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# FLOOD MONITORING SYSTEM USING IOT

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**ABSTRACT:** Nowadays, accidents due to broken and missing manhole covers are quite frequent. Manholes are not monitored properly in developing countries based on street lights. These accidents can lead to serious injuries and also death. Hence, here we propose a system to overcome this problem. We have included an array of sensors for complete monitoring of the manhole cover and Intensity of street lights is required to be kept high during the peak hours. As the traffic on the roads tends to decrease slowly in late nights so that such accidents can be prevented. This project includes a cover to monitor the gas emitted from the sewage systems so that toxicity can be monitored, the internal temperature is also monitored if a check for a change in the temperature as the property of manhole change with temperature which could need to crack formation, a tilt sensor is introduced to indicate whether the manhole can tilt. Also, a float sensor is used to indicate when the water level goes beyond a certain level, in case of any alert due to any of the parameters we send an SMS to an authority number. Intensity of street lights is required to be kept high during the peak hours. As the traffic on the roads tends to decrease slowly in late nights, the intensity can be reduced progressively till morning to save energy. Thus, the street lights switch ON at the dusk and then switch OFF at the dawn automatically. The process repeats every day.

**KEY WORDS:** Flood Monitoring, Manhole Detection, Underground System, Broken Manholes, Iot Based Manhole System

## 1. INTRODUCTION

For a clean and healthy environment, many Indian cities have an underground drainage system that is controlled by the Municipal Corporation. The water in the drainage system is occasionally mixed with pure water due to poo upkeep Infections and diseases can be spread through the drainage system. Because of climate change, drainage is affected throughout the year, and the environment is dynamic, people's daily lives are disrupted. To fix all drainage system concerns and to send Blynk notifications to the municipal corporation informing them of the state of the drainage system so that officials can take the necessary steps to restore the drainage system. A gas sensor was used to detect the gas produced within the bio-waste drainage system, preventing it from escaping. The pressure inside the drainage system produced an explosion. The purpose of this design is to track the drainage system using the sensor. When the sewage system is obstructed, water overflows, or the drainage lid is removed, sensors monitor the drainage and send the data to a nearby municipal corporation official via integrated Wi-Fi, where the water overflow and gas value are presented live in the cloud for later examination. The Blynk Server also provides the drainage's location. [5]

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The sewage system exhibits instability and uncertainty due to multivariable, nonlinear, temporal variation, and random treatment processes. This model's purpose is to create a low-cost, customizable solution for detecting obstructions and stinky or foul-smelling gases.

Two ultrasonic sensors detect the water level, and if the difference between the two levels exceeds the threshold value, an alert message is delivered to the person in charge. The Arduino microcontroller is connected to the sensors' output. It looks at the previously set threshold level and sends a GSM alarm message to the person in control, which is tracked via IoT. Thing-speak, an IoT server analytics solution, displays the graph for clog detection and gas detection on the monitor. The most significant benefit of this technology is that it can save sewage workers from dying from harmful gas exposure. [7]

Manhole covers are an important feature of the city drainage system because of their large quantity and widespread distribution. However, every year, hundreds of people suffer various losses as a result of the manhole cover's complex form and ineffective function. We established the integration of urban drainage manhole cover to solve this problem.

Intelligent monitoring system to improve urban management and protect people's travel safety capacity. This system features real-time monitoring, timely alarms, precise positioning, and quick processing. etc. [8]

- The sensors' intelligence and predictive system identify the drain clog and provide us with the information we need to proceed.
- In a real-time scenario, sensors will monitor water levels, drainage blockages, and the amount of harmful gases.
- urbanization leads to increased flood risk because of the impervious surfaces in urban areas

Because metropolitan cities have chosen an underground system, the municipal government is responsible for keeping it clean. If drainage outlet management is poor, H2O becomes contaminated and can lead to disease transmission. Drainage blockages during the monsoon season disrupt the final public's routine. As a result, there should be a facility within the city corporation that alerts officials to sewer blockages and their precise location. It primarily recognises within the sector of warning people about a gas explosion, an increase in water level, and thus an increase in temperature. It makes use of IOT to create a drainage monitoring system in an extremely high automotive by using sensors to detect and send alerts to authorities via wifi .[12]

## 2. LITERATURE SURVEY

Automated Internet of Things for Underground Drainage and Manhole Monitoring System for Metropolitan Cities by Muragesh SK1 and Santhosha Rao

The Internet of Things (IoT) consists of real life objects, communication devices attached to sensor networks in order to provide communication and automated actions between real world and information world. IoT came into existence because, without human interaction computers were able to access data from objects and devices, but it was aimed at, to overcome the limiting

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factors of human entered data, and to achieve cost, accuracy and generality factors. Sensor Network is a key enabler for IoT paradigm. This paper represents the implementation and design function of an Underground Drainage and Manhole Monitoring System (UDMS) for IoT applications. The vital considerations of this design are low cost, low maintenance, fast deployment, and high number of sensors, long life-time and high quality of service. The proposed model provides a system of monitoring the water level and atmospheric temperature and pressure inside a manhole and to check whether a manhole lid is open. It also monitors underground installed electric power lines. In real time, UDMS can remotely monitor current states of the manholes.

IoT based wastewater spillage detection system by Rutvik Patel, Jay Prajapati, Meha Dave, Ishwariy Joshi, Jagdish M Rathod

Internet of Things (IoT) is a system of interrelated devices including computers, processors, machines, or objects capable of transferring data over a network with no object-object, object-system interactions. In India, one of the most influential problems observed is the overflowing drains in the sewage system which becomes more problematic during the monsoon seasons when the authorities are unaware of the overflowing drains. It becomes unhygienic for the nearby residents and also causes water-logging which leads to breeding of pests. Our solution to this problem is an IoT system which instantly notifies the municipal authorities about the overflowing drains via email or notification at the city control center, also the citizens will get updates via social media or a mobile application. This system mainly comprises a low-powered IoT based portable device to be attached below the manhole cover. It leverages the LoRa technology to transmit the sensor data. Also, the frame of the manhole will be using solar power to charge the device. The proposed system makes the management and monitoring of the underground drainage system easier and hence saves the lives of hundreds of manual scavengers who die each year while cleaning the drainage systems.

## 3. PROPOSED SYSTEM

The proposed system of this project is shown in Fig .

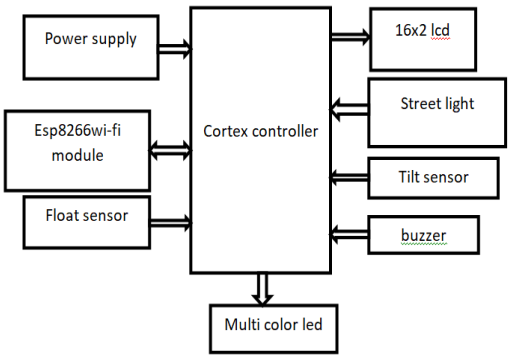


**FIG 3.1:** Block Diagram

An underground drainage monitoring system will not only help in maintaining the proper health and safety of the city but also in reducing the work of government personnel. Using Manhole detection 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 updates the live values of all the sensors in the manholes

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falling under the respective area using IoT. A message will also be displayed on the LCD.

**4.OVERVIEW OF BLOCKDIAGRAM**

Cleaner cities and intelligent management of drainage in the city. Detection of drainage water level and blockages in the drainage. Checking water flow rate continuously, as well as sending automatic mail, display on the monitor if the water level is outside of an expected normal range. The main objective is to obtain an effective low-cost and flexible solution for condition monitoring and infrastructure management in the city. Sensing the temperature and leakage of gas and updating it in real time through IoT.).

**CORTEX/STM32**

STM32F103C8T6 is a very powerful Microcontroller and with its 32-bit CPU, it can easily beat Cortex UNO in performance. As an added bonus, you can easily program this board using your Cortex IDE (although with some tweaks and additional programmer i.e. USB to U(S)ART converter).

The following image shows the front and back sides of a typical STM32 Blue Pill Board. As you can see, the layout of the board is very simple and some might even confuse it for an Cortex Nano.

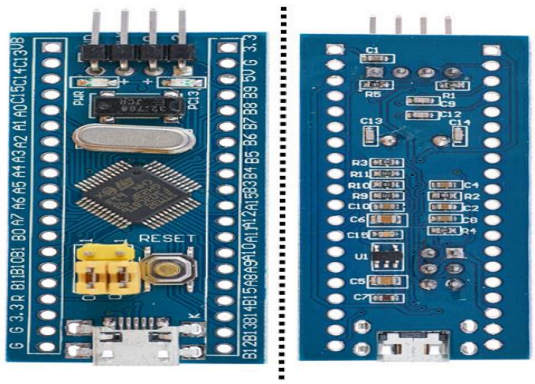


**FIG 4.1:** Cortex/Stm32 Module

An important thing about these boards is that they are very cheap, cheaper than the cloned version of Cortex UNO. I got this board for approximately $2.5 (₹180) in my local electronics store. So, it is obviously a cloned version (probably a counterfeit STM32 MCU?) and there are many cloned versions of the board available in the market.

**FLOAT SENSOR**

Level sensors detect the level of liquids and other fluids and fluidized solids, including slurries, granular materials, and powder that exhibit an upper free surface. Substances that flow become essentially horizontal in their containers (or other physical boundaries) because of gravity whereas most bulk solids pile at an angle of repose to a peak.

**TILT SENSOR**

A position sensor is a sensor that detects an object's position. A position sensor may indicate the absolute position of the object (its location) or its relative position (displacement) in terms of linear travel, rotational angle or three-dimensional space. Common types of position sensors

**FIG 4.2:** tilt sensor

**STREET LIGHTS**

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This system is mainly designed for LED based street lights with auto intensity control A photo resistor or Light Dependent Resistor or CdS (Cadmium Sulphide) Cell is a resistor whose resistance decreases with increasing incident light intensity. It can also be referred to as a photoconductor.

A photo resistor is made of a high resistance semiconductor. If light falling on the device is of high enough frequency, photons absorbed by the semiconductor give bound electrons enough energy to jump into the conduction band..

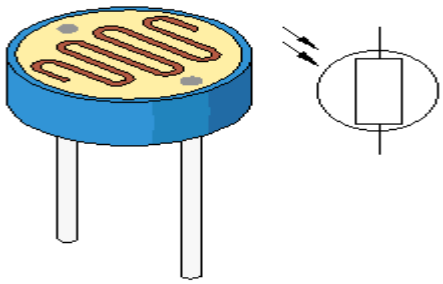

**FIG 4.3:** LDR Sensor

**LCD**

A liquid valuable stone show (LCD) is a thin, level show device made up of any number of shading or monochrome pixels showed before a light source or reflector. Each pixel involves a segment of liquid valuable stone molecules suspended between two direct anodes, and two polarizing channels, the tomahawks of furthest point of which are inverse to each other. Without the liquid valuable stones between them, light experiencing one would be impeded by the other. The liquid pearl reshapes the polarization of light entering one channel to empower it to experience the other.

## 5. RESULTS

**FIG 5.1:**Manhole Detection Implementation

## 6. CONCLUSION

Underground monitoring is challenging problem. This project proposes different methods for monitoring and managing underground drainage system. It explains various applications like underground drainage and manhole identification in real time. Various parameters like temperature, toxic gases, flow and level of water are being monitored and updated on the internet using the Internet of Things. This enables the person in-charge to take the necessary actions regarding the same. In this way the unnecessary trips on the manholes are saved and can only be conducted as and when required.

Also, real time update on the internet helps in maintaining the regularity in drainage check thus avoid the hazards

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