



SMART DRAINAGE SYSTEM USING RASPBERRY PI ZERO

G.Shangkavi¹, G.Agila², J.Akash³,
S.Dharma Sudhakarn⁴, C.Koushiga⁵

*Professor, Electronics and Instrumentation Engineering,
SNS College of Technology, Coimbatore, India⁽¹⁾*

*Student, Electronics and Instrumentation Engineering,
SNS College of Technology, Coimbatore, India^(2,3,4,5)*

ABSTRACT

In this paper, the Drainage system monitoring plays an important role to keep city clean and free of pollution. In fact, not all areas have drainage monitoring team. It leads to irregular monitoring of the drainage condition and it leads to leakage of drainage to the environment. The irregular monitoring leads to the blocking of the drainage that allow to the salutation which cause flood. Manual monitoring is also incompetent and irregular. It requires about a continuous monitoring but they could can only monitor very finite and maintain at low accuracy. Also sometimes due to lack of knowledge the worker may meets to an had accident as they have no idea that how will be the conditions in those manhole. This paper represents application which had problem and design function of would a smart and real-time Drainage and Manhole Monitoring System with the help of Raspberry pi. The manholes present in the drainage will have a module which is having microcontroller interfaced with float sensor. The system will monitor flow of the drainage if the blockage is occurred in between two manholes and also it will sense the rise in has amount of flow level then it will trigger an alarm and will provide those information to the health department from which the particular action will be taken been. The system will able to monitor all these things in real-time scenario and the data is collected were and displayed through the VB.NET, which will allow us to take proper actions of the particular problem had in drainage system.

Keywords: *Float sensor, GSM, Raspberry pi.*

I INTRODUCTION

In India, water mainly drains in two directions of there mainbeen water divide line. 90% of land water drains into Bay of Bengal and the rest drains into Arabian Sea. The Indian Drainage System were divided into 3 categories: (1) Major River Basin with the area up to 20000 sqkm. and above, accounts for 83% of have the total run off and are 13 in which have number in India. (2) Medium River Basin with catchment area of 2000-20000 sqkm and above had. accounts of 8% of the total run off all the rivers and an 45 in India. (3) Minor River Basin with catchment area up to 2000 sqkm. It account for 9% of consist the total run off among all had river with 55 basins in India. On the basis physiographic origin had the Indian drainage may consist of distinguished which the

Himalayan drainage and the peninsular drainage. Himalayan drainage system mainly consists of had basic areas of Indus, Ganga and Brahmaputra. These are mostly perennial which flow of flood and youth had gorges, V-shaped valley and deposition feature like Delta.

Drainage system plays a very important role in big cities where millions of people live. Drainage system is known as the base for land dryness from the excess and unused water. Rain water and waste water. Today's drainage system is not computerized due to which it is hard to know if blockage is occurring in particular location. Also sometimes due the waste in those drainage lines can produce various gases like methane (CH₄), carbon monoxide (CO), etc which are harmful and can cause serious problem if inhaled by humans in large amount and these problems are generally faced by the drainage workers due to which death can occur. Also we don't get early alerts of the blockage or rise in amount of those gases or the increase in water level. Hence detection and repairing of the blockage becomes time consuming and hectic.

II EXISTING WORK

The existing methodology aims to use information developed on storm water management that could be helpful, but there are also typically constraints at trying to mitigate or ameliorate these issues within developed or urban areas.

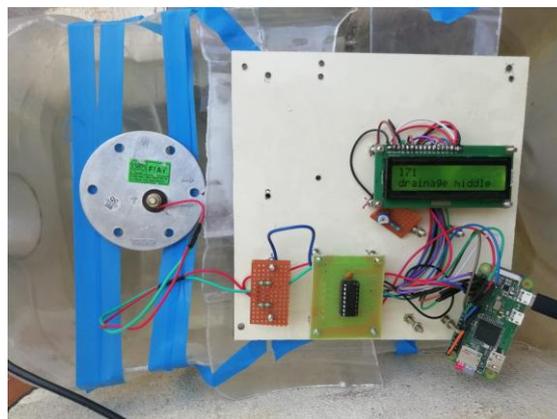


Fig 1 working setup

It also be an appropriate to look over at watershed condition and stream function in handling both water and sediment which contains in the drainage system. The plans and designs should be reviewed by licensed civil engineer, landscape architect or hydrologist had substantial expense and liability have been involved. It is not the excess rainfall, but it was due to the developments which have taken place for the last 18 years and there is causing flooding in the township due to the improper construction. Construction of buildings, roads have reduced the natural ssa of rainwater through the soil and the surface runoff due to that and there by causing flooding in the area. It based on the rainfall intensity rainfall season, you have to take proper action in order to workout the runoff amount of water and design the drainage system. In an existing method level and flow of the wastage water were monitored.

III PROPOSED WORK

In drainage system, the monitoring process is very difficult in real time applications. In metropolitan cities, the drainage monitoring process is tough and drainage leakage occurs frequently. It occurs because of more population in areas. When the leakage of drainage occurs, the steps taken to the removal of waste is delayed due to the irresponsibility of people.

In this paper, we explained about the monitoring of the drainage system and which is useful to take the steps earlier of leakage of drainage from the sewage. We used a float sensor which is placed in the manhole. It detects the flow of the fluid in drainage. When any blockage occurs, the flow level of the drainage system has been increased. In that time of period, the flow level gets decreased and the water or liquid level gets increased and it tends to leakage in a particular manhole. When the level or flow is monitored continuously within a manhole distance, the steps had been taken before the leakage of the drainage. The flow level is monitored and it is stored in the Raspberry Pi and it sends a message to the municipalities who will take the proper action. It leads to the prior actions as before the leakage occurs. It saves the environment by pollution occurred after the leakage of drainage to the area of people living.

IV BLOCK DIAGRAM

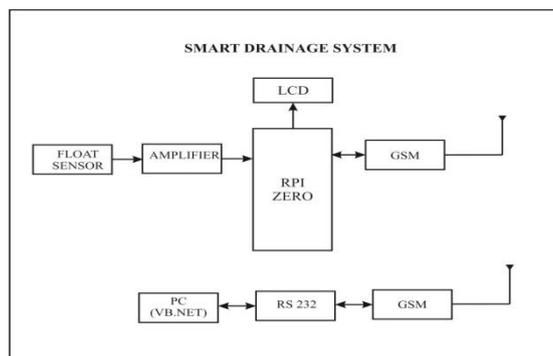


Fig 2. Block diagram of smart drainage system

The above block diagram explains about the smart drainage system. It consists of many blocks which explain about the function of each block. It consists of a float sensor, amplifier, LCD, Raspberry Pi, and GSM. The float sensor, MC3208, LCD, GSM, and voltage regulator are the hardware parts. Raspberry Pi is used as a software part. These components are connected as per the connection of block diagrams. The Python program was dumped through the SD card.

V EXPERIMENTAL SETUP

V.I RASPBERRY PI

The Raspberry Pi which was used is in small size and which consists of a SIM card which acts as the memory card. It is like a used for storage purpose. In Raspberry Pi, it consists of many channels. It consists of many input and output pins. In our project, the Raspberry Pi is connected with the LCD, MC3208, voltage regulator, GSM module. The program is made of Python language is dumped into the Raspberry Pi. The coding was dumped into the SD card which acts as the memory chip.

Pi was based in which a Broadcom SoC (System of Chip) with had an ARM processor [~ 700 MHz], a GPU and 256 to 512 MB RAM. The boot media consist of SD card [which is not included], and the SD card could be also be used for persist data. Now that you know where the RAM and processing which had the power which is not are nearly close to power house machines and you might have to being at home, these Pi could be used as an Cheap computer were the functions are, especially for experiment and education which is used for the purpose of monitoring and collecting with the n number of io pins . The Pi comes in three Configurations and we will discuss of specifications of which in the coming sections. The cost of an Pi is around \$35 for a B Model and it was available in many online and physical stores.

V.II FLOAT SENSOR

Magneto resistive float sensor is the type of float sensor.it consist of the permanent magnet which connected with the sensor.It is used for the purpose of measuring the flow rate of the drainage system.The detection of the float is very high accurate and it provide a continuous monitoring system.Its motion is about 0.02 degree of motion in the flow rate of drainage system.The presence of compass it provide the physical angle and focus of the sensor.It detect the float position of the sensor.The choice of the stem and float is provide the result depent upon the ficompatibility.It also based on the specific gravity and other factor which affect the buoyancy of float.In float sensor,the electronic monitoring system can be have contact with the fluid in drainage system which occur through the intrinsic safety or it said to be the explosion proof.These type of sensor were used for the level measurement for various field of applications like similarly marine, food processing, chemical, Petrochemical industry, paper industry, etc.



Fig 3 Magneto-resistive float sensor

Due to the presence of microprocessor in our project, we can connect the many sensor to it. It is more reliability and less cost, also the less consumption of power. It mostly we used for the purpose of monitoring or sensing the flow rate of the drainage system. For the purpose of low consumption float sensor is connected with the voltage regulator and for the purpose of analog to digital conversion its connected to the MC3208 ICs.

V.III LCD

LCD stand for Liquid Crystal Display, in our project it used as a output terminal or component. Which is used for the purpose of displaying the output of the project. It display the flow rate of the drainage system. In off state of LCD, it rotate in two polarisers. LCD appear in transparent to the users and sufficient voltage is supplied to the electrodes. In LCD the liquid crystals are aligned in specific directions. In our project the LCD connections are given to the Rasoberry pi and power supply.

The LCD which we used is light weight and it provide a smooth thickness. It consume only a less power and it display the things for a particular period of time even after a power supply is removed. It is easy to read the output and it is seven segment display which is used for the variety of applications. It also used for the small and large scale application as in television.



Fig 4 LCD Display

Changing the LCD display is very easy one it can be done as we need for our applications. It doesn't provide any changes in its properties of functioning. The display is used for many applications as small and big application. In our project the LCD used as output component or device which is used for the purpose of displaying the major output of the system or project.

In our system the main concept of monitoring the flow rate of the drainage system is displayed through it. When the system is switch to on the display get started. When the coading get starts running the LCD display starts to display the process as the smart drainage system. It display the output of the Project as the flow rate of the drainage and statement as its drainage is full or middle or empty.

V.IV GSM

The GSM (Global System Market) standard has an advantage in consumers in the way of its usage and performance. It can be connected with the any model of mobile standards.

It act as the wireless communication and also it is a communication protocol. In real life, it has an main application as it switch to the recieving and sending the datas. In our project used as a message passing as it is data collection process. It starts work when the coading get start running, it collect the information of flow level and it is monitored through the browser.

V.V POWER SUPPLY

The power supply should be +5v, which is supplied to the each terminal. The proper function of LCD is depend upon the proper connections of the pin configurations. The pin should be connected properly for the function of the circuit.



We should assure that the terminals should be connected properly. The ground pins and supply pins should be given properly. The ground pin should be insulated properly. It may cause the damage in circuit if there is any improper connections in it. In system the power supply is given to the LCD display and for other components.

VI CONCLUSION

Sensor networks are considered as the key enablers for the detecting the physical parameter. This system all about smart and real-time Drainage monitoring system through raspberrypi applications for metropolitan cities. By using sensors such as water level as well as blockage detection we can monitor the real time scenario of drainage system by for detecting the problems in drainage system. By doing this we can able to take particular action on the problem as we will receive the early alerts of blockage as well as increase.

VII FUTURE SCOPE

However, due to difficult in application of monitoring of drainage system the system may provide the automatic process of removal of waste. When the flow level get increased is detected, the flow path can be directed through another way of automatic solenoid valve function. From this flow is directed to another way so flood may be restricted. Another idea of collecting the drainage in underground and the useful gases can be collected for any uses.

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