An Automated Sewage Line Block Detection and Removal System

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Abstract: **Underground sewage system is found everywhere in major to small cities. A vital problem faced by the maintenance of the sewage system is unexpected underground blocks in the drainage lane. In current scenario, these blocks are removed manually by sending the workers through the man holes. As the man hole is being closed for a long time and opened rarely, it accumulates poisonous gas in it. Once the worker inhales such gas, it leads to severe health issue even to death. To avoid these situations by making this cleaning process automated, this project aims at incorporating the Internet of Things concept in the underground sewage monitoring, block detection, and block crushing. This will eliminate the need for manual power in this tedious process. We will be using water level sensor, acoustic sensor for detecting the blockage in the sewage line. If it receives a signal back then it conclude that there is a block at some distance which will be also calculated along with the direction. As soon as the signal received from the monitoring unit, the water gun moves towards the block position on the rod. Then it blows out water on the block and removes it. Along with this, a gas sensor will be permanently installed to monitor the volume of poisonous gas inside that locality. This can be used when unexpected human effort is required. This monitoring can alert the worker about the current poisonous gas level before he enters into the sewage lane. These units are supported by solar power panel which is installed in an outside on-road solar pole. The sensor details are sent to a reporting unit through a GSM network which is connected to the monitoring unit periodically. This system keeps track on the received records. If any abnormal event is recorded, immediately the crusher unit is ON and it operates with an external power supply.**

Keywords: **GSM networks robots and projected system**

1. Introduction

Robots are been in use for creating the human life easier and comfy. It plays significant role altogether varieties of applications like agriculture, industries, security and atmosphere. There are such a large amount of hazards occasions in day to day life for human life wherever the human cannot work. In that things while not a major quantity of safety precautions like, the disposal of wastes that are venturesome, hot substances, distant handling of volatile devices and righting and captive things among others the choose and place robots, usually referred to as arm mechanism is used. Robots will work safely at these dangerous conditions. These robots guarantee the human safety and replace huge human men. It is additionally applied in surgeries, defense functions and bio science with computer science, producing field and super market field. These are compact and economical robotic systems. There's a desire for the event in improvement the emptying wastes by mistreatment robots. Since emptying improvement involves manual scavenging that results in many health hazards to the person coming into the manholes of the emptying. Usually the emptying water overflows that makes unhealthy environmental conditions that gives platform to become a breeding place for mosquitoes. Per the study takes place at 2014, nearly 1300 manual scavengers' dies because of the health disorders. The explanation behind this is often that the emptying consists of a lot of venomous gases like methane series that results in higher morbidity of the manual scavengers. Additionally the improper disposal of emptying wastes causes degrade of our surroundings.

2. Existing system

Without taking the risks for human life or limb, robots will replace humans in some venturesome duty service. For instance take into account the bomb disposal. Robots are employed in several bomb squads across the state. Robotic arms will seize a suspected bomb and place it in an explosion-proof safe box for detonation and/or disposal. Similar robots will facilitate shut down cytotoxic wastes. Robots will add every kind of impure environment, chemical further as nuclear. They will add environments thus venturesome that an unprotected human would quickly die. The nuclear trade was the primary to develop and use robotic arms for handling radioactive materials. Robotic arms allowed scientists to be placed in clean, safe rooms in operation controls for the robotic arms placed in radioactive rooms. In existing system before several year individuals enter the manholes so as to wash the wastes. Later pumps and tanks are used. Nowadays because of technological development sewer robots are employed in improvement the sewage. The greatest disadvantage of the present methodology is that it fails to wash the mud that is within the type of rock

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solids because of the deposition of slits. The watching of voidance may be wiped out order to avoid the overflow of voidance water into the streets that cause environmental degradation.

3. Proposed system

The projected system makes an attempt to utterly clean the drainage that consists of rock solids thereby monitors the overflow of voidance water while not manual interruption. The block diagram contains of water level indicator, Transmitter, Receiver, Robotic arm.
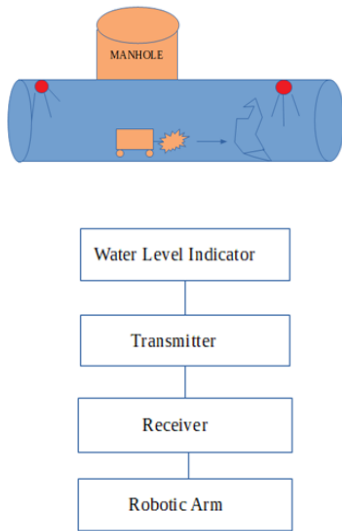

Fig. 1. Over all system design

A. Water level indicator

The water level indicators are to be placed within every drainage of the road that are connected to every different manhole in a single transmitter by means that of wire. The water level indicator is used as a monitor for the overflow of emptying water. Let us consider a street contains 5 emptying holes and every emptying holes includes 3 levels of water flow that is to be monitored .Once the water within the emptying holes reaches the limit, it triggers the transmitter that is placed within the empty holes. Primarily based on the level of water the data is given to the transmitter. If the drainage water is high in the tank1, the message to be transmitted by the transmitter is as "The water level within the tank1 is high". If the water level within the empty holes is low, it can be understand by the PWD staff that the emptying hole is completely clean. The transmitter is used to transmit the message to the receiver. The identical technique is applied within the every tank. The default of provided voltage is given to the drainage robot system. And also the 3 level of the indicator is get connected with the metal strip and placed at the different level. Once the water gets to immerse the strip, it acts as the great conductor to urge shorted with another level that triggers to send the four pin input to the diode

logic within the transmitter. e., overflow of emptying water, medium flow and underflow.
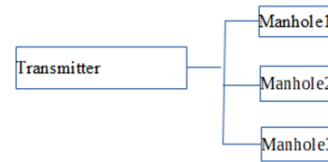

Fig. 2. Transmitter

B. Transmitter

The diagram of transmitter includes sixteen pin input since each tank in a very street contains three pins and one pin as zero there are totally sixteen pins. The sixteen pin input is given to diode logic wherever it converts sixteen inputs to four pin output. Here HT12D encoder is used to inscribe the signal to RF transmitter. The whole setup of transmitter half is placed within the drainage. The voidance tank that is to be placed with the transmitter is predicated on the space between receiver and therefore the tank.
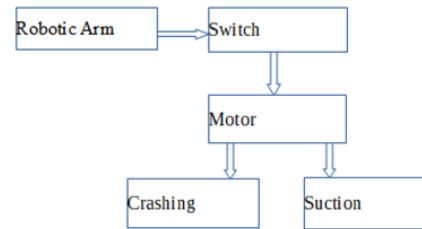

Fig. 3. Robotic arm

C. Receiver

The receiver half encloses RF receiver, GSM modem, Arduino UNO. The full setup is to be placed on the street poles. The RF receiver receives the signal from the RF transmitter and gives the signal to HT12D that decodes the four pin input to 16pinoutput. Arduino UNO uses AT commands that are to be programmed then the transmitter sends the message to the receiver. GSM electronic equipment uses 890-915 MHz to send info from the mobile station to the bottom transceiver station. Here we have a tendency to are using GSM 900 module wherever the mobile variety of the PWD employees is feed into the electronic equipment that allows the message together with the decision.
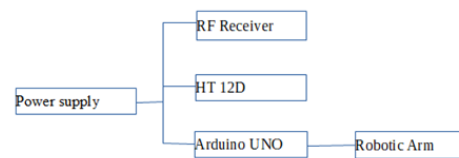

Fig. 4. RF receiver

D. Robotic ARM

Robotic arm works same as a human arm. Here it uses three

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different edge effectors.
- Gripper
- Grinding
- Suction

4. Advantages

Cutback in environmental degradation. The over flow of drain water is monitored without human intervention. Human life is saved and also the correct disposal of drain wastes.

5. Disadvantages

Price expensive. And also this technique need trained technicians to operate the robotic arm.

6. Future scope

Sensor networks are thought-about because the key enablers for the IoT paradigm. However, because of the widening style of applications, it's more and more troublesome to outline common needs for the WSN nodes and platforms. This project addresses all automatic net of Things for Underground drain phases of the sensible development of associate degree Underground drain observation System (UDMS) through IoT applications for metropolitan cities. A true life, rigorous application is chosen as a respect to guide. Aspects of sensing element network platform thought-about are: platform structure, flexibility and reusability, optimization of the sensing element nodes, optimization of the communication, error recovery from communications and node operation, high accessibility of service in the least levels, application server responsibility and therefore the interfacing with IoT applications. This project are often accustomed guide the specification, optimization, and development of sensing element network Platforms for different IoT application domains.

7. Conclusion

By implementing this conception of intelligence emptying or Cleaning methodology there can be cut back in the manual scavengers in our country that reduces the health hazards for humans thereby reducing the environmental pollution in our country. Although the initial setup might value high it provides healthy setting for U.S. and for our future generation.

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