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Automatic Alert System for Monitoring & Detection of Blockage in Manholes

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Abstract:- The society is in the need of a better and a cleaner resource as a future goal to be called as a smart city. An important feature while implementing a smart city is to have an advanced underground infrastructure. An essential role to keep the city clean is mainly dependent upon the drainage monitoring system. As the manual manhole monitoring is lacking ability, this results in the problems of slow handling in drainage and it takes more time to resolve it.

The proposed project takes the help of various types of sensors so keep track of its respective parameters. When these sensors reach its threshold value, particular value is being updated to the Arduino Uno. Arduino Uno updates the resulting signal and the respective location of the manhole to the concerned municipal corporation through WIFI module and the authorities could easily locate the exact manhole that has the problem and can take appropriate measures.

Keywords:- *IoT, WIFI, MQ2 Sensor, LCD, Arduino UNO, DHT Sensor.*

I.INTRODUCTION

Populated areas are severely affected by the floods that are caused by the activities of human beings such a use of non-recycled plastic, shrinking open spaces, the drains which are not continuously kept under observation leads to the accumulation of the water after heavy rainfall. Due to Bellandur lake misfortune 76 heavily polluting Industries were shut. Delhi was severely flooded with water due to the continuous rainfall that caused shrink in the traffic. In 2015, Chennai has witnessed severe flooding which caused the death of several hundreds of people. These incidents are the result of improper drainage monitoring system

Installation of water flow rate sensors at the intersecting node helps this proposed project overcomes the drawbacks, identifying blockage in the drainage water pipe. It uses an IoT to construct the drainage monitoring system as increasingly advanced by utilizing sensors such as the water level sensor, the DHT sensor and the gas sensor for identifying and sending warnings through a WIFI-module that sends a message on a webpage to the authorities.

The main objectives of the proposed project include well maintained areas of city and proper arrangement of the drainage in those areas of the city, identification of the level of water in the drainage and blocks in the drainage, and continuously monitoring the flow rate of water, and also sending automatic warnings, making visible on the server if the level of water is exceeding the threshold. The aim is to obtain a cost-effective, eco-friendly and easy monitoring of the drainage of different areas resulting in conditioned monitoring and infrastructure management.

II. SOME RELATED WORK

- Romer, K. Mattern, 2004, in their paper “The design space of wireless sensor networks, Wireless Communications” have described of the near past, sensor networks(wireless) has made its way into a wide range of systems& its uses with a wide range of varying requirements and characteristics. As the result, it is becoming increasingly hard to discuss typical requirements regarding software support& hardware issues. Here it converses about the outcome of this fact with respect to the design of sensor networks (wireless) by considering its various parameters.
- Suvarna A. Sonawane ,Prof. S A. Shaikh 1, July 2017, in their paper “Monitoring Smart City Applications using Raspberry PI Based on IOT” have described that the Smart city is the developmental objective for monitoring the standards of service in the concerned city and its surrounding to modify the management & speed up the improvement of the drainage system and its requirement to modify to a healthy and sound city that delivers services in real time and newest amenity to implement the concept of advanced city using the concept of IoT due to which easy wireless communication is possible. The Raspberry Pi3 controller transfers the different types of data collected by the sensors within the proposed system. The resultant from the microcontroller is updated to the database and E- mail is also sent to the desired user.
- Mukhopadhyay S.C, Suryadevara N.K, in their paper “Towards the Implementation of IoT for Environmental Condition Monitoring in Homes” has formulated an effective implementation for IoT used for the continuous monitoring of the regular procedure by the help of cost-efficient sensing model. This report about the interconnecting mechanism & also about integrated architecture of the network for the purpose of efficient measurement of the values of the sensors and data transmission with the help of internet is being showed. It also provided automatic services of the devices in the initial monitoring state.

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III. METHODOLOGY

The project on this system will not only help in producing proper health condition but also reduce the work load of the government organization. The system takes help of various types of sensors to keep track of water level, humidity level and gas level and then interfaces with Arduino Uno in order to get real time output. Microcontroller continuously monitors the data which is fed to it as input whenever the sensor output exceeds the threshold value then the current set of data is sent to the microcontroller. In addition to this, Microcontroller sends the notification along with the location of the manhole to the consulted organization through a WIFI-module on to a website and the persons who are in charge could easily locate where the problem exactly is and take certain measures to resolve the problem.

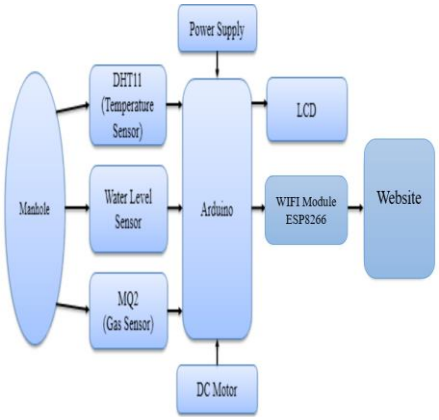

Fig. 1: Block Diagram of Automatic Alert System For Monitoring & Detection Of Blockages In Manhole

A. Abbreviations and Acronyms

IoT – Internet of Things

B. Implementation of Proposed Work

This model on manhole detection will not only help in producing proper health condition but also reduce the work load of the government organization This system takes help of various types of sensors to keep track of water level, temperature and gas level with the help of sensors and interfaces with Arduino Uno in order to make the system work easily . Microcontroller continuously monitors the data which is fed to it as input . whenever the sensor output exceeds the threshold value then the current set of data is sent to the microcontroller.

The process in which all the readings are valued and then the steps that each of the sensing device take place is as follow

- Step 1: Initially the Water sensor checks if the water level is within the threshold level. If not it sends the notification to the government organization which is likely to be municipal corperation by the help of wifi module if not then it moves on to next step.
- Step 2: Second stage is carried out by gas level sesor in order to detect if there are any leakages of gas if so then it informs the authority to correct it . If not it moves onto the next step.
- Step 3: In the final stage it checks whether there is a significant increase in the temperature level thus the result can be obtained by the temperature level sensor. If there are any changes it informs the authority or else it moves onto next step.

Microcontroller continuously monitors the data which is fed to it as input. In addition to this, the station consists of WIFI module and Arduino Uno which are the two microcontrollers which are interfaced. By the help of ADC which is located inside the arduino board it helps to covert the analog signals to the digital signals and further the signals are processed and sent to the database by the help of wifi module which monitors the input signal . If there is any alert signal generated in the managing station the Arduino Uno sends the notification and the information about the location of where the problem of manhole detected to the government authorities with the help of WIFI-module where the data can be read on the website and the officials could easily identify which manhole is having issues and could take appropriate steps to correct it.

C. Flow Chart

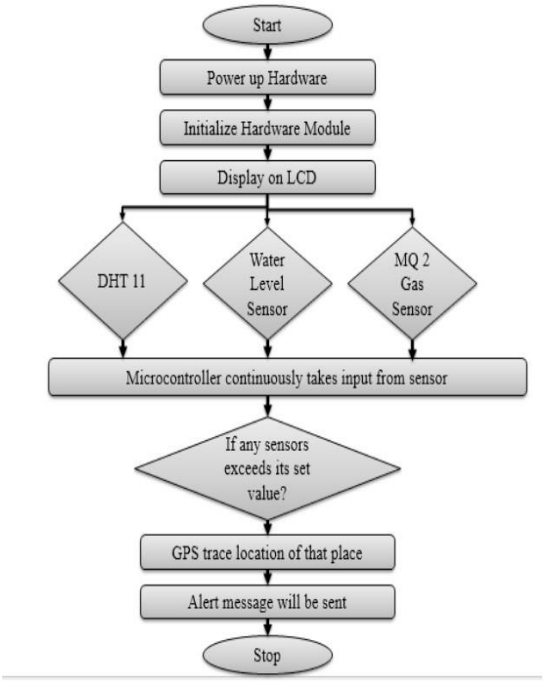

Fig. 2: Flow Chart

The project will not help in maintaining and monitoring the proper health and safety of the city and also helps in reducing the work from the end of the government personnel. The project takes help of various types of sensors and interfaces with microcontroller Arduino Uno in order to make the system smart. Microcontroller continuously monitors the data which is fed to it as input. Microcontroller continuously monitors the data which is fed to it as input. In addition to this, Arduino Uno sends the signal and location of the manhole to the municipal corporation through a WIFI-module on to a website and the concerned members of the authorities could easily locate which manhole with the blockage and could take appropriate measures to resolve it.

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D. Arduino Code

```
#include <MQ2.h>
#include <Wire.h>
#include <ESP8266WiFi.h>
#include "ThingSpeak.h"


const char* ssid = "Error 404";   // your network SSID (name)
const char* password = "12345678";   // your network password
int n = A0;
int lpg, co, smoke;
MQ2 mq2(n);
WiFiClient  client;

unsigned long myChannelNumber = 1710427;
const char * myWriteAPIKey = "WOMH39AOTNWW2DU2";

// Timer variables
unsigned long lastTime = 0;
unsigned long timerDelay = 30000;

// Variable to hold temperature readings
//float lpg;
//uncomment if you want to get temperature in Fahrenheit
//float temperatureF;


void setup() {
Serial.begin(115200);  //Initialize serial
mq2.begin();

WiFi.mode(WIFI_STA);

ThingSpeak.begin(client);  // Initialize ThingSpeak
}

void loop() {
float* values= mq2.read(true); //set it false if you don't want to print the values in the Serial
//lpg = values[0];
lpg = mq2.readLPG();
if ((millis() - lastTime) > timerDelay) {

// Connect or reconnect to WiFi
if(WiFi.status() != WL_CONNECTED){
Serial.print("Attempting to connect");
while(WiFi.status() != WL_CONNECTED){
WiFi.begin(ssid, password);
delay(5000);
}
Serial.println("\nConnected.");
}

// Get a new temperature reading

Serial.print("lpg level): ");
Serial.println(lpg);
//uncomment if you want to get temperature in Fahrenheit
/*temperatureF = 1.8 * bme.readTemperature() + 32;
Serial.print("Temperature (ºC): ");
Serial.println(temperatureF);*/


// Write to ThingSpeak. There are up to 8 fields in a channel, allowing you to store up to 8 different
// pieces of information in a channel.  Here, we write to field 1.
int x = ThingSpeak.writeField(myChannelNumber, 1, lpg, myWriteAPIKey);
//uncomment if you want to get temperature in Fahrenheit
//int x = ThingSpeak.writeField(myChannelNumber, 1, temperatureF, myWriteAPIKey);

if(x == 200){
Serial.println("Channel update successful.");
}
else{
Serial.println("Problem updating channel. HTTP error code " + String(x));
}
lastTime = millis();
}
}
```

IV.DISCUSSION

Every one of the actual boundaries like water level , Gas power, blockage, smoke because of arrival of gases and substance inside the sewer vent are detected by sensor unit and convert these contributions to electrical result. Arduino gets electrical result as info and is inserted with WIFI module and modified so that all the data is ship off server when the sensors cross their qualities past a given edge esteem. Then the site shows generally live readings of each hub and the ready data onto the website page.

V.RESULT

The introduced model distinguishes the blockage and level of water in the sewer vent. Moreover, screens steady stream rate. Moisture and gas spillage could be perceived. Then it moreover enlightens the sewer vent top and its status is checked. Exactly sensor shows up at as far as possible level, then that different worth of it would be transported off the microcontroller. It invigorates potential gains of general huge number of sensor using IoT. Accepting the issues arising from the sewer vent, sensor distinguishes it and sends that information to the microcontroller. Additionally, the microcontroller passes on the message and the particular region of the sewer vent through it to the supervising station. Then, a modified mail is sent by Arduino UNO, The normal actions with respect to the issue under the sewer vent. The circuit is rigged up as shown in figure 3.

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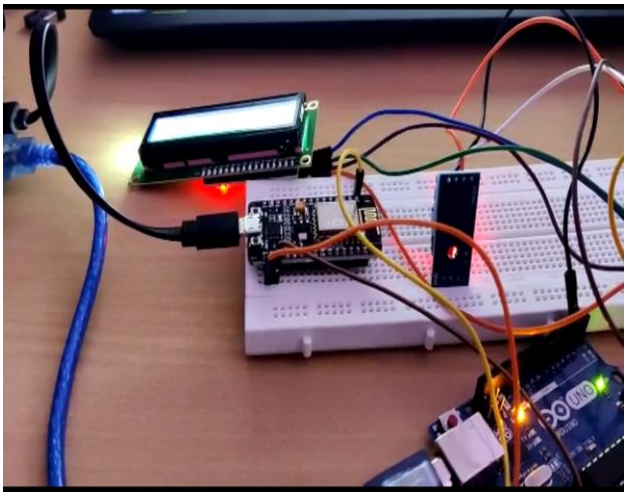

Fig. 3: Circuit

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