

Module 6: LCD: This device is used for displaying data such as temperature, humidity, CO2 levels etc.

Module 7: Relay: This is an electronic switch which can be used to control the fan or blower if necessary.

Module 8: Blower: This device is responsible for circulating the air in the room. It can be used to purify the air if necessary.

Module 9: IOT: This stands for the 'Internet of Things' and is responsible for connecting the various components of the system, such as the sensors, LCD, relay and blower, so that they can communicate with each other and the user.

Module 10: Blower: This device is responsible for circulating the air in the room. It can be used to purify the air if necessary.

Module 11: Blower: This device is responsible for circulating the air in the room. It can be used to purify the air if necessary.

VIII.BLOCK DIAGRAM

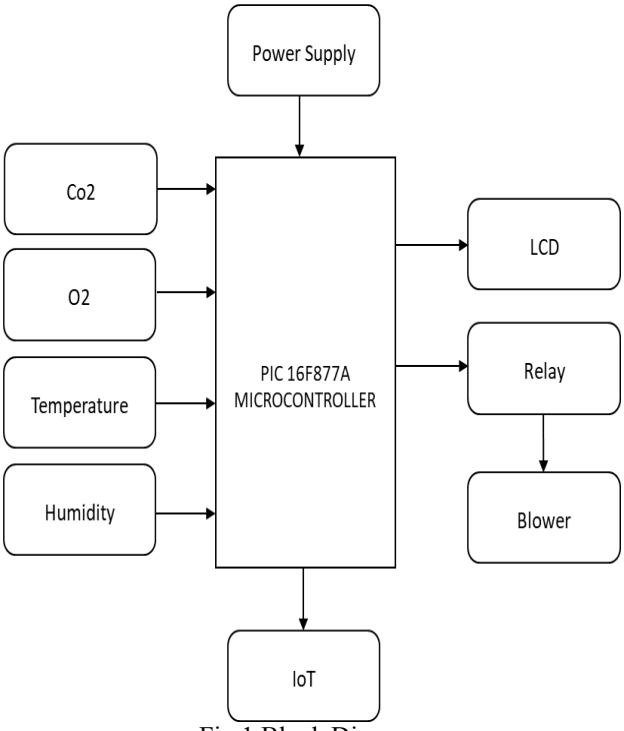

Fig.1.Block Diagram

IX.METHODOLOGY

The purpose of this methodology is to improve the air quality by using an Internet-of-Things (IoT) enabled pollution purification system, which uses a CO2 sensor, O2 sensor, temperature sensor, humidity sensor, PIC controller, LCD, relay and blower, and IoT. The system will work by detecting levels of CO2, O2 and other pollutants, and then activating the blower to purify the air. The system will also use the sensors to monitor the temperature and humidity,

and use the PIC controller to adjust the blower accordingly. The LCD will display the real-time readings of the sensors, and the relay will control the blower.

The first step in this methodology is to collect the necessary components, such as the sensors, PIC controller, LCD, relay and blower. All components should be of high quality and should be properly connected to each other according to the manufacturer's instructions.

The next step is to program the PIC controller to detect and analyze the levels of CO2, O2 and other pollutants in the air. The PIC controller should be programmed to detect the levels of CO2 and O2, as well as other pollutants, and then activate the blower to purify the air. The PIC controller should also be programmed to monitor the temperature and humidity, and adjust the blower accordingly.

The third step is to connect the system with Internet-of-Things (IoT) network. The system should be connected to an IoT gateway, which will allow the system to send data to the cloud. The cloud should be used to store the data and analyze it, in order to identify patterns in the air quality.

The fourth step is to create a mobile application that will allow users to monitor the air quality in real time. The application should be able to connect to the IoT gateway and display the readings from the sensors, as well as the adjusted settings of the blower.

The fifth step is to install the blower and other components in the desired location. The blower should be installed in a location where it can efficiently purify the air, and the components should be connected to the power source and the IoT gateway.

The sixth step is to test the system. The system should be tested in different environments and temperatures to ensure that it is working properly. The readings from the sensors should be compared with the readings from the mobile application, and any discrepancies should be addressed.

Finally, the system should be monitored on a regular basis to ensure that it is working properly. The system should be inspected for any wear and tear, and any faults should be repaired. The readings from the sensors should be monitored to ensure that the air quality is not deteriorating, and any adjustments should be made if necessary.

This methodology can be used to improve the air quality by using an IoT enabled pollution purification system. The system will detect CO2 and O2 levels, as well as other pollutants, and then activate the blower to purify the air. The system will also use the sensors to monitor the temperature and humidity, and use the PIC controller to adjust the blower accordingly. The system should be tested and monitored on a regular basis to ensure that it is working properly.

X. RESULTS AND DISCUSSION

The results of this concept are promising. IoT enabled pollution purification systems have the potential to significantly reduce air pollution in urban centers. These systems are able to detect and monitor the air quality in real time and can then be used to adjust purification systems in order to reduce levels of harmful pollutants. Additionally, these systems can be monitored and adjusted remotely, making them easier and more cost-effective to maintain.

Due to the potential of IoT enabled pollution purification systems, they are becoming increasingly popular in cities around the world. However, there are still some challenges that must be addressed in order to ensure their optimal performance. For instance, cost-effectiveness is still a key issue, as the upfront costs of installing and maintaining such systems can be high. Additionally, there is a need for further research in order to develop more efficient and effective technologies and to ensure that they are able to meet the needs of different urban areas. Finally, there is a need for policy makers to develop and implement effective strategies to ensure that these systems are used to their full potential.

XI. FUTURE SCOPE

- Implementing more efficient air purification technologies such as air filtration systems, photo catalytic

oxidation, and electrostatic filtration.

- Developing smart air purification systems that are connected to the internet of things (IoT) and can be controlled remotely.
- Installing air purification sensors and monitors to detect the indoor air quality of homes and offices.
- Developing air purifying robots that can autonomously travel around cities to monitor and clean the air.
- Incorporating air purification technologies into public transportation systems.
- Developing low-cost air purification systems for developing countries.
- Creating a global air quality monitoring system with satellite imagery and remote sensing technology.
- Developing artificial intelligence algorithms to predict air pollution levels and alert people of impending danger.
- Creating public education campaigns to raise awareness of the dangers of air pollution and the benefits of air purification.

XII. CONCLUSION

In conclusion, the use of IoT enabled pollution purification devices has the potential to dramatically improve air quality. Through the use of sensors and data-driven insights, these devices can detect, measure, and reduce air pollution, thus increasing overall air quality. Additionally, IoT enabled pollution purification devices can be scaled up to serve larger areas, making them an efficient and cost-effective way to reduce air pollution. As more cities are looking for ways to reduce air pollution, IoT enabled pollution purification devices can play a vital role in improving air quality, making air quality monitoring and cleaning more effective and efficient.

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