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Detection and Monitoring of Manhole using IOT

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ABSTRACT: Drainage system monitoring plays an important role to keep city clean. In fact, not all areas have drainage monitoring team. It leads to irregular monitoring of the drainage condition. The irregular monitoring leads to the blocking of the drainage that imply to the salutation which trigger flood. Manual monitoring is also incompetent. It requires professionals but they can only monitor very finite and maintain low accuracy. Also sometimes due to lack of knowledge the worker may meet with an accident as they have no idea that how will be the conditions in those manhole. This paper presents the application and design function of a smart and real-time Drainage and Manhole Monitoring System with the help of Internet of Things. The manholes present in the drainage will have a module which is having microcontroller interfaced with gas sensor, level indicator, NRF. The system will monitor if the blockage is occurred in between two manholes and also it will sense the rise in amount of various gases which are harmful to the human beings, and also a system of monitoring the water level then it will trigger an alarm and will provide those information to the health departments from which the particular action will be taken. The system will able to monitor all these things in real-time scenario which will allow us to take proper actions of the particular problem in drainage system.

I. INTRODUCTION

The sewage system must be monitored in order to maintain the city clean. Uneven sewage system monitoring causes drainage to become clogged.. Overflowing drains in the sewage system are one of the most prevalent difficulties identified, which become more severe during the monsoon seasons when the authorities are ignorant of the overflowing drains. It is unsanitary for the adjacent residents and creates waterlogging, which leads to bug breeding.

Solution to this problem is an IoT system that warns municipal officials about overflowing drains immediately by email or notification at the city control center as well as citizens via social media or a mobile app. The essential component of this system is a low-power IoT-based portable gadget that is mounted below the manhole cover.

II. LITERATURE SURVEY

Paper Authors	Title of the paper	Nature of the work	Technology used
D.Sakthipriya, V.Logeswari, K. Nishanthi, B.Reethika	Manhole Monitoring System Implemented In Smart City	To create an effective accident-avoidance system in large cities by prohibiting open manholes. The ultrasonic sensor that determines whether or not the manhole is open or closed. The command and control The Internet of Things is used for maintenance.	IOT, ML.
Aarathi M, Bhuvaneshwaran A	Drainage and Waste Management Monitoring and Alert System for Smart City	The equipment checks for blockages between the two manholes, detects the volume and depth of various dangerous gases, and delivers information via alerts. City Hall is located in the city's centre.	ML and IOT

Memane Abhishek Ganpat, Aher Omkar Ganpat Bansoe, Sumit Shivaji	Smart Manhole Detection	The suggested system is a low-cost, low-maintenance, IoT-based real-time system that sends a message to the managing station if a manhole's threshold values are exceeded. This technology lowers the risk of death for manual scavengers who clean underground sewage, while simultaneously benefiting the general public.	IOT
Rutvik Patel Jay Prajapati, Meha Dave, Ishwariya Joshi, Jagdish M Rathod	IoT based wastewater spillage detection system	The suggested technology simplifies the management and monitoring of underground drainage networks, saving the lives of hundreds of manual scavengers who die each year while cleaning them.	LoRA Technology

Table 2.1: Summary of Literature Survey

III. METHODOLOGY

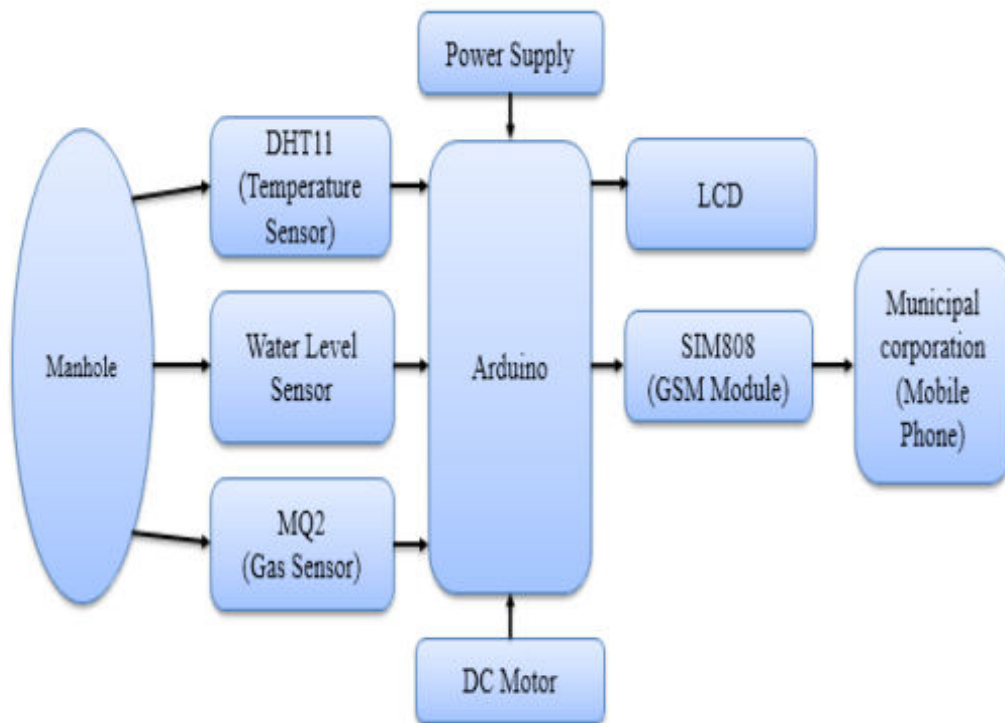


Figure 3.1: Block Diagram of Underground Drainage Monitoring System

Figure 3.1 shows the Block Diagram of Underground Drainage Monitoring System

- Various types of sensors (flow, level, temperature and gas sensors) are interfaced with microcontroller Arduino Uno in order to make the system smart.
- When the respective sensors reach the threshold level, the indication of that respective value and sensor is being sent to the microcontroller.
- Furthermore, Arduino Uno then sends the signal and location of the manhole to the municipal corporation through GSM and GPS and the officials could easily locate which manhole is having the problem and could take appropriate steps.

- Also, Arduino Uno updates the live values of all the sensors in the manholes falling under the respective area using IoT. A message will also be displayed on the LCD.

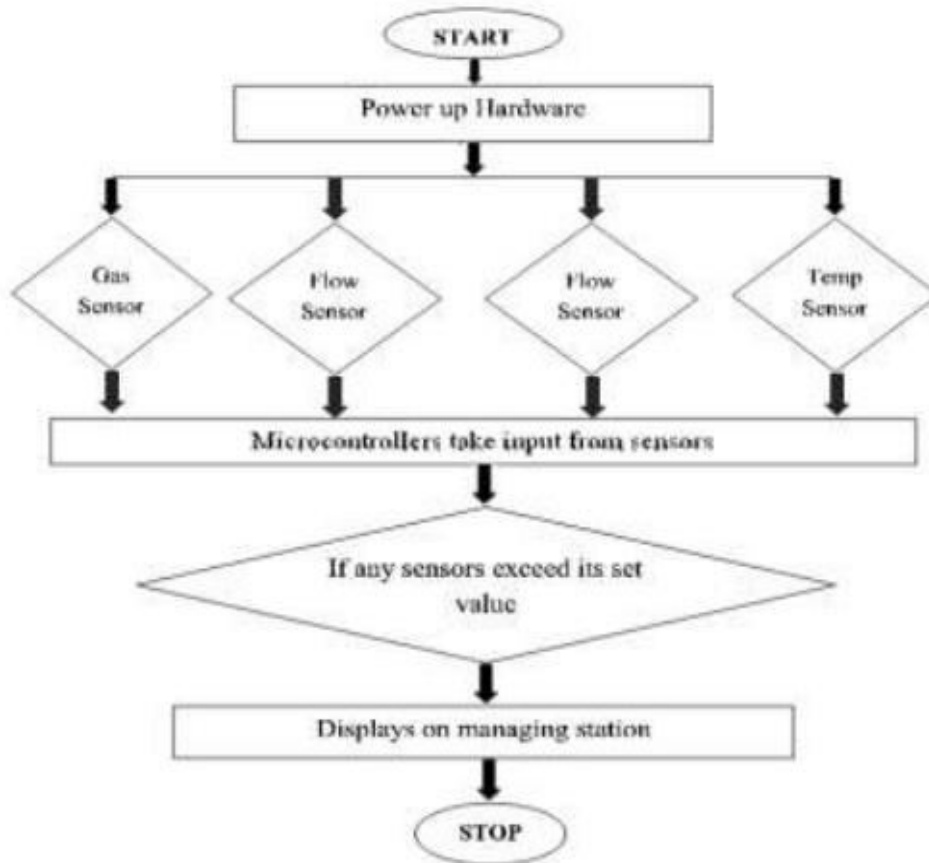


Fig 3.2: Flow Chart

Hard Ware Components Used:

Arduino UNO, Humidity and Temperature sensor (DHT 11), Water level sensor, Gas sensor (MQ2). LCD, DC Motor, 12V Relay Module, GSM Module (SIM 808).

Soft Ware Description:

Blynk IoT Platform

Blynk was designed for the Internet of Things. It can control hardware remotely, it can display sensor data, it can store data, visualize it and do many other cool things.

There are three major components in the platform:

- **Blynk App** - allows us to create amazing interfaces for our projects using various widgets we provide.
- **Blynk Server** - responsible for all the communications between the smartphone and hardware. We can use our Blynk Cloud or run our private Blynk server locally. Its open source, could easily handle thousands of devices.
- **Blynk Libraries** - for all the popular hardware platforms - enable communication with the server and process all the incoming and out coming commands. Now imagine: every time we press a Button in the Blynk app, the message travels to the Blynk Cloud, where it magically finds its way to your hardware. It works the same in the opposite direction and everything happens in a blink of an eye.

IV. EXPERIMENTATION

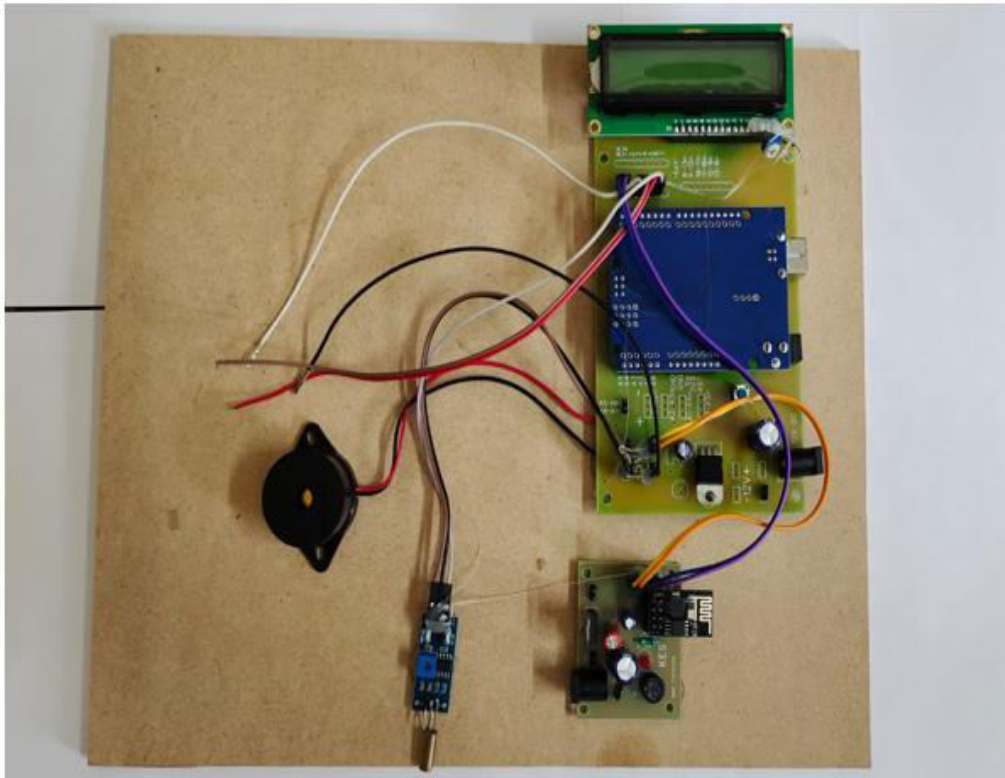
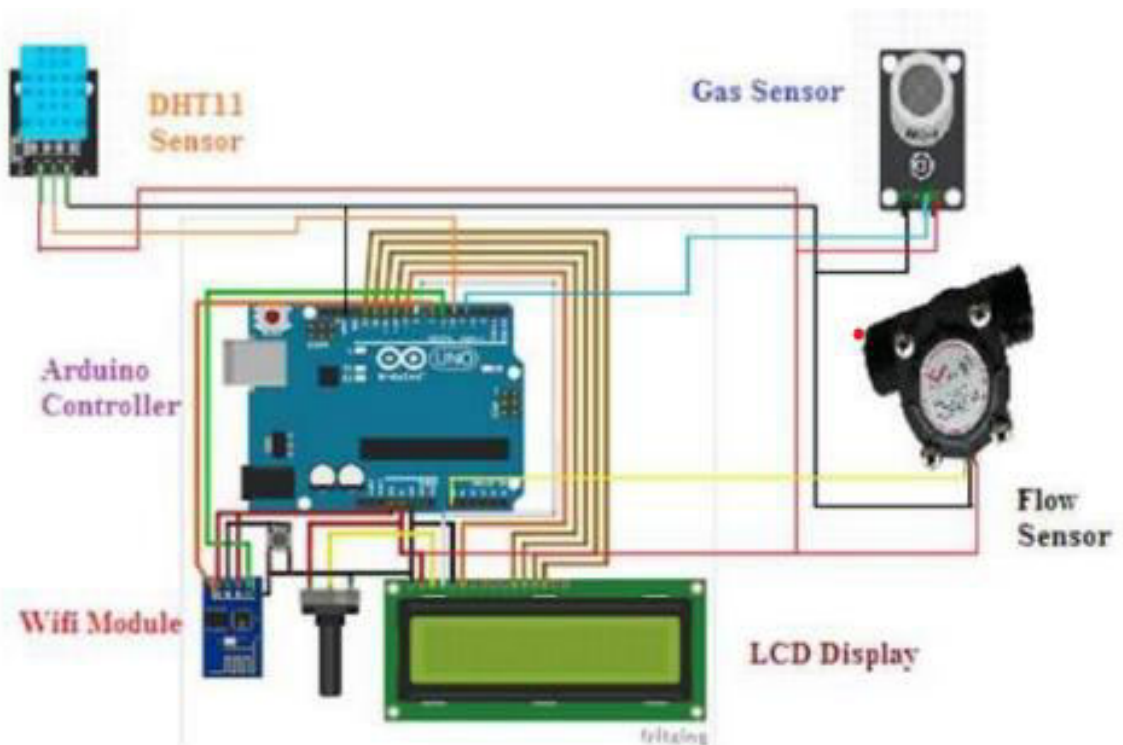


Figure: Prototype



V. CONCLUSION

This device represents the application and design function of a smart and real-time Drainage and Manhole Monitoring System with the help of Internet of Things. The manholes present in the drainage will have a module which is having microcontroller interfaced with gas sensor, level indicator, NRF. The system will monitor if the blockage is occurred in between two manholes and also it will sense the rise in amount of various gases which are harmful to the human beings, and also a system of monitoring the water level then it will trigger an alarm and will provide those information to the health departments from which the particular action will be taken. The system will able to monitor all these things in real-time scenario which will allow us to take proper actions of the particular problem in drainage system.

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