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DRAINAGE OVERFLOW & MANHOLE MONITORING & DETECTION USING ARDUINO & NODE MCU

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Abstract - *Certain measures have recently been taken to improve the cleanliness of the country. Many odour and sewage problems lead to poor sanitation, leading to human and life-threatening diseases. You can overcome them in innovative and effective ways. Good wastewater management is a symbol of a good city. Sewage is the main concern of today's cities. There is no safe place. Suitable for all hatches. Most of the hatches are in ruins. Damage to the sewer shaft can cause traffic accidents. These broken hatches constitute a personal safety hazard and aim to develop an effective injury prevention method by preventing the opening of sewers in big cities. The humidity and dryness sensors can be used to detect overflow. "To detect dangerous gases such as methane, gas sensors can be detected, and temperature can be detected by temperature sensors. This is good for society. It also saves the lives of medical staff. Safety for sanitary workers also involved in it.*

Keywords: *methane, temperature, sensors, sewage*

1. INTRODUCTION:

In large cities where millions of people live, drainage systems play a very important role. The drainage system is called the foundation of excess and unused water, rainwater and sewage and drought. Manual drainage monitoring is not possible. The drainage obstacles implied by the greeting will not cause flooding when manually monitoring the area. This requires a lot of dedicated people, they can only write a limited report. This drain pipe problem can cause serious problems during daily city trips. If the correct measures are taken, problems such as littering, sudden rise of water level, and various harmful gases may occur during cleaning. The current drainage system has not been computerized, so it is difficult to determine whether a blockage has occurred at a specific location. Sometimes it's also because the waste in these drains releases various gases, such as methane (CH4),Hazardous substances such as carbon monoxide (CO), if inhaled in large quantities by humans, may cause serious The problem of death caused by sewer workers[10]. In addition, we have not received any advance warning that the rise of these gases or the rise of water levels will be prevented. These are real-time examples that we can use to analyse the deficiencies of the drainage system. As of 2019, Bangalore has streets, sewers and even houses in some places without the necessary infrastructure, Bangalore's unprecedented development has brought a major problem. The city's drainage system includes main drainage, side drainage and side drainage, which are blocked in the rainy season. In order to avoid such problems, an intelligent solution is needed. The infrastructure of a smart city can be linked to transportation, military technology, transportation logistics, environment and intelligent automation of the environment[9]. Therefore, in order to advance the smart city infrastructure in this document, we propose a smart detection and monitoring system that uses various sensors to block underground drainage

1.2. EXISTING SYSTEM:

The existing drainage monitoring system is not automated [1].{4]. Therefore, when a jam occurs, it is difficult to determine the exact location of the jam. There is also no early fall warning. Therefore, it takes a long time to identify and eliminate the blockage. Became very uncomfortable. Deal with the situation where the pipeline is completely blocked. People have a big problem due to the failure of the drain pipe.

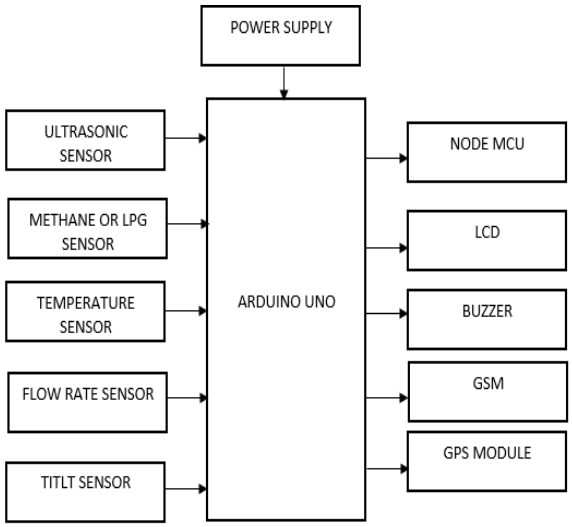
1.3. PROPOSED SYSTEM:

Since most cities in India have underground drainage systems, the normal operation of the system is very

important to keep the city clean, safe and healthy. If they do not maintain the drainage system, then clean water may be contaminated by drainage and infectious diseases may spread. Therefore, various types of work have been carried out to locate, maintain and control these underground systems. In addition, leaks and explosions are unavoidable aspects of water distribution system management and may represent a large amount of water loss in the distribution system. If the project is not discovered for a long time, it will represent the implementation and design function of using different methods to monitor and manage the underground drainage system.

In this system, we use ultrasonic sensors, gas sensors, temperature sensors, tilt sensors and flow sensors[2],[3]. All these sensors are connected to Arduino UNO. Depending on the sensor parameters, warnings or messages will be sent to authorize personnel. Used to detect waste water leakage. The gas sensor detects toxic gases leaking from underground pipelines. The sensor is used to determine whether the hatch cover is open. When any of the above sensors detects an abnormality, a message will be sent to authorize personnel indicating where the problem occurred. All these sensor values are updated on the website via the Wi-Fi module.

2. BLOCK DIAGRAM:



3. MODULE DESCRIPTION

3.1. Arduino UNO:

Arduino Uno is an open source microcontroller based on the Microchip ATmega328P microcontroller developed by the company[6],[7]. The card has digital and analog input/output (I/O) pin groups, which can be connected to various expansion cards (shield) and other circuits. The card has 14 digital I/O pins (six with PWM output function) and 6 analog I/O pins, and it can be connected with Arduino IDE (Integrated Development Environment) via a USB Type B cable Programming. Via USB cable or via power supply.The external battery is 9 volts, although it accepts voltages between 7 and 20 volts. It is similar to Arduino Nano and Leonardo. The hardware reference design has been licensed under the Creative Commons Attribution in the same way as the 2.5 license and is available on the Arduino website. Production files can also be used for some hardware versions.

Fig:1 Hardware component Aurdino uno

3.2. Temperature Sensor

The thermistor is a thermistor whose main function is to show a large, predictable and accurate resistance change with changes in body temperature. The coefficient thermistor (PTC) shows that the resistance increases with increasing body temperature.

Fig: 2 LM35 Temperature sensor

3.3.Methane gas Sensor

The methane sensor records the methane concentration in the air and outputs it as an analog voltage. The concentration range of 300 to 10,000 ppm is suitable for leak detection. For example, the sensor can detect whether someone has turned on the gas stove, but did not turn on the gas stove. The sensor can work in a temperature range of -10 to 50°C and consumes less than 150 mA at 5 V.

Fig:3 Gas Sensor

3.4. Buzzer

A piezoelectric buzzer is a simple device that can generate basic tones and beep sounds. They work with piezoelectric crystals, which are special materials that change shape when voltage is applied to them. When the glass is pressed against the membrane like a small speaker cone, a pressure wave is generated. When the human ear perceives noise, it only needs to change the frequency of the voltage applied to the piezoelectric, and it will quickly produce noise with a changing shape

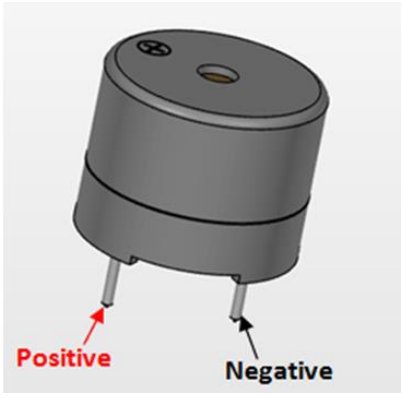


Fig4: Buzzer

3.5. GSM Module

Digital cellular technologies such as GSM (Global System for Mobile Communications) are used to transmit mobile data and voice services. In 1970, Bell Labs realized this concept through a mobile radio system. As the name suggests, this is the name of a standardization organization that was established in 1982 to create a common European standard for mobile phones. This technology occupies more than 70% of the global cellular digital user market. The technology was developed using digital technology. Today, GSM technology supports 1 billion mobile phone users in the above 210 countries/regions. This technology can provide simple to complex voice and data services. This article provides an overview of GSM technology.

Fig:5 GSM Module

3.6. Ultrasonic sensor:

An ultrasonic sensor is an electronic device that measures the distance to a target by emitting ultrasonic waves and converting the reflected wave from the target. The ultrasonic sensor provide electrical signals. The propagation speed of ultrasonic waves is faster than the propagation speed of sound. In order to calculate the distance between the sensor and the object, the sensor measures the time that elapses between the sound of the transmitter and its contact with the receiver. The calculation formula is: Distance (D) =½Time (t) x Velocity (C).

Fig: 6 Ultrasonic sensor

3.7. GPS MODULE:

GPS is the abbreviation of "Global Positioning System", which is a satellite navigation system about 20,000 kilometres location and time information. It can work 24 hours a day under all conditions. Minus 24 satellites with the development of technology, more than 33 satellites work together in the GPS system.

Fig:7 GPS Module

3.8. Flow Sensor

Water flow sensor consists of a plastic valve from which water can pass. A water rotor along with a Hall Effect sensor is present the sense and measure the water flow. When water flows through the valve it rotates the rotor. By this, the change can be observed in the speed of the motor. This change is calculated as output as a pulse signal by the Hall Effect sensor. Thus, the rate of flow of water can be measured.

Fig: 8 flow sensor

3.9. MEMS Sensor

MEMS are low-cost, and high accuracy inertial sensors and these are used to serve an extensive range of industrial applications. This sensor uses a chip-based technology namely micro-electro-mechanical-system[5]. These sensors are used to detect as well as measure the external stimulus like pressure, after that it responds to the pressure which is measured pressure with the help of some mechanical actions. The best examples of this mainly include revolving of a motor for compensating the pressure change. Whenever the tilt is applied to the MEMS sensor, then a balanced mass makes a difference within the electric potential. This can be measured like a change within capacitance. Then that signal can be changed to create a stable output signal in digital, 4-20mA or VDC.

Fig: 9 MEMS Sensor

4. RESULTS

WORKING CONDITION OF KIT:

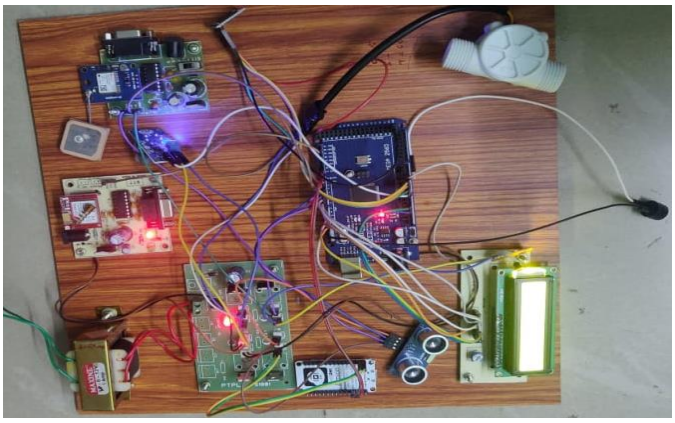


Fig: 10 Working Module

RESULT FROM CLOUD DATA:

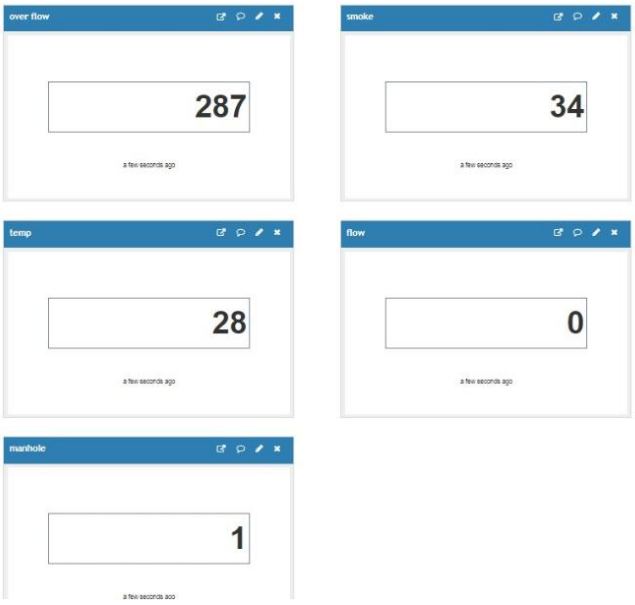


Fig: 11 Cloud Data

Fig :12 GSM output from GPS

5. CONCLUSION

Monitoring underground drainage is a challenge. This project proposes various methods for monitoring and managing underground drainage systems. Explain various uses, such as underground drainage and real-time identification of hatches. . Through this project, we can reduce the labour and time required to check the blockage of sewers and underground drainage pipes, and avoid hazards. Use your smartphone to access the website, or if you can't check your email regularly, we can send notifications via SMS notifications with the location where problem occurs.

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