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Smart Drainage system using IoT

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ABSTRACT: The underground drainage system is a significant segment of metropolitan foundation. It is viewed as city's life saver. Most administration on underground waste is manual along these lines it isn't productive to have perfect and working underground framework additionally in such enormous urban communities, it is hard for the administration faculty to find the specific sewer vent which is confronting the issue. This undertaking depicts checking of underground waste framework. The waste channels are secured with sewer vents to work and to clear the stopping up present inside the channel. By setting the sensors within the sewer vent will identifies and moves the suitable data about the water, identify raised stream levels of waste and stopping up. Sensors simply screen the water levels.

KEYWORDS: IoT, Smart Drainage, water level Sensor.

I. INTRODUCTION

IOT is the abbreviation for "Internet Of Things" which expects to associate the physical world to the advanced world with the assistance of sensors that measure the boundaries of this present reality as they continue changing and can make an information base of the readings gathered and inevitably the information gathered can be utilized for additional examinations, subsequently improving the general activity of the framework as expected.

The present drainage system isn't automated. So at whatever point there is blockage it is hard to sort out the specific area of the blockage. Additionally, early cautions of the blockage are not gotten. Consequently identification and fixing of the blockage become tedious. It turns out to be exceptionally badly designed to deal with the circumstance when lines are impeded totally. Because of such disappointment of seepage line individuals face a great deal of issues. This venture depicts observing of underground seepage framework. The seepage channels are secured with sewer vents to work and to clear the obstructing present inside the channel. By putting the sensors within the sewer vent will detects and moves the proper data about the water, distinguish raised stream levels of seepage and obstructing. A sensor network comprises of hundreds or thousands of sensors having the ability to impart among them or to send the information. Sensors simply screen the water levels.^[6]

In view of the qualities given by the sensors seepage water level qualities are shipped off the worker. It gives a framework which can screen the water level. On the off chance that seepage framework gets obstructed and water floods it tends to be recognized by the sensor system. Alert will be produced when the blockage just beginnings developing. Time accessible to fix the blockage will be sufficient to forestall the waste line from totally closing.

Different Solutions to Drainage Problems

1. French
2. Dry Well
3. Corrugated Tubes

Not every drainage solution will work for every situation. There are a number of successful ways that water can be diverted away from houses and properties. With the help of experienced drainage system services, problems with drainage can be controlled so it is controlled or eliminated.^[6]

II. REQUIRED COMPONENTS

- ArduinoUno/ ESP8266 NodeMCU
- GPRS module
- Water level Sensor
- Connecting wires
- Power supply 5V

- Waterpump

Arduino Uno: The Arduino is a microcontroller-based open source electronic prototyping board which can be modified with a simple to-utilize Arduino IDE. Arduino comprises of both a physical programmable circuit board and a bit of programming, or IDE. The significant segments of Arduino UNO board are: 1. USB connector, 2. Force Port, 3. Microcontroller, 4. Simple information pins, 5. Advanced pins, 6. A Reset switch 7. Gem oscillator 8. USB interface chip, 9. Tx and Rx LEDs. The board works at a voltage of 5 volts, however it can withstand a most extreme voltage of 20 volts. The microcontroller utilized on the UNO board is Atmega328P by Atmel. It has 6 simple info pins, marked "Simple 0 to 5". The quartz oscillator ticks 16 million times each second. On each tick, the microcontroller performs one activity.

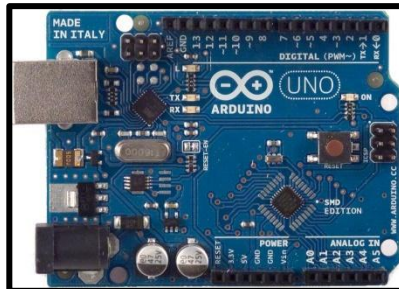


Fig.1:Arduino UNO R3

GSM module: GSM/GPRS module is utilized to build up correspondence between a PC and a GSM-GPRS framework. Worldwide System for Mobile correspondence (GSM) is a design utilized for versatile correspondence in the majority of the nations. Worldwide Packet Radio Service (GPRS) is an expansion of GSM that empowers higher information transmission rate. GSM/GPRS module comprises of a GSM/GPRS modem gathered along with power gracefully circuit and correspondence interfaces (like RS-232, USB, and so forth) for PC [5]. GSM/GPRS MODEM is a class of remote MODEM gadgets that are intended for correspondence of a PC with the GSM and GPRS organization. It requires a SIM (Subscriber Identity Module) card simply like cell phones to actuate correspondence with the organization. Additionally, they have IMEI (International Mobile Equipment Identity) number like cell phones for their recognizable proof. A GSM/GPRS MODEM can play out the accompanying activities:

1. Receive, send or delete SMS messages in aSIM.
2. Read, add, search phonebook entries of theSIM.
3. Make, Receive, or reject a voicecall.



Fig. 2: GSM module (SIM 800L)[10]

Water Level sensors: Level sensors distinguish the degree of fluids and different liquids and fluidized solids, including slurries, granular materials, and powders that show an upper free surface. Substances that stream become basically even in their holders (or other physical limits) due to gravity while most mass solids heap at a point of rest to a pinnacle. The substance to be estimated can be inside a compartment or can be in its characteristic structure (e.g., a waterway or a lake). The level estimation can be either constant or point esteems. Constant level sensors measure level inside a predefined run and decide the specific measure of substance in a specific spot, while point-level sensors just demonstrate whether the substance is above or beneath the detecting point. For the most part the last identify levels that are unreasonably high or low.

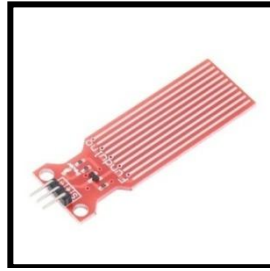
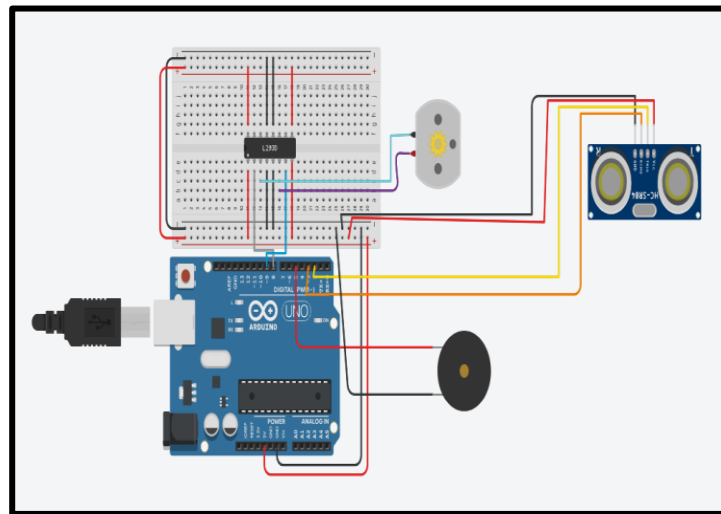


Fig. 3:Water level sensor

III. PROPOSED SYSTEM



The above proposed system requires no manpower as it is completely automated. Arduino is used for controlling the whole process and GSM module (which can be replaced by a Wi-Fi ESP8266 module) is used for sending alert messages to user in cell phone. When Arduino reads Low signal at D3 then its sends the notification “water level Normal”.

Now if the water level rises then the D3 pin becomes HIGH and turns on the motor and sends notification “Excess Water level”.[8]

Every time the water level sensor reads a value it is send to the firebase. IoT gateway gathers the data from all the sensors and transfers it to the cloud for further processing. Data received by the cloud can be visualized in many forms like different graphs, histograms, etc. In the next phase of processing, data on the cloud is processed to generate some useful results.Once the data is stored in cloud, different forms of data analytics can be implicated to improve the efficiency of the farm.

IV. ADVANTAGES OF THE PROPOSED SYSTEM

The following are the advantages of the proposed system:

- Cleaner urban areas and smart administration of seepage in the city.
- Detection of seepage water level and blockages in the waste.
- Checking water level constantly, just as sending programmed message, show on the screen if the water level is outside of a normal typical reach.
- The principle objective is to acquire a powerful ease and adaptable answer for condition checking and framework the board in the city.

V. FUTURE SCOPE

Further in future, the Arduino board can be customized to perform more cloud-based examination and follow a portion of the accompanying activities:



- Smart Drainage System is the most critical part for a perfect city.
- Thus, in future our thought is to incorporate some extra modules to our framework, for example, giving the area ID of the chamber utilizing GPS.
- we can give the force utilizing solar board.

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