

## UNDERGROUND DRAINAGE MONITORING SYSTEM

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### ABSTRACT:-

*In this project underground drainage monitoring system is implemented. In this overflow sensor is detected then SMS will be sent to the corresponding phone number. Next when gas sensor is detected then automatically SMS will be sent and buzzer will give indication. The information is displayed on the LCD. Hence this project gives effective outcomes.*

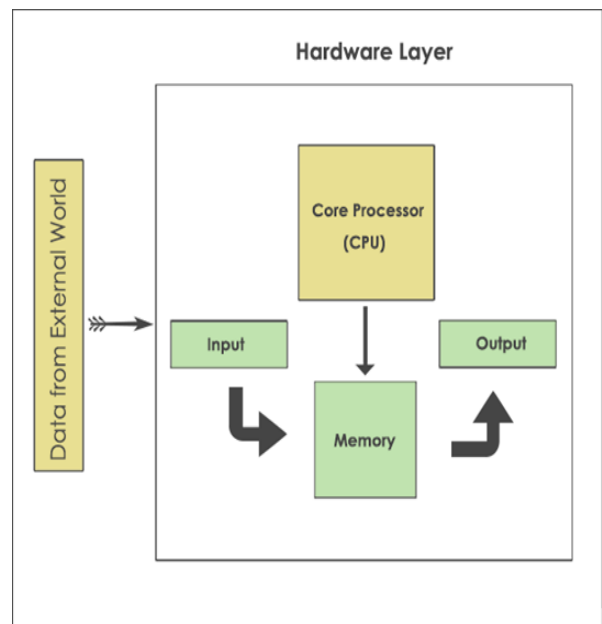
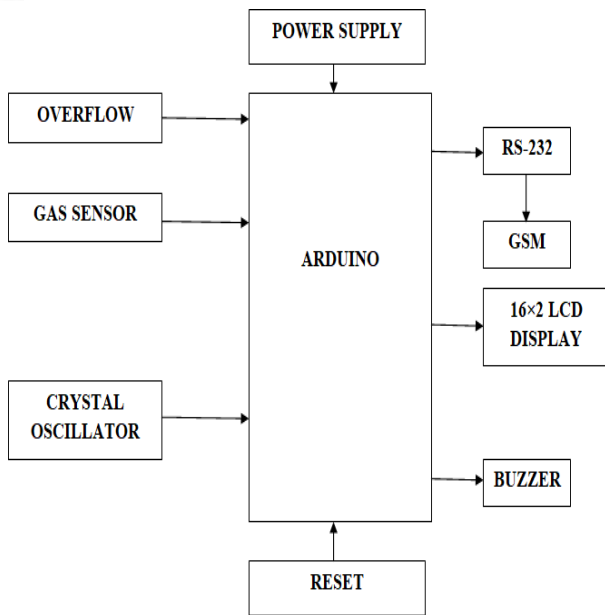
**Keywords:-** Arduino, GSM, LCD Display, Buzzer, RS232, Overflow sensor, Gassensor, Crystal oscillator, Reset.

### INTRODUCTION:-

The underground drainage system monitoring plays a very important role in making the cities clean. In India, the process of monitoring and maintaining the drainage system is done manually. The drainage consists of solid and liquid waste generated by hospitals, industries, factories and from homes. Hazardous gases are released from this waste which affects the human health. Exposure of sewage workers to poisonous gases increases the chances of sewage workers affected by diseases like paratyphoid fever, hepatitis and even death. Manual monitoring & cleaning the drainage is necessary but it leads to huge accidental deaths of human due to over gas in manholes. According to the recent survey at least one worker had died while cleaning sewage tank

for every five days since the beginning of 2017. The death of sewage workers has been increasing day by day. The underground drainage system is an important component of urban infrastructure. It is considered to be city's lifeline. Most management on underground drainage is manual therefore it is not efficient to have clean and working underground system also in such big cities, it is difficult for the government personnel to locate the exact manhole which is facing the problem. Therefore, it is essential to develop a system which can handle underground drainage without human intervention. Underground Drainage involves sewerage system, gas pipeline network, water pipeline, and manholes. This project describes various functions used for maintenance and monitoring of underground and road-sided drainage system. It provides a system which is able to monitor the water level, atmospheric temperature, water flow and toxic gasses. If drainage system gets blocked and water overflows it can be identified by the sensor system. And machine starts moving in the forward direction and clean all the blocking drainage.

### PROPOSED SYSTEM:-



**Fig 2.1: BLOCK DIAGRAM OF EMBEDDED SYSTEM**

- The above figure shows the block diagram of proposed system.

- In this initially overflow sensor detects then SMS will be send to the corresponding phone number.

- Next when gas sensor detects then automatically SMS will be send and buzzer willgive indication.

- The information is displayed on the LCD.

**EMBEDDED HARDWARE:**

The core of any embedded target is the electronic hardware – which resides on a Printed Circuit Board. The embedded development board is divided into five modules. They are Processor, Memory, Input devices, Output devices and Bus controllers.

**AURDINO:**

The Arduino Uno is a microcontroller board based on the ATmega328. It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz ceramic resonator, a USB connection, a power jack, an ICSP header, and a reset button. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with a AC-to-DC adapter or batteryto get started



Arduino Uno R3 Front

Arduino Uno R3 Back

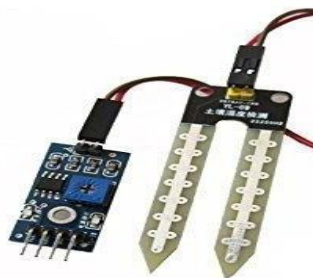
**GAS SENSOR:**

Gas sensor can be used to detect the presence of LPG, Propane and Hydrogen, also could be used to detect Methane and other combustion steam.

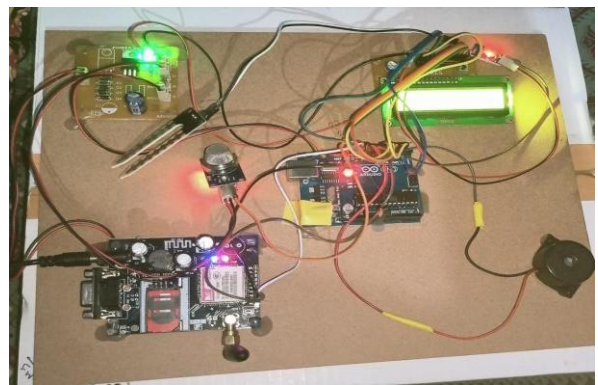


**OVERFLOW SENSOR:**

It is an electronic device that is designed to detect the presence of water to provide an alert to the prevention of water leakage.



**IMPLEMENTATION:**



**RESULT:**

The Arduino Uno used in the system is interfaced with various sensors such as a gas sensor and an overflow sensor successfully. The interfacing of GSM is yet to be studied and implemented. The entire circuit is yet to be designed and implemented on the printed circuit board as per its specifications and the prototype for the underground is yet to be designed.

**CONCLUSION :-**

Exposure of sewage workers to poisonous gases like hydrogen sulphide, sulphur dioxide, carbon monoxide, methane, ammonia, nitrogen oxide increases the death of the sewage workers. Hence in this project an underground drainage monitoring system was implemented. In the future we can extend this project by using a Raspberry Pi.

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