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Underground Drainage Monitoring System

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Abstract— **The additional volume of waste water entering the pipes, can cause backups which can lead to the sewer system to overflow. The Monitoring of urban underground infrastructure, it is important to control the current flow from the external water is in the pipe line. By wireless to connect underground communication, and sensor solutions, you can follow the development of the urban underground IoT applications, such as for the monitoring of wastewater and storm water overflow in real-time with the help of Flow sensors with respect to Arduino. This project presents an analysis of the loss of a wireless underground utility services in the urban underground IoT for waste water monitoring and control. It is shown that the communication range is4 km away and can be reached from an underground channel of communication by means of a 10 cmthick layer of asphalt. The urban waste water and is responsible for the collection and the treatment of wastewater in the waste water treatment plants, treatment of the many millions of liters of water per day. Cities and towns in the need for the monitoring of the quantity and quality of wastewater discharged into the system the collection and the achievement of these structures. The volume of water in the pipes and could cause back-ups, which in turn can lead to sewer overflows.**

I. Introduction

The underground drainage system is an important component of the urban infrastructure. It is considered to be the lifeline from the city centre. The majority of the executive board, through the tunnel, the drainage is in the manual, so it is not very efficient in order to have a clean and smooth surface and underground system in the large cities, with the government's people find it hard to get the exact manhole, that is the problem. Most of the cities and towns which have adopted an underground sewer system, and it is the responsibility of the station manager, and the carrier-to-maintain the location of the towns and cities. If the drain is used improperly, water will pollute the water and infectious disease and can spread it. The Drainage is blocked during the rainy season this will lead to problems in everyday life, for example, the traffic may be blocked, and the environment will be polluted, and this is totally going wrong in the society. If the object is in the city of The company's management station that the government officials will learn about it immediately after the drain is blocked, in the field, and in what position it is locked. Therefore, it is necessary to develop a system that you can support the underground drainage, the 3-without the need of human intervention.

II. METHODOLOGY

The main goal of this project is to develop and design Touchscreen and voice control based Robotic Vehicle which can be control 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. Various types of sensors (flow, level, temperature and gas

sensors) 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.

III. LITERATURE REVIEW

[1]Monitoring Smart City Applications using Raspberry PI Based on IOT

Authors: Prof. S.A.Shaikh 1, Suvarna A. Sonawane.

Description: The Smart city is the development goal to improve good management and faster development of the city. Latest facility to implement the concept of smart city use IOT concept by which easy wireless communication is possible The system consists of sensors, collect different types of data from sensors and transfer to the Raspberry Pi3 controller. The acquired output from the controller is sent to the control room through the E- mail and also display on the personal computer.

[2] Automated IOT for Underground Drainage and Manhole Monitoring System for Metropolitan Cities. Author: Muragesh S. K1 and Santhosha Rao

Description: The IoT consists of reallife 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. Sensor Network is a key enabler for IoT paradigm. It represents the implementation and design function of an UDMS for IoT applications. The proposed model provides a system for monitoring the water level and atmospheric temperature and pressure inside a manhole and to check whether a manhole lid is open.

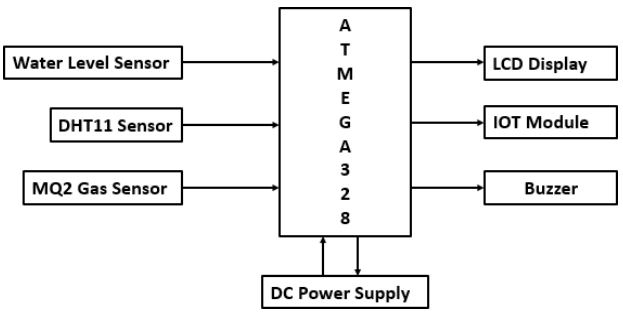
[3] The design space of wireless sensor networks, Wireless Communications
Author: Romer, K. Mattern,

Description: In the recent past, wireless sensor networks have found their way into a wide variety of applications and systems with vastly varying requirements and characteristics. This is particularly problematic in a multidisciplinary research area such as wireless sensor networks, where close collaboration between users, application domain experts, hardware designers, and software developers is needed to implement efficient systems. In this paper we discuss the consequences of this fact with regard to the design space of wireless sensor networks by considering its various dimensions.We justify our view by demonstrating that specific existing applications occupy different points in the design space.

[4] Towards the Implementation of IoT for EnvironmentalCondition Monitoring in Homes
Author: Kelly S.D.T, Suryadevara, N.K, MukhopadhyayS.C

Description: In this paper, we have reported an effective implementation for Internet of Things used for monitoring regular domestic conditions by means of low- cost ubiquitous sensing system. The description about the integrated network architecture and the interconnecting mechanisms for reliable measurement of parameters by smart sensors and transmission of data via internet is being presented. The longitudinal learning system was able to provide self-control mechanism for better operations of the devices in monitoring stage. The framework of the monitoring system is based on combination of pervasive distributed sensing units, information system for data aggregation, reasoning and context awareness. Results are encouraging as the reliability of sensing information transmission through the proposed integrated network architecture is 97%. The prototype was tested to generate real-time graphical information rather than a test bed scenario.

IV. BLOACK DIAGRAM



A. Explanation of Block Diagram :

The system consists of AVR Microcontroller is heart of the project, water level sensor, DHT11 sensor, gas detection sensor, LCD display, IOT, Buzzer or alert unit,DC power supply.
Various types of sensors are interfaced with AVR microcontroller in order to make the system smart.

The particular value is fixed as a threshold value to these sensors. The threshold value is decided based on the behavior of the sensor. The value sensed by the sensor is checked against the threshold value.
If the sensor readings exceed the threshold value, the alert message are sent to the concerned authorities through IOT. Then buzzer is actuated when the readings exceed the threshold value.
Also this model identifies the poisonous gas in the manhole that effect the Manhole Cleaner, if there is any poisonous gas the system gives message to the cleaner to take safety measure before cleaning and provides permission of cleaning to the cleaner. So that it saves the life of the Manhole cleaner.

V. COMPONENT SPECIFICATION

A. Microcontroller (ATMEGA 328):

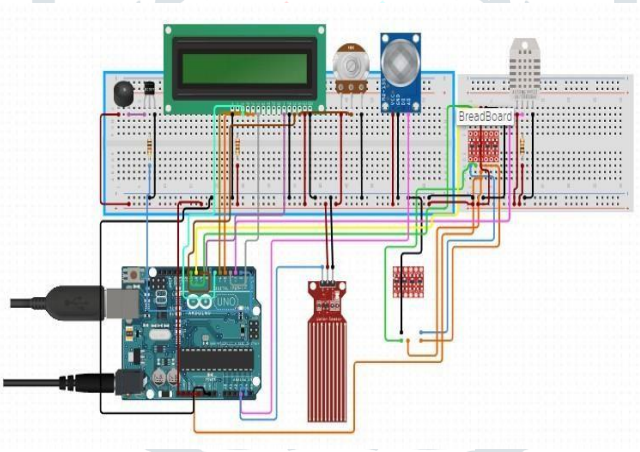
It is an eight (8) bit micro-controller. It can handle the data sized of up to eight (8) bits. It is an AVR based micro-controller. It builts in internal memory is around 32KB. It operates ranging from 3.3V to 5V. It has an ability to store the data even when the electrical supply isremoved from its biasing terminals.

B. Water level Sensor:

It's a device that measures the high or low level of a liquid in a fixed vessel. According to the method of liquid level measurement, there are two types of contact and non-contact. What we call input water level transmitter is a contact measurement, which converts the height of liquid level into electrical signal output. It is a widely used water level transmitter at present .

C. MQ2 Sensor:

MQ2 gas sensor is an electronic sensor used for sensing the concentration of gases in the air such as LPG, propane, methane, hydrogen, alcohol, smoke and carbon monoxide. MQ2 gas sensor is also known as chemi resistor. It contains a sensing material whose resistance changes when it comes in contact with the gas. This change in the value of resistance is used for the detection of gas



VII. RESULT

D. DHT11 Sensor:

DHT11 sensor consists of a capacitive humidity sensing element and a thermistor for sensing temperature. The humidity sensing capacitor has two electrodes with a moisture holding substrate as a dielectric between them. Change in the capacitance value occurs with the change in humidity levels. The IC measure, process this changed resistance values and change them into digital form.

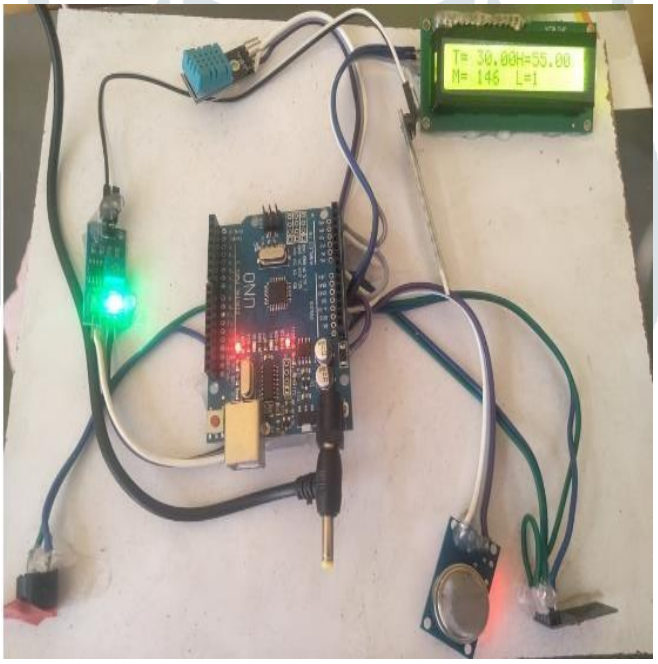
E.LCD Display:

LCD stands for liquid crystal display. It is one kind of electronic display module used in an extensive range of applications like various circuits & devices like mobile phones, calculators, computers, TV sets, etc. These displays are mainly preferred for multi-segment light- emitting diodes and seven segments. The main benefits of using this module are inexpensive; simply programmable, animations, and there are no limitations for displaying custom characters, special and even animations, etc.

F.Buzzer:

An audio signalling device like a beeper or buzzer may be electromechanical or piezoelectric or mechanical typ
e. The main function of this is to convert the signal from audio to sound. Generally, it is powered through DC voltage and used in timers, alarm devices, printers, alarms, computers, etc. Based on the various designs, it can generate different sounds like alarm, music, bell & siren.

VI. SOFTWARE DESIGN



Circuit Diagram:

The microcontroller used in the system is Arduino ATmega 328 to which various sensors such as gas sensor, water level sensor .The level sensor detect the level of the drainage.the gas sensor detect the toxic gases concentratic such as carbon monoxide and methane. If the sensor exceeds it's threshold value then a text the notification is send to the respective municipal authorities through GSM

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