VISVESVARAYA TECHNOLOGICAL UNIVERSITY

Jnana Sangama, Belagavi-590018.

A Project Synopsis on

"LOCATING AND DETECTING TOXIC GASES IN MANHOLES"

Submitted in the partial fulfilment of the requirements for the award of the Degree of

Bachelor of Engineering

In

Computer Science and Engineering

Chetana Panda	1OX19CS023
Hemant Raj Singh	1OX19CS034
Jampana Darsh Raju	1OX19CS037
Jino Thomas	1OX19CS038

Under the guidance of
Asst. Prof. Manjula L
Dept. of CSE

Department of Computer Science and Engineering
The Oxford College of Engineering
Hosur Road, Bommanahalli, Bengaluru-560068

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Name of the College: The Oxford College of Engineering

Name of the Department: Department of Computer Science and Engineering

Name of project guide: Asst. Prof. Manjula L

Email id: manjulakshmanan1983@gmail.com

Contact No.: 99456 71081

Name of Team Members

Name: Chetana Panda

USN No: 1OX19CS023

Email id:chetnapanda2000@gmail.com

Mobile No: 8197539247

Name: Hemant Raj Singh

USN No.: 1OX19CS034

Email id:rajhemant83@gmail.com

Mobile No.: 8539911148

Name: Jampana Darsh Raju

USN No.: 1OX19CS037

Email id:darshjcse2023@gmail.com

Mobile No.: 9110421055

Name: Jino Thomas

USN No.: 1OX19CS038

Email id: jinothomas274@gmail.com

Mobile No.: 9645014589

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INTRODUCTION

Carbon dioxide in manholes can be produced from many sources, including sewage, chemicals, and decomposed radioactive materials in natural gas.Some of the common gases found in manholes are

methane, carbon monoxide, hydrogen sulphide and ammonia.Methane is a flammable gas formed by the decomposition of organic materials in sewage.

Carbon monoxide is a colourless, odourless gas produced by the breakdown of fuels such as gasoline, natural gas and propane.Hydrogen sulphide is a rotten egg-like gas formed as a result of the decay of organic materials.Exposure to toxic gases in manholes can cause various health problems such as difficulty breathing, unconsciousness and even death.Methane and other flammable gases can also cause fire or explosion.Since pollutants in manholes are generally colourless, odourless and tasteless, personnel entering these areas should be appropriately trained in gas recognition and management.Workers should be equipped with appropriate personal protective equipment such as respirators and gas detectors.

They must also provide their employees with regular safety training and ensure they have access to the necessary equipment and resources.As a result, toxic gases in manholes pose a serious safety hazard to workers and the public.To minimize these risks, it is important that steps are taken to prevent the release of harmful gases and that workers are properly trained and equipped to be safe in these locations.

OBJECTIVES

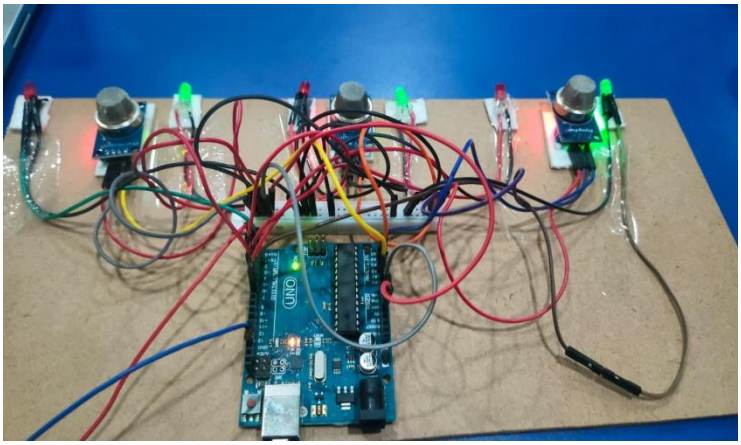
- The objective of our project is to develop an IoT device that gives real-time statistics of the concentration of various gases in manholes and also to help locate the manholes by sharing their latitudes and longitudes.
- Not only will this device detect toxic gases, but it will also send the data of the infected manhole to the respective authorities for further action.
- The data would be sent over the internet and also plan on storing it in a real-time database.
- With the help of sensory and systemic intelligence, we will be able to detect shutters within the drainage system and the application of the device will also be able to give the latitude and longitude of the particular manhole where the device is installed.
- This will help the authorities in locating the manholes accurately.
- This device has been developed to assist authorities and also to supress the health hazards caused by the toxic manholes.

METHODOLOGY

After a hefty amount of research in the field of sensors and power supply units we were able to conclude upon which sensors would be best suited for our project.All in all we were able to finally settle to a particular model for our hardware components.Often the product is ruined due to incorrect programming language chosen for implementation or unsuitable method of programming.

The most important details in this text are the three major implementation decisions that have been made before the implementation of this project: Analysis of the hardware components, fabricate the prototype, Implementation of any software is always preceded by important decisions

Regarding selection of the platform, the language used, etc.



The prototype of the project

The configuration of the framework is the most basic component influencing the nature of the product and has a noteworthy effect on the later stages, especially testing and upkeep.The architectural configuration procedure is concerned with building up a fundamental basic system for a framework, which includes recognizing the real parts of the framework and interchanges between these segments.The proposed architecture for this system is given below, showing the way this system is designed and brief working of the system

Unlike a block diagram or layout diagram, a circuit diagram shows the actual electrical connections. A drawing meant to depict the physical arrangement of the wires and the components they connect is called artwork or layout, physical design, or wiring diagram.A brief analysis of the components was done and their functionality was studied. A circuit diagram that was feasible for construction and that could monitor SpO2, heart rate and detect fall was designed.The final protype look was also finalized in this module once the circuit diagram was sketched.

(Building/Fabricating the Prototype) This module involved a tedious amount of research and multiple trial and error experiments were conducted based upon the compatibility of the components, the right amount of power required.(Final Fabrication and Testing) The last phase of our project is the process of testing the prototype's efficiency and accuracy.

- Stage 1- Final Fabrication: Post experimentation with the band model, the components were then installed into an enclosed container made of plastic which will demonstrated as manhole.The prototype is demonstrated in the imaginary manhole which has already setup with the different types of gases so that the module is able to sense and fetch the gas toxicity level as per the project objective.
- Stage 2- Testing: To test the accuracy and reliability of the model, test was conducted by comparing the readings of the prototype against the real-world gases toxicity levels already fetched from the manhole database.

RESULTS AND CONCLUSION

A thorough experimentation of the prototype is necessary so as to check the accuracy, calibration and efficiency of the sensors. The experimentation would also shed light on other factors such as proper working of UI, accurate data transfer to the system, data storage in cloud and so on.The readings of all the acquired sensors were taken and examined for testing and assurance purposes. These readings were taken under real life conditions and under natural environment imitating the toxic gases of manholes. The readings were found to be accurate; the readings were also found reflecting during change of environment and changes in toxicity level of gases accordingly.

Manholes are amongst the most unprotected areas in the world. To combat this, we developed an affordable device that can help the social workers detect the gas levels and send the details of infected manholes to the government. Our device successfully warns employees about varied gas levels in the manhole and aids in the prevention of future mishaps. It is a high-performance monitoring system that does its work efficiently and safely. Moreover, it will help reduce the tragedies due to gas poisoning from manholes and to be alert for any hazardous gas outburst.

SCOPE FOR FUTURE WORK

In the future, we can try and add various other harmful gas detectors, sprinkler systems to go off during a fire, continuous live data feed to a designated system, escape path lighting system to light up the nearest escape path in case of an emergency, increase ventilation to remove harmful gases quicker, add email service to notify agencies via electronic mail.The mobile application can also be more sophisticated with features such as FAQ, emergency plans and contact, chat bot. It could also have a SOS service to send location and all the current stats to emergency help services and notify them in case of any disaster.