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IOT BASED-Sewage Blockage Detection System

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Abstract: Sewer system monitoring is important to keep the city clean. Irregular monitoring of the sewage system leads to obstruction of drainage.
Sewer blockages are the main causes of sewer flooding and pollution. Sometimes, out of ignorance, workers may encounter an accident as they may not be aware of the conditions inside the manhole. This document represents an experimentation of the smart sanitation system using IoT.
In this model, a water pump motor, transformer, microcontroller and IoT module is used to obtain the desired output from the module.

I. INTRODUCTION

Sewage system plays a crucial role particularly, especially in large cities. The world is rapidly becoming smart cities, but the problems encountered are still those of the primitives. The modern world is in great need of modern advances and sophistication in its planning.
There is no proper monitoring of the sewage system at houses. The sewer system has instability and uncertainty with the characteristics of the variable and nonlinear variant of the time variant and the random processing process. The purpose is to obtain an economical and flexible solution for detecting block and foul smells. Gas sensors will pick up the odor when a blockage occurs and water flow stops.
Then an alert is sent to the residents. Simultaneously anti-clogant liquid is sprayed in the pipeline where blockage occurs which will remove the block. The best outcome of this system is that it can avoid unhygienic houses.

II. LITERATURE SURVEY

A. Smart Sensor and Arm Drainage Monitoring System

The core of the project is ARM7. ARM7 is a processor that is programmed to sense water level in sewage and blockage. A gas sensor is attached that gives an alert of any leakage via message and sound buzzers.

B. Smart Sewage Alert for Workers using IoT

A level sensor is used to detect the level of water in the drainage and display it on a screen. Sensor is used in detecting a clog and rate of flow. The WEMOS D1 is used to check specific conditions and it can send automatic alerts via GSM and can update it in real time.

C. Underground Drainage Monitoring System using IoT

The system uses a variety of sensors such as temperature sensor, water level sensor and gas sensor which are interfaced with a PIC Microcontroller. System monitors the level of water and toxic gases.

D. Smart Drainage Monitoring System Using Internet of Things

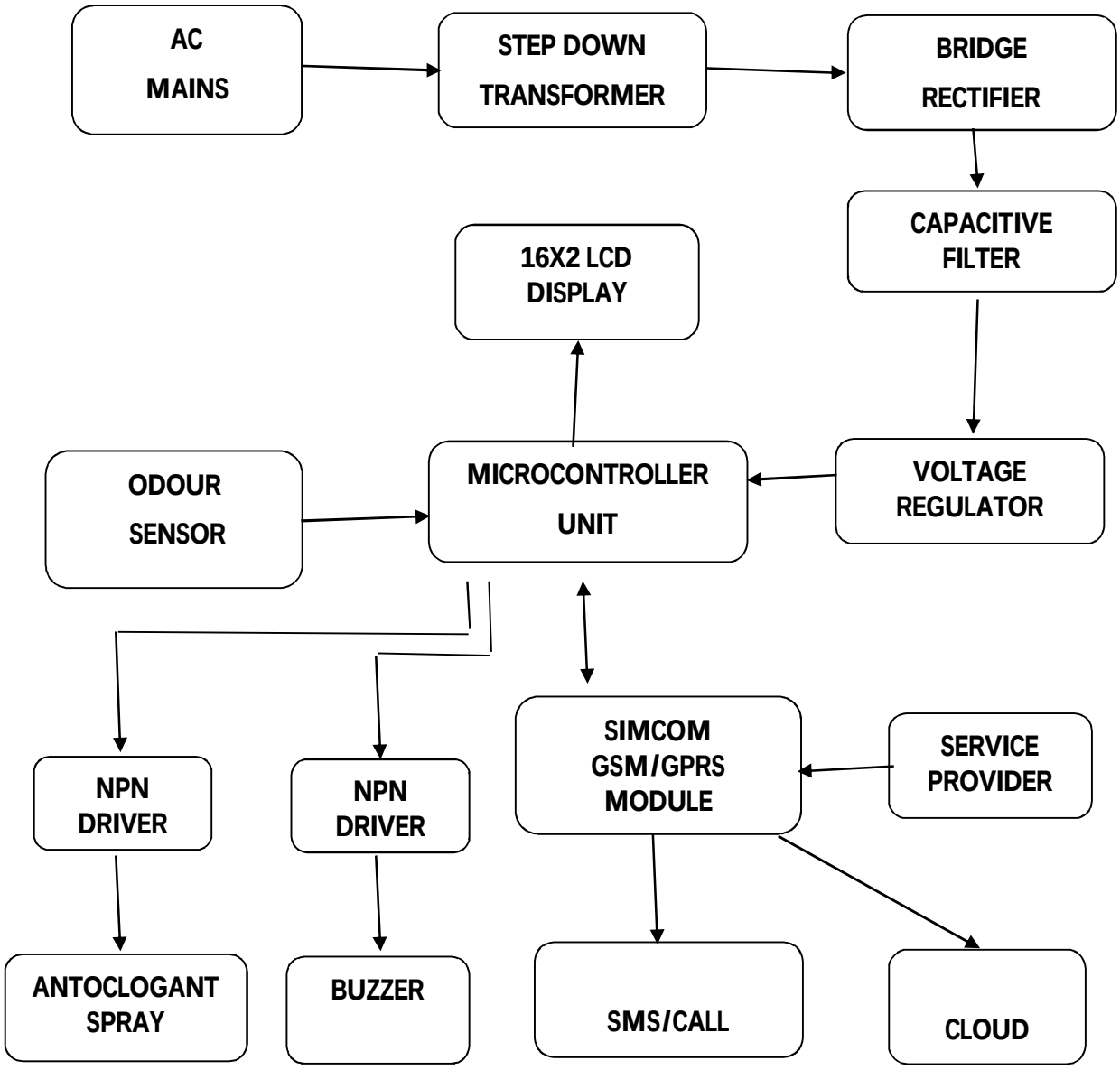
A smart drainage monitoring system using a variety of sensors is designed. The level of water will determine the probability of flood as low, medium or high. Gas sensor is also used in measuring the amount of various toxic gases.

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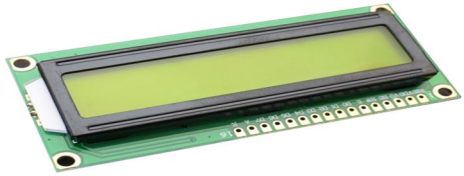
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III. HARDWARE REQUIREMENTS

A. *Block Diagram*



B. *Liquid Crystal Display*



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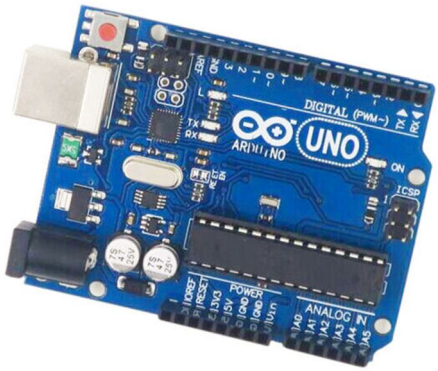
This LCD Display is designed for E-blocks. It has a 16 character, 2-line alphanumeric LCD display connected to a single 9-way D-type connector. This device will be connected to E-Block I/O ports. The display requires 5V power supply. The device cannot exceed 5V, as this will cause damage to the device. The 5V power supply can be generated from either E-blocks Multi programmers or a 5V fixed regulated power supply. The 16 x 2 intelligent alphanumeric dot matrix can display 224 different characters and symbols.

C. Bridge Rectifier



A Bridge rectifier is a device that alternates an AC current to a DC current that rectifies AC current input to DC current output. Bridge Rectifiers are popularly used in power supplies which can provide required DC voltage for electronic components and devices. Rectifiers are classified in three types namely half-wave, full-wave, and bridge rectifier. The vital functions of these rectifiers is just as same as the conversion of current.

D. Arduino UNO



Arduino is an open-source project that created microcontroller-based kits for building digital devices and interactive objects capable of sensing and controlling physical devices. The project is based on microcontroller board designs, produced by different vendors, using different microcontrollers. These systems provide sets of digital and analog input/output (I/O) pins that can interface to various expansion boards (termed shields) and other circuits.

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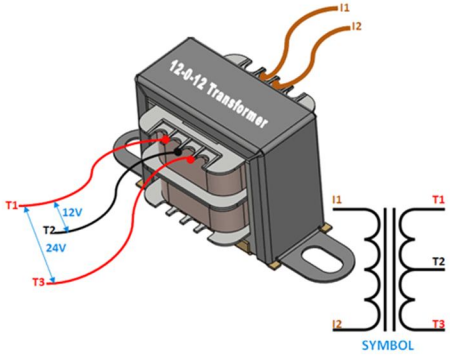
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E. Gas Sensor



The gas sensors react spontaneously to gases, now the system is updated on all modifications that occur in the concentration of molecules in the gaseous state. The gas sensor module comprises a steel exoskeleton under which a location component is housed. This detection element is subjected to a current through the connecting leads. This current is called heating current passing through it, gases approaching the sensing element are ionized and absorbed by the sensing element. This modifies the resistance of the sensing element which modifies the value of the current which leaves it. The sensor connection cables are thick so that the sensor can be firmly connected to the circuit and a sufficient amount of heat is drawn inside. They are cast in copper and covered with a tin plating.

F. Transformer



It is a chassis mounting mains transformer. Transformer consists of 240V primary windings and a center tapped secondary winding. The transformer has insulated connecting leads. The Transformer acts as a step down transformer that reduces AC power supply of -240V to - 12V. Electromagnetic induction produces an electromotive force in a conductor that is exposed to time-varying magnetic fields. Transformers are used in step up or step down of alternating voltages in power supply applications.

IV. RESULTS

The data from the sensor is sent to the microcontroller. An alert message is also sent to the mobile number of the resident. Simultaneously the anti-clogent liquid is also sprayed in the pipeline where the block occurs. This is how the whole system works and can be operated easily by anyone.

V. FUTURE SCOPE

Having implemented this project, gives the removal of clog from the sewage system. It can be further developed by using advanced technologies. The eradication of the clog can be done by using chemicals in sewage pipes. In addition to this, the clog can be removed using robots.

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VI. CONCLUSION

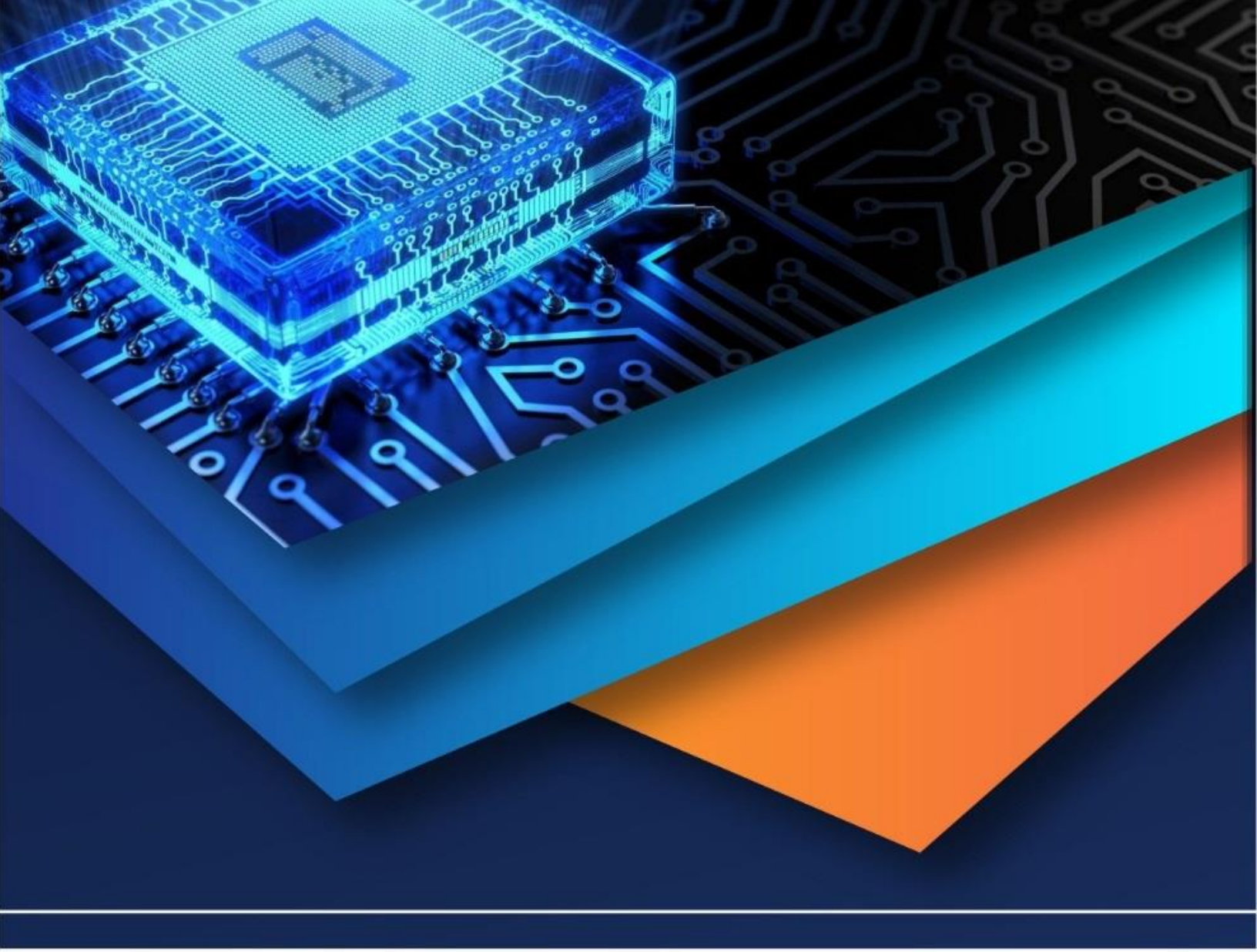
At present times underground observance is difficult. This project proposes a totally different way for managing the underground system. This system provides an efficient way in detecting a clog. This can be implemented in remote residential areas and can be operated easily by anyone. It is a low cost, time saving and less human intervention system.

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