IoT BASED MANHOLE COVER DETECTION AND BLOCKAGE MONITORING SYSTEM

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Abstract : The implementation and design function of an underground drainage and manhole monitoring system (UDMS) for IoT applications. This article includes a gas 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 as well as on the IOT website. Also, all the parameters are continuously updated on the website.

1. INTRODUCTION

An integral part of any drainage system is the access points into it when it comes to cleaning, clearing, and inspection. Metropolitan cities have adopted underground drainage system and the city's municipal corporation must maintain its cleanliness. When there is a blockage in a particular node, there is variation in the flow of drainage water which when cross the set value will display the alert in the managing station. Also other demerits are solved by detecting temperature variations inside the manhole and alerting the same to the managing station.

IoT Based Manhole Detection and Blockage Monitoring System

It is noteworthy that monitoring systems based on IoT cloud which is used for Smart city applications are called nowadays "IoT device". The IoT device for monitoring MC normally needs to be placed beneath the MC to prevent any harm to pedestrians or the traffic and is connected to the base station then to the cloud. Information is then transferred to the organisation that is concerned about the manhole cover and the utilities junder it. The IoT based automated MC monitoring system is composed mainly of Sensors, Data Acquisition system

(DAQ), Control Unit (CU), Communication unit, and Power unit. Based on the study done by the researcher, power consumption is one of the main challenges for designing the IoT based automated MC monitoring system. An analogue to digital converter (ADC) found in the DAQ unit is the circuit with the highest power consumption which needs to be redesigned to reduce the amount of power consumed take their medicine, which they are supposed to take one or more times each day. The majority of drugs need to be taken consistently or at certain times of the day. Patients in this region sometimes forget to take it, which makes the anticipated cure challenging. Patients who are old, have cognitive disability, lack the information or skills necessary to follow the While most of the designs of IoT devices is based on digital circuit design techniques because it is robust to noise and easy to program, analogue circuit design can be considered as another route to overcome the same challenges with significant results especially for power consumption and security.

2. HARDWARE REQUIREMENTS

The following is a list of the materials utilised to carry out the project:

· Raspberry Pi 4

· Ultrasonic Sensor

· IR Sensor

· MQ-2 Gas sensor

· GPS

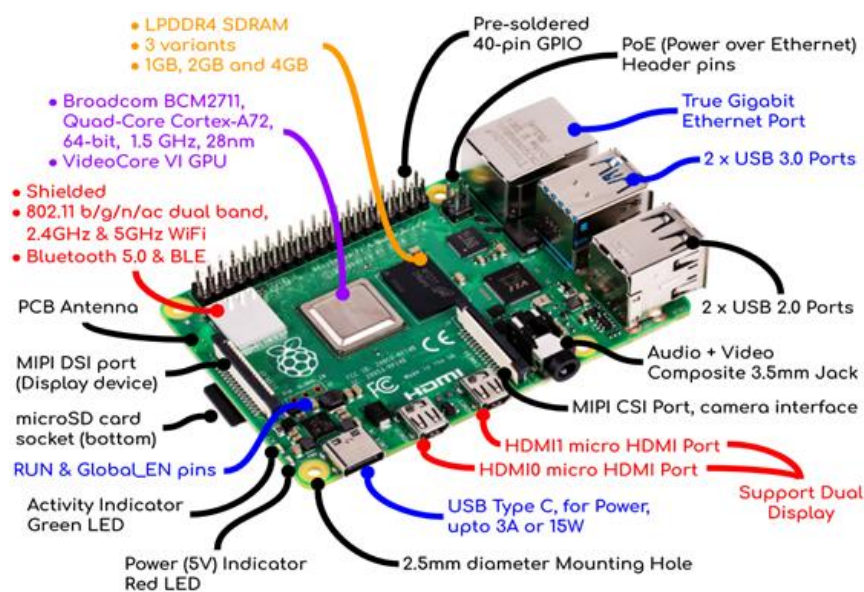· 16*2 LCD Display

· Buzzer

Fig 2.1 Footprint of Raspberry Pi 4

The Raspberry Pi 4's front appearance is shown in Figure 4.1, along with a list of every component on the board. We go into further information about the RPi 4 specs in Table 4.1 below.
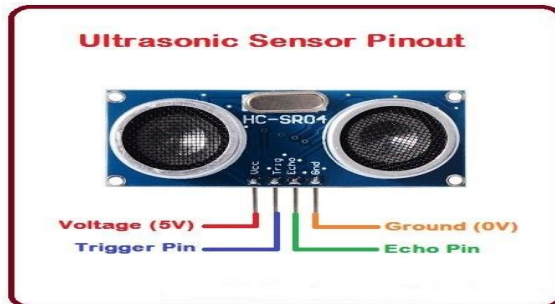

Fig 2.2 Ultrasonic Sensor

2.3 LIQUID CRISTAL DISPLAY

A colour or black-and-white arrangement of pixels known as a liquid crystal display (LCD) is a small, flat display device that is placed in front of a light source or reflector.

Fig 2.3 LCD Display

2.4 IR SENSOR:

These sensor modules have the ability to make an effort at heart rate detection. An IR emitting LED is shone on one side of the fingerprint to do this, and a phototransistor is used to detect slight variations in the IR received on the opposite side of the finger.

2.5. BUZZER

A mechanical, electromechanical, or piezoelectric auditory signaling device is a buzzer or beeper (piezo for short). As timers, alarm clocks, teaching aids, and to signal human engagement like a mouse click or key press, buzzers and beepers are often employed.

Fig 2.5 Buzzer

3. PROJECT DESIGN

This chapter describes the project's design, which includes the project's primary block diagram of the system, circuit diagram, and design process flow.
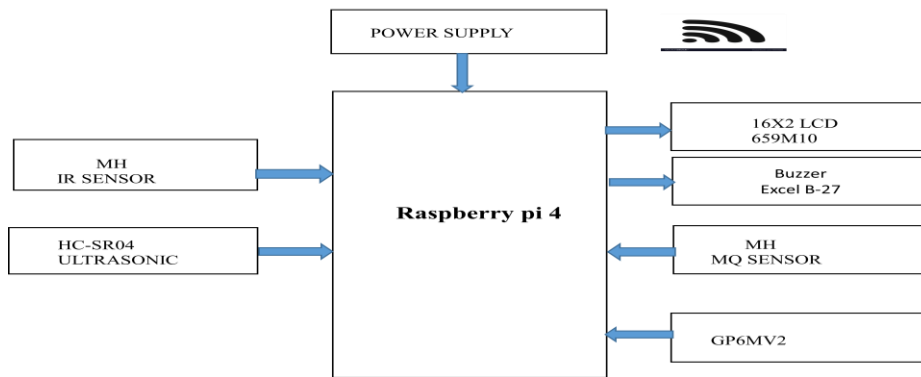
3.1 BLOCK DIAGRAM

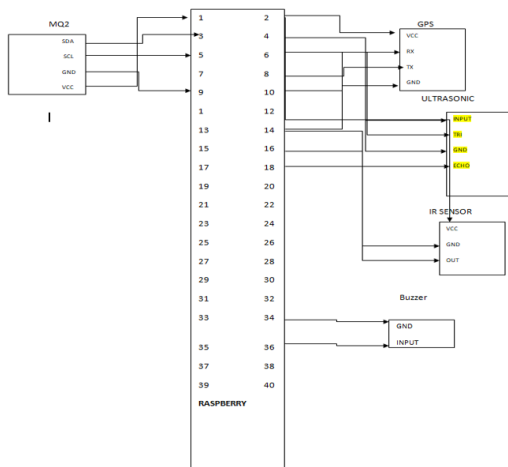**Fig 3.1 Block Diagram of the System**
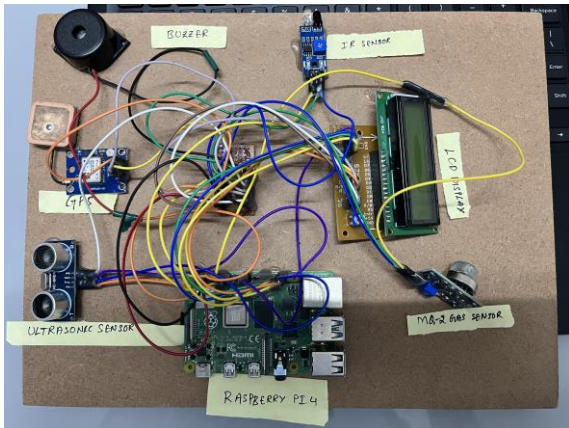
3.2 CIRCUIT DIAGRAM

Fig 3.2 Circuit Diagram

4.RESULTS

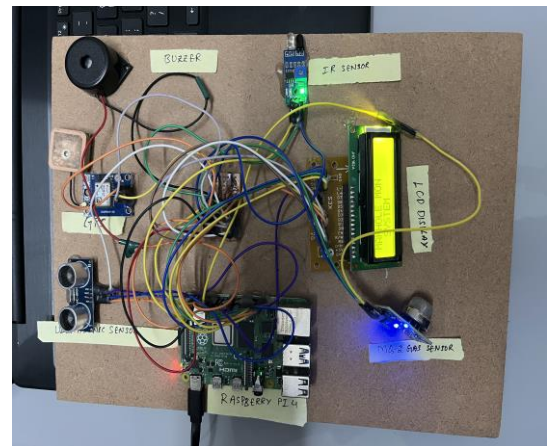**Fig 4.1 Hardware kit without power supply**

Fig 4.2 Hardware kit with power supply

App view in Mobile phone

Fig   shows the App view in Mobile phone is as follows
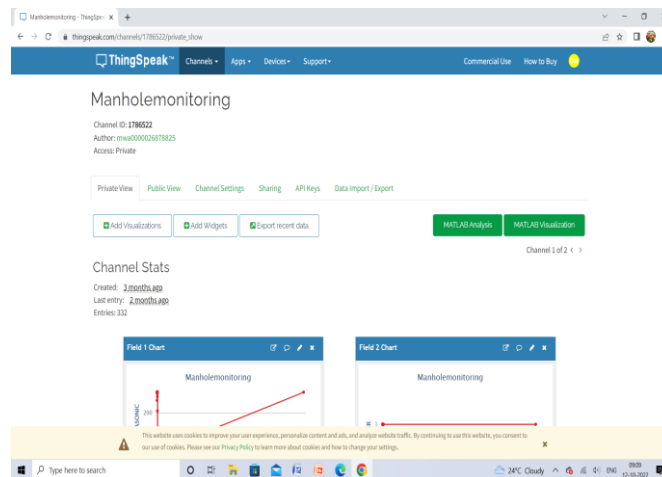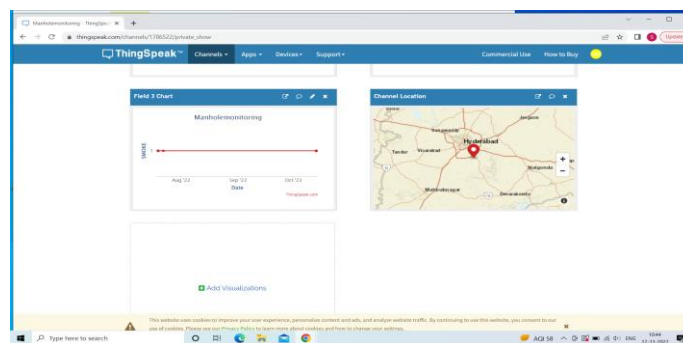

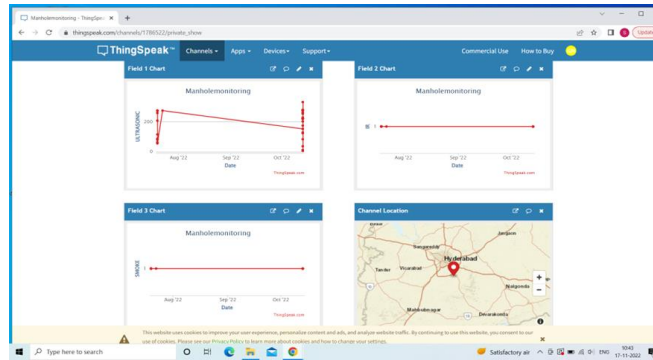
Fig 4.3 App view in mobile phone

Fig 4.4 App view and location in mobile phone

5. CONCLUSION

Therefore, 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.

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[5].M Aarthi, A Bhuvaneshwaran. Iot Based Drainage and Waste Management Monitoring and Alert System for Smart City- Annals of the Romanian Society. The main objective of this paper is to is check the drainage status on the regular basis.