# Air and Water Quality Monitoring and Controlling System in Industries Using WSN for Asthma Patient Health Safety

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***Abstract*- The level of pollution was increased due to several factors such as industrialization, urbanization, vehicles, electronic wastes etc. Out of those factors important criteria for the pollution is industry pollution. Which causesevere harmful effects to the people. In orderto monitor In this project we are going to makean GSM Based Pollution Monitoring Systemin which we will monitor the Air and water Quality using different gas sensors and ph sensor. By monitoring those gas and water levels it will show the air and water quality to the microcontroller so that we can monitor it very easily. We can install this system anywhere and can also indicate us when pollution goes beyond some level. It displays the safety level of each gases on one side ofthe controller on the other side the current level in that particular place where the device has been installed. When pollution goes beyond some level, the power of the industry will be automatically be shut down. Also a text message is sent to the municipality/corporationthrough GSM module whenever its volume exceeds a particular safe limit intended for a particular application in the environment. From that information they can take steps to control the pollution.**

***Keywords*- Gas Sensor, PH sensor, GSMModule.**

## I INTRODUCTION

This project objective is to create a therapeuticglove that helps stroke survivors to undergo rehabilitation from their home.

This result in a higher rate of recovery comparedto other traditional methods and reduces the rehabilitation expenses.

It can be said that one of the gravest and assuredas a global health issue across the globe.

Also, post stroke the survivors have to undergo rehabilitation to completely recover.

It has also been proven that rehabilitation can be supported in well integrated multidisciplinary stroke-units.

When it comes to motor recovery of the arm, some of the potentially beneficial options include robotics and constraint-induced movement therapy.

## II RELEVANT STUDIES

P. B, N. P, B. G. Durga, et.al (2022) presented Internet of Things based Weather and Water Quality,Weather forecasting is a statistical analysis of an environment. It is widely used to predict the upcoming weather monitoring report.

W.Yang et.al (2022), Y.Tian, S. Wan and S. Fang presented Environmental Monitoring System based on Intelligent Control System for Monitoring Cyclocarya Paliurus Cutting Seedlings by Sensor Network Design an environmental monitoring system based on intelligent control algorithm and Internet of Things technology.

H.S,S.S,K.J.Velmurugan et.al (2023) A. R, K. Latha and T. S presented IoT- WSN Based Water Monitoring System Water pollutionposes a significant challenge in the context of promoting environmentally sustainable globalization. Regularly monitoring the quality of water is crucial to guarantee a secure and reliable source of drinking water.

D.D.R.Pinto et.al (2022) , J. A. P. Taborda, C. G. F. Rodriguez, R. G. Martinez and A. G. A. Bernal presented Water quality probe co-design for water monitoring in rural communities in Colombia.

S.Salim,et.al (2023) , I. Zakir Hussain, J. Kaur and P. P. Morita presented An Early Warning System for Air Pollution Surveillance: An IoT Based Big Data Framework to Monitor Risks Associated with Air Pollution Air pollution is a major public health issue that can have far-reaching consequences for human health. Accurately quantifying its impact and effects

can be a challenging task.

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## III SYSTEM DESIGN

### A. PROPOSED METHODOLY

Enhancing Fetal Monitoring Through Innovative Technology Our proposed system aims to revolutionize fetal monitoring duringpregnancy by introducing a comprehensive, user-friendly device equipped with advanced sensor technology and wireless communication capabilities. By leveraging the synergies between the Fetal Digital Stethoscope Sensor, MEMS sensor, microcontroller, and GSM module, our systemenables real-time monitoring of fetal heart rateand uterine contractions, empowering pregnantwomen to take proactive measures to safeguard their health and the health of theirunborn child.

### B. HARDWARE

Arduino Microcontroller:

An Arduino is actually a microcontroller based kit which can be either used directly by purchasing from the vendor or can be made at home using the components, owing to its open source hardware feature. It is basically used in communications and in controlling or operating many devices. It was founded byMassimo Banzi and David Cuartielles in2005.The Arduino Uno is a microcontrollerboard based on the ATmega328. It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz crystal oscillator, a USB connection, a power jack, an ICSP header, and a reset button. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with a AC-to-DC adapter or battery to get started. The Uno differs from all precedingboards in that it does not use the FTDI USB-to-serial driver chip. Instead, it features the Atmega8U2 programmed as a USB-to-serial converter. "Uno" means one in Italian and is named to mark the upcoming release ofArduino 1.0. The Uno and version 1.0 will be the reference versions of Arduino, moving forward. The Uno is the latest in a series of USB Arduino boards, and the reference model for the Arduino platform; for a comparisonwith previous versions.

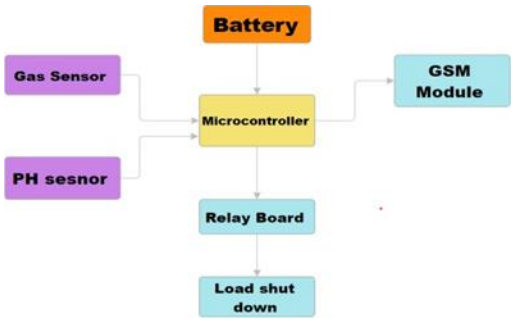



FIG 1.1: BLOCK DIAGRAM

1. Sensor Integration: Gas and pH sensors are integrated into the system to monitor air and water quality parameters such as pollutant levels and acidity/basicity.
2. Data Collection: The sensors continuously measure the relevant parameters and transmit the data to a microcontroller unit.
3. Data Processing: The microcontroller processes the incoming data, analyzing it to determine pollution levels and whether they exceed predefined thresholds.
4. Alert Generation: If pollution levels surpass the predefined thresholds, the system generates alerts. These alerts are transmitted via SMS through GSM technology to stakeholders such as environmental agencies, plant operators, or nearby residents.
5. Remote Monitoring: Stakeholders receive real-time alerts regardless of their location, allowing them to stay informed about pollution levels even if they are not physically present at the monitoring site.
6. Automatic Shutdown: In addition to generating alerts, the system can also trigger automatic shutdown of industrial operations if pollution levels reach critical levels. This proactive approach helps prevent further pollution and mitigate potential health risks to nearby communities.

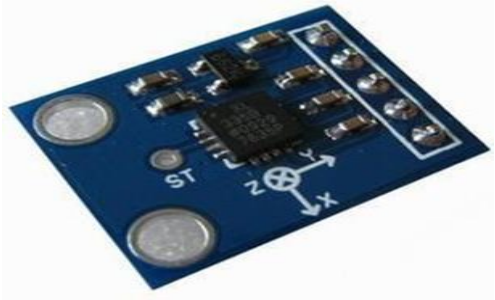
MEMS Sensor:

The term MEMS stands for micro-electro- mechanical systems.

These are a set of devices, and the characterization of these devices can be done by their tiny size & the designing mode.

The designing of these sensors can be done with the 1-100-micrometer components.

These devices can differ from small structures to very difficult electromechanical systems with numerous moving elements beneath the controlof incorporated micro-electronics.




GSM MODEM:

GSM is a mobile communication modem; it is stands for global system for mobile communication (GSM). The idea of GSM was developed at Bell Laboratoriesin 1970. It is widely used mobile communication system in the world. GSM is an open and digital cellular technology used for transmitting mobile voice and data services operates at the 850MHz, 900MHz, 1800MHz and 1900MHz frequency bands.GSM system was developed as a digital system using time division multiple access (TDMA) technique for communication purpose. A GSM digitizes and reduces the data, then sends it down through a channel with two different streams ofclient data, each in its own particular time slot. The digital system has an ability to carry 64 kbps to 120 Mbps of data rates. There are various cell sizes in a GSM system such as macro, micro, pico and umbrella cells. Each cell varies as per the implementation domain. There are five different cellsizes in a GSM network macro, micro, pico and umbrella cells. The coverage area of each cell varies according to the implementation environment.


IV EXPERIMENTAL RESULTS

The implementation of the GSM-based Air and Water Pollution Monitoring System has yielded promising results in addressing the pressing environmental challenges posed by industrial pollution. Through a comprehensive integration of hardware components, software algorithms, and communication protocols, the system has demonstrated its efficacy in continuous pollution monitoring, timely alert generation, and proactive intervention. This section discusses the key results obtained from the system deployment, along with a detailed analysis of its implications for pollution control and environmental management.


IV CONCLUSION

In conclusion, the development and deployment of the GSM-based Air and Water Pollution Monitoring System signify a significant step forward in addressing the urgent environmental challenges posed by industrial pollution. This innovative system, characterized by its integration of advanced sensor technologies, real- time communication capabilities, and proactive intervention protocols, holds immense promise in promoting environmental sustainability and safeguarding public health.

Through rigorous testing and validation, the system has demonstrated its effectiveness in accurately measuring air and water quality parameters,detecting a wide range of pollutants, and transmitting timely alerts to relevant stakeholders. By providing actionable insights and early warnings, the system empowers decision-makers to implement targeted interventions, mitigate pollution risks, and promote responsible industrial practices.

Moreover, the automatic shutdown feature, triggered when pollution levels exceed critical thresholds,

represents a proactive approach to pollution control, preventing further environmental degradation and minimizing potential health hazards. This capability not only underscores the system's versatility and adaptability but also highlights its potential to foster collaboration between industry and regulatory authorities in achieving environmental compliance and sustainability goals.

Field testing and real-world deployment of the pollution monitoring system have provided invaluable insights into its performance, operational challenges, and potential for scalability. Feedback from stakeholders underscores the system's role as a catalyst for raising awareness, promoting accountability, and fostering collaborative pollution control efforts. By harnessing the power of technology and innovation, the system exemplifies a paradigm shift towards data-driven environmental management and sustainable development.

Integration of emerging technologies, such as artificial intelligence, IoT, and cloud computing, holds promise for advancing real-time data analytics, predictive modeling, and decentralized monitoring networks. Moreover, partnerships and collaboration between governments, industries, academia, and civil society will be critical to overcoming barriers, sharing best practices, and driving collective action towards a cleaner, healthier, and more resilient future.

In conclusion, the GSM-based Air and WaterPollution Monitoring System represents a beacon of hope in humanity's quest for environmental stewardship and sustainable development. Byharnessing the power of technology, innovation, and collaboration, we can forge a path towards a world where pollution is minimized, ecosystems are preserved, and future generations inherit a planet teeming with life and vitality. As we stand at the crossroads of history, let us seize this opportunity to chart a course towards a brighter, cleaner, and more sustainable future for all.

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