

Underground Drainage Monitoring System Using IOT

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ABSTRACT: India has affirmed a project of making 100 smart cities. For construction a smart city one needs to consider various parameters such as smart water, smart electricity, and smart transportation and so on. Also will be a need of smart underground infrastructure which includes underground water pipelines, communication cables, gas pipelines, electric flow, and so on. As most of the cities in India have accepted underground drainage system, it is very important that this system must work in a proper manner to keep the city clean, safe and healthy. But they fail to maintain the drainage system the pure water may get unhygienic with drainage water and can spread infectious diseases. So diverse kind of work has been Done to detect, maintain and manage these underground systems. At the same, leaks and bursts are unavoidable aspects of water distribution system management and can account for significant water loss within a distribution network if absent undetected for long period. Drainage system plays a very important role in big cities where millions of people breathe. Drainage system is identified as the base for land dryness from the excess and unused water. Rain water and waste water Drainage conditions must be monitored in order to maintain its proper function. In detail not all areas have drainage monitoring team. It guide to irregular monitoring of the drainage condition. The irregular monitoring has contribution on the blocking of the drainage that involve to the salutation which trigger flooding in the neighborhood. Drainage system monitoring plays an important role to keep city clean. In truth, not all areas have drainage monitoring team. It leads to uneven monitoring of the drainage condition. The irregular monitoring leads to the blocking of the drainage that imply to the shrug which trigger flood.

I. INTRODUCTION

Underground drainage system is an important part of urban infrastructure. It is considered to be city's lifeline. The largest part management on underground drainage is manual therefore it is not competent to have clean and working underground system also in such big cities, it is complicated for the government personnel to locate the accurate manhole which is facing the problem. Thus, it is essential to develop a system which can handle underground drainage without human intrusion. Underground Drainage engages sewerage system, gas pipeline network, water pipeline, and manholes. This project tells a variety of functions used for maintenance and monitoring of underground drainage system. It provides a system which is competent to monitor the water level, atmospheric temperature, water flow and toxic gasses. If drainage system catch blocked and water overflows it can be identified by the sensor system. And that sensor sends information by the transmitter which is situated in that area to the corresponding managing station.

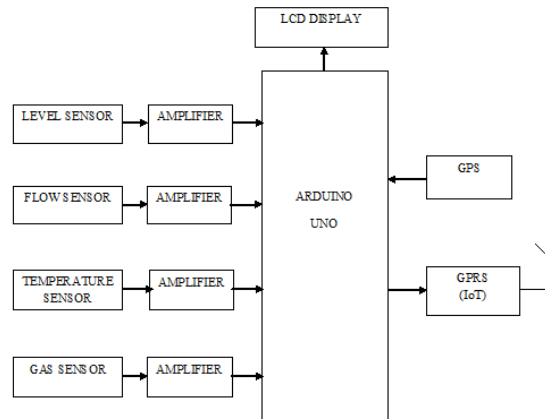


Fig 1: Proposed block diagram

ARDUINO:

Arduino is an open source, PC kit and programming organization, undertaking, and client set that plans and produce microcontroller groups for constructing programmed devices and intelligent object that can be able to detect and control questions in the actual world. The inception of the Arduino extend initiated at the Interaction Design Institute in Ivrea, Italy. The apparatus reference plans are appropriated under a Creative Commons Attribution Share.



Fig 2: Arduino

FLOW SENSOR:

Water flow sensor consists of a plastic tap body, a water rotor, and a hall-effect sensor. While water flows through the rotor, rotor rolls. Its speed changes with a diverse rate of flow. The hall-effect sensor outputs the analog pulse signal. This one is suitable to detect flow in water distributor or coffee machine.



Fig 3: Flow sensor

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Features:

- Compact, Easy to Install
- High Sealing Performance
- High Quality Hall Effect Sensor
- RoHS Compliant

GAS SENSORS

Electrochemical gas sensors are gas detectors that change the concentration of a end gas by oxidizing or reducing the target gas at an electrode and measuring the follow-on current.



Fig 4: Gas sensor

II. LEVEL SENSOR

Level sensors sense the strength of liquids and extra fluids and fluidized solids, with the slurries, granular materials, and powder that reveal an upper free surface. Will that flow turn out to essentially horizontal in their containers (or other physical boundaries) as of gravity whereas most bulk solids pile at an angle of repose to a max elsewhere.

LM35 (TEMPERATURE SENSOR)

The LM35 series are a exactness integrated-circuit temperature sensor, whose output voltage be linearly proportional to the Celsius (Centigrade) temperature. The LM35 therefore advantage more linear temperature sensors calibrated in ° Kelvin, as the user is not vital to subtract a large constant voltage from its output to obtain expedient Centigrade-scaling.

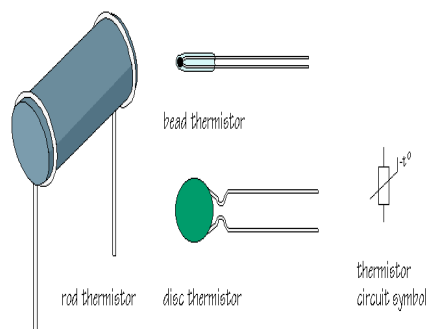


Fig5: Temperature Sensor

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LCD (LIQUID CRYSTAL DISPLAY)

LCD stands for Liquid Crystal Display. LCD is decision wide spread use replacing LEDs (seven segment LEDs or other multi segment LEDs) as the following reasons:

1. The waning prices of LCDs.
2. The capacity to display numbers, characters and graphics.

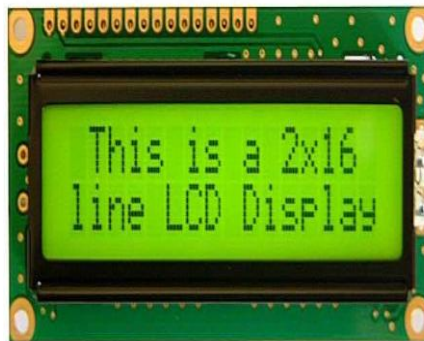


Fig 6: Liquid Crystal Display

GPS THE GLOBAL POSITIONING SYSTEM

(GPS) is a map-reading system that provides location and time information in all weather conditions, everywhere or near the Earth where there is an passable line of sight to four or more GPS satellites. The system provides vital capabilities to military, civil, and commercial users around the world. The United States government formed the system, maintains it, and makes it freely accessible to anyone with a GPS receiver.

ARDUINO SOFTWARE (IDE)

Arduino Integrated Development Environment - or Arduino Software (IDE) - included a text editor for writing code, a message area, a text console, a toolbar with buttons for general functions and a series of menu. It fix to the Arduino hardware to upload programs and communicate with them.

INTERNET OF THINGS (IOT):

The Internet of things (IoT) is the network of substantial devices, vehicles, home appliances, and other items embedded with electronics, software, sensors, actuators, and connectivity which facilitates things to connect, collect and exchange data.

IoT understand extending Internet connectivity beyond standard devices, such as desktops, laptops, smart phones and tablets, to any range of usually *dumb* or non-internet-enabled substantial devices and everyday objects. With the Embedded technology, these devices can communicate and interact over the Internet, and they can be remotely monitored and controlled. Among the arrival of driverless vehicles, a branch of IoT, i.e. the Internet of Vehicle starts to gain more awareness.

III. RESULT AND DISCUSSIONS

Arduino Based gas Monitoring and Automatic Cylinder booking with noticed the System gas sensor, 10 kg stack cell as info gadgets and relay, 16x2 LCD show and GSM Terminal utilized as succumb gadgets.

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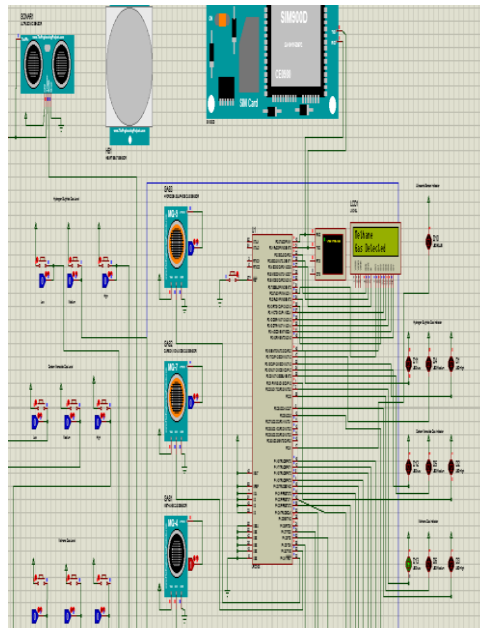


Fig7: output diagram

IV. CONCLUSION

Underground monitoring is a challenging problem. This project proposes dissimilar methods for monitoring and managing an underground drainage system. It clarifies the various applications like underground drainage and manhole identification in real time. A variety of 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 to the manholes are saved and can only be conducted as and when required. Furthermore, real time update on the internet helps in maintaining the regularity in drainage check thus avoiding the hazards.

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