



SEWAGE MONITORING SYSTEM

¹Mr.M.Ranjith Kumar,² Mr.G.Vivek , ³Dr.P.Ajay Kumar Reddy

¹Assistant Professor,² Assistant Professor,³Associate professor

¹Department of Electronics and Communication Engineering,

¹Kuppam Engineering College, Kuppam, India

Abstract : As most of the cities in India have adopted underground sewage system, it is very important that this system should work in a proper manner to keep the city clean, safe and healthy. One of the major unnoticed problems in the urban areas of our country is improper maintenance of the sewage system. Sewage conditions should be monitored in order to maintain its proper function.

For example, drain overflow causes traffic problems, stagnation of drain water leads to bad Odor, growth of insects, unwanted bacterial growth that leads to spread of disease, humans falling into the open and submerged manholes. Infact ,not all areas have sewage monitoring team.

This project provides a solution for the above problems. This system is designed using wireless sensor network to monitor the sewage conditions in a particular area like if the lid of manhole is open or if the drain gets full and also the air quality inside the drain, an alert is sent to the corresponding department about the same.

This module uses department. Thus, by proper monitoring, life can be saved from danger. The sewage conditions are intimated to corporation in prior to manage the waste and to maintain a clean society. This project represents the implementation and design functions for monitoring and managing underground sewage system with different approaches.

IndexTerms - ARDUINO UNO, PROXIMITY SENSOR, FLOAT SENSOR, GSM MODULE.

I. INTRODUCTION

One of the hidden problems that may have a significant impact on our home and our health is the problem of drain blockage. Small objects, random debris, grease and other stuff can slowly and gradually accumulate inside the pipes, obstructing the flow of water. If blocked drains are not cleaned and treated immediately, the stagnant water can lead to a number of complications that will affect our property. Stagnant water That has accumulated for a long time will emit a musty odor. This bad smell can go up to the surface and permeate the house with an unpleasant, unhealthy atmosphere. Mean while, the water foundations of the house, which may weaken its structural integrity.

The moisture may come up the floor boards or walls, leading to water stains, discoloration or warping. Left too long, the area may even become one to flooding. Moreover, stagnant water attracts mosquitoes, pests and other insects that may carry germs and diseases. It will also make the area prone to bacteria, mold and mildew. Similarly, garbage overflow will also cause a same problem of attracting insects, producing bad odor, making an unhealthy environment etc

During rainy season, water will be logging on the roads especially in the slum areas. The lid of the drainage will not be visible to those walking on it. If the lid is open, then it will cause a serious problem. An overflow on the ground during rainy season is a serious but unattended problem.

This may cause death if people near that area fail to notice it. So, our project explains about detecting the above-mentioned problems and intimating it to the concerned departments for taking necessary actions.

II. EXISTING SYSTEM

In the existing system ,sensors are not yet employed in monitoring the sewage system, monitoring garbage full and also, if an overhead line falls down in rain water, only if some person notice it and inform to others in the nearby area orally.

In our system it is giving a possibility of power shock while raining. If Wires are disconnected ,automatic power off system not available

III. PROPOSED SYSTEM

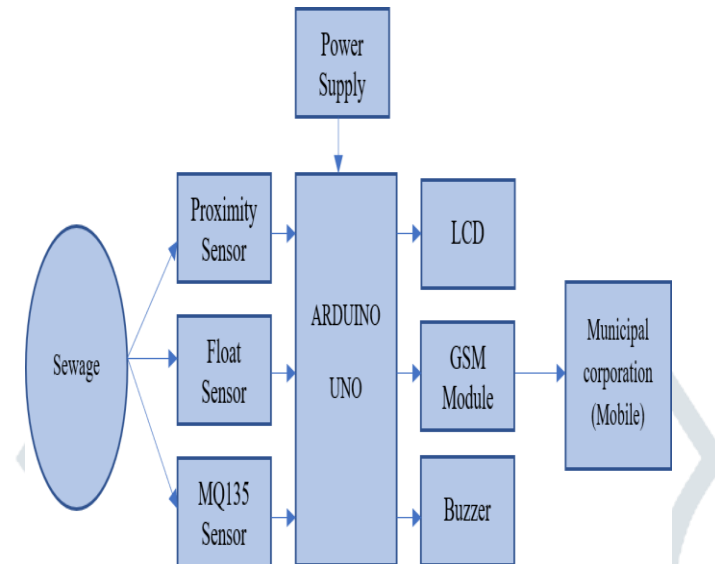
In this proposed system, a module is set up near the sewage system with float sensor for monitoring these wage water level and proximity sensor for monitoring whether the sewage lid is open or closed. If either the lid is open or the water level is full and the sewage is over flowing, then the microcontroller sends an alert signal to the GSM module and sends SMS alert to the concerned

department. Also, to alert people about the sewage condition to prevent death due to falling into open sewage, a buzzer alert is given in the sewage module. Also, the sewage module consists of a gas sensor.

This sensor senses the toxic gases like methane, ammonia, carbon dioxide, carbon monoxide etc., these gases present in the under the sewage, then the controller sends an alert signal to the GSM module and sends SMS alert to the concerned department.

Also, buzzer alert is given in the sewage module regarding the toxic gases. Float sensor monitor the over flow of sewage water. The sewage full is monitored by float sensor and intimated to corporation through message.

IV. BLOCK DIAGRAM



Fig(1): Block Diagram of Sewage Monitoring System

The block diagram represents the overall interactive detection of drainage overflow. The block contains power supply section consists of transformer, rectifier, filter and regulator circuit. An Arduino (UNO) microcontroller is used for the functionality of the sensors to maintain the proper working and sends the message of sensor outputs through GSM module.

A float sensor is used to detect the drainage water flow conditions. Whenever the drainage overflows the GSM sends the message to corresponding departments to do necessary actions regarding. Likewise, proximity sensor is used to detect drainage lid is in closed condition or open, if open then information is sent through GSM to particular department

V. CIRCUIT DIAGRAM

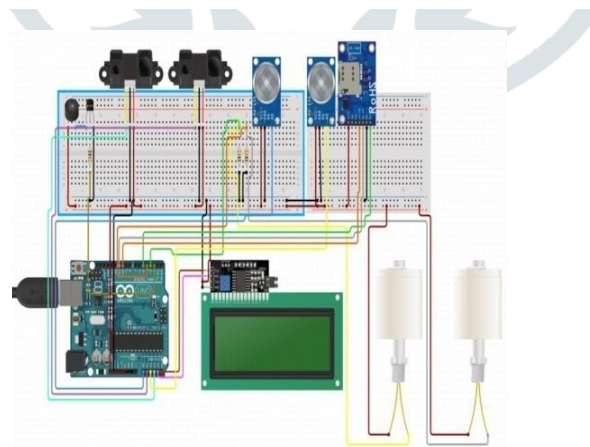


Fig (2) : Circuit Diagram of Sewage Monitoring System

The Arduino UNO is used for this project to detect the sensors functions and GSM connects through serial communications.

First of all, the regulated power supply is used for controller and the other sensors. The power supply circuits contain 12v AC. The Float sensor, proximity sensor and gas sensors are connected to Arduino ports and buzzer is connected to digital ports of the controller.

GSM module is connected through serial communication via max232 and interface the LCD in controller. whenever the sensors are activated, the buzzer will glow for intimation as well as sending SMS to all departments through GSM Module.

VI. HARDWARE DESCRIPTION

ARDUINO UNO:

The Arduino Uno is a type of Arduino board that uses an ATmega 328p microprocessor and is available as an open-source project. The Arduino UNO board is a popular choice among novices for electronics projects. The Arduino Uno has a set of analogue and digital pins that serve as input and output points for connecting the board to external components. Onboard, there are a total of fourteen I/O pins, six of which are analogue input pins.

The board contains a USB port that can be used to connect to a power supply, Reset button, ICSP Header, and other components. To make the Arduino UNO board functional and used in the project, all of these components are added to it. The board can also be charged through USB port or straight from the board's DC supply.

GSM MODEM:

This GSM Modem can accept any GSM network operator SIM card and act just like a mobile phone with its own unique phone number. Advantage of using this modem will be that you can use its RS232 port to communicate and develop embedded applications. Applications like SMS Control, data transfer, remote control and logging can be developed easily.

The modem can either be connected to PC serial port directly or to any microcontroller. It can be used to send and receive SMS or make/receive voice calls. It can also be used in GPRS mode to connect to internet and do many applications for data logging and control. In GPRS mode you can also connect to any remote FTP server and upload files for data logging.

This GSM modem is a highly flexible plug and play quad band GSM modem for direct and easy integration to RS232 applications. Supports features like Voice, SMS, Data/Fax, GPRS and integrated TCP/IP stack.



Fig(3). SIM 800C GSM Module

PROXIMITY SENSOR

A proximity sensor often creates an electro magnetic field or a beam of electromagnetic radiation (infrared, for example) and monitors the field or return signal for changes. The proximity sensor's target is the thing that is being detected. Different sensors are required for different proximity sensor targets.

A capacitive proximity sensor or a photo electric sensor, for example, may work with a plastic target, whereas an inductive proximity sensor requires a metal target



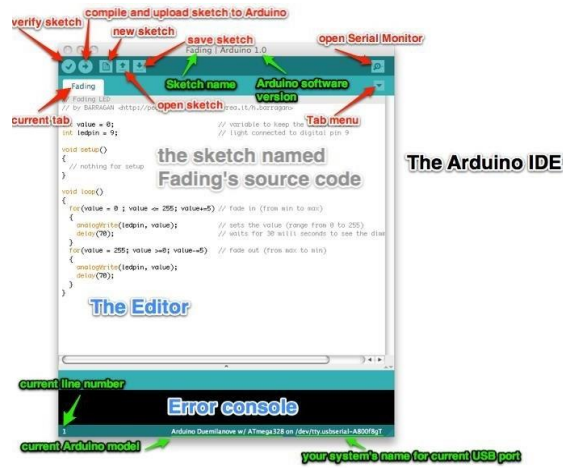
Fig(4): Inductive Proximity Sensor

VII. SOFTWARE DESCRIPTION

Arduino IDE:

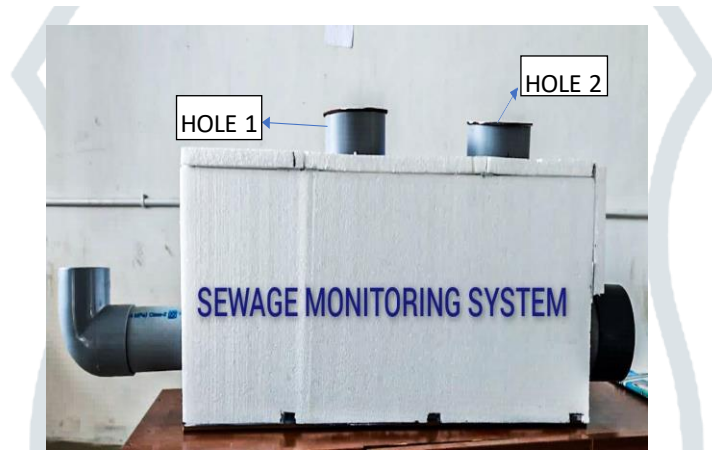
IDE stands for "Integrated Development Environment": it is an official software introduced by Arduino.cc, that is mainly used for editing, compiling and uploading the code in the Arduino Device. Almost all Arduino modules are compatible with this software that is an open source and is readily available to install and start compiling the code on the go.

In this article, we will introduce the Software, how we can install it, and make it ready for developing applications using Arduino modules



Fig(5). Menu Bar of Arduino IDE

VIII. RESULTS



Fig(6): Prototype of Sewage Monitoring System



Fig (7): Manhole-1 Lid Status

IX. CONCLUSION:

Underground observance is difficult nowadays. This project proposes totally different way for managing under ground system. This system provides a smart way of detecting manhole lid, toxic gas and water level. This can be implemented in smart cities and can be operated easily by anyone. It is a low cost, time saving and less human intervention system. The proposed system identifies the sewage water level and detects the manhole lid status, also monitoring the toxic gas that occurs due to the sewage water. The proposed methodology helps to prevent the sudden accident of workers and also helps to keep the society clean. This device helps the worker at a basic level of knowledge to understand the gas level and his pulse rate. The smart device can be implemented and used across the world and also helps to monitor the overflow of the sewage water

X. REFERNCES:

- [1] Prof S. A. Shaikh¹, Suvarna A. Sonawane²,” Monitoring Smart City Application Using Raspberry PI based on IoT” International Journal of Innovative Science, Engineering & Technology, Vol 5 Issue VII, July 2017
- [2] Prof Muragesh SK¹, Santhosh Rao², “Automated Internet of Things for Underground Drainage and Manhole Monitoring Systems for Metropolitan Cities.” International Journal of Innovative Science, Engineering & Technology, Vol. 2 Issue 4, June 2015.
- [3] <https://www.hindawi.com/journals/wcmc/2020/8852965/>.
- [4] Kolsky P, “Storm drainage an intermediate guide to the low-cost valuation of system performance”, Intermediate Technology Publications, London, 1998.
- [5] Pillai SC & Subramanyam, “Role of Protozoan the Aerobic Purification of Sewages”, Nature in international Journal of Science
- [6] Fujitsu, “Develops Technology for Low-Cost Detection of Potential Sewage System Overflows”, Kawasaki, Japan, February 10, 2015.
- [7] Priti Maheshwari & Timothy Michel, “Australia Internet of Things (IoT) based Water Level Monitoring System for Smart Village”, AISECT University, Bhopal, MP, India.
- [8] Anap SD, Den gale Rani V, Ghule Suvarna U, Jadhav Shradha B, “Wireless Based Water Level Monitoring and Control System of Electronics”, International Advanced Research Journal in Science, Engineering and Technology, vol. 3, Issue 4, April 2016.
- [9] Keshamoni, K. and Hemanth, S. (2017). “Smart gas level monitoring, booking amp; gas leakage detector over iot.” 2017 IEEE 7th International Advance Computing Conference (IACC).
- [10] Haswani, Navin Deore, Pramod (2018). Web-based real time underground drainage or sewage monitoring system using Wireless Sensor Networks.
- [11] Kathryn Newhart, Amanda S. Hering, Ryan Holloway, Tzahi Cath (2019), “Data-driven performance analyses of wastewater treatment plants”, Article in Water research 157.
- [12] X .Li, R.Lu, X.Liang, X.Shen, J.Chen, X. Lin (2011), “Smart Community: An Internet of Things Application”, IEEE Communications Magazine.