International Journal of Scientific Research in Engineering and Management (IJSREM)
Volume: 06 Issue: 01 | Jan - 2022 ISSN: 2582-3930

SEGAS- Sewage Gas Extraction and Monitoring System Using IoT

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Abstract – The main objective of this project is to collect and monitor the sewer gas or sewage gas present inside the sewage or river. Our main motive of the project is not to waste the gas present inside the sewer tanks or rivers and to use the gas present inside the sewer tanks or river as a cooking gas, Automobile gas and it can also be used to generate electricity. It is a very simple procedure, just to collect the gas inside the sewer tanks or river and use it directly for usage

Key Words: sewer gas, generation of electricity, Android application.

1. INTRODUCTION

The sewage gas or sewer gas extracted from sewage is collected and stored in a cylinder. The sewage gas consists of methane, hydrogen sulfide, ammonia etc. This whole system is monitored by IoT and its application, where we can detect the leakage of gas and indicated to alert the users and also a warning message is send to the user. The sewage gas can be used for cooking, production of electricity and automobile fuel.

2. LITERATURE REVIEW:

1.HARDWARE REQUIREMENT:

I. Arduino: Arduino is an open-source electronics platform based on easy-to-use hardware and software. Arduino boards are able to read inputs - light on a sensor, a finger on a button, or a Twitter message - and turn it into an output - activating a motor, turning on an LED, publishing something online.

II. Gas Sensor: The MQ6 Gas Sensor is used to detect the leakage of sewage gas in the system. This sensor is suitable for detecting methane, hydrogen sulfide, Carbon dioxide, and Hydrogen.

III. Node MCU: Node MCU is used to transfer the data from the system to the cloud. The Node MCU consists of ESP8266 which is the key microcontroller in the node MCU for transferring data into the cloud.

IV. Ultrasonic Sensor: The ultrasonic sensor HC-SR04 is used to measures the distance to an object using ultrasonic sound waves. An ultrasonic sensor uses a transducer to send and receive ultrasonic pulses that relay back information about an object's proximity. Usually clogging occurs inside the drainage system in such case the water level rises so when the water level rises the water enters the sewer monitoring system and damages the circuit so to prevent it we are using ultrasonic sensor where the system alerts the operator or the user and sends an message.

V. LCD Display: 16X4 Liquid Crystal Display(LCD) is used to display the value of the gas present inside the gas storage tank and show the value of the gas in case of any leakage.

VI .LED and BUZZER: Light Emitting Diode (LED) and Buzzer used to alert the operator or user in case of any leakage gas and increase in water level.

3. SOFTWARE REQUIREMEMNT:

Arduino IDE: Arduino IDE an Integrated Development Environment is a cross-platform application that is written in functions from C and C++ which is used to compile the program into the Arduino microcontroller.

Android Studio: Android Studio is the official integrated development environment which is specially designed for Android development. The program language used is java.

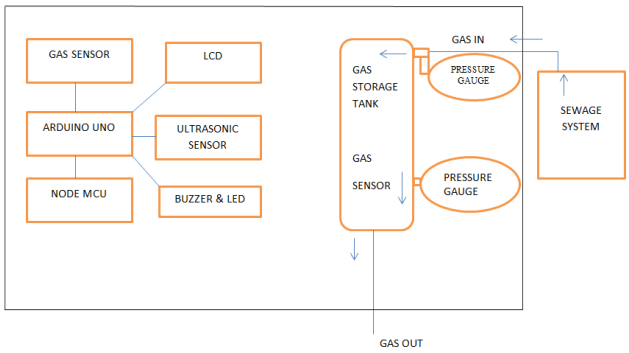

Fig. 1 Block diagram

3.IMPLEMENTATION:

At first the gas is produced inside the sewage tanks and then the gas in stored inside a storage cylinder where it has two pressure gauge and gas sensor. One of the pressure gauge is placed where the gas from the sewage enters into the cylinder to check in how much pressure does the gas enters into the cylinder. Another pressure gauge is kept to check how much pressure is present inside the cylinder. The Gas sensor is

placed inside the storage cylinder to check the amount of gas present inside. Another gas sensor is placed outside the gas cylinder to detect the leakage of gas in case. These
values of the gas present inside the cylinder and outside the cylinder is displayed on the LCD display, in case of any leakage the alert is sent to the user through an android application and alert is also displayed in the system by an warning alarm. There is also an exhaust fan to blow the gas inside the system in case of leakage. Usually clogging occurs inside the sewer system in such case the water level rises, so when the water level rises the water enters the sewer monitoring system and damages the circuit so to prevent it we are using ultrasonic sensor where the system the alerts the operator or the user and sends an message and alerts in the system. The main highlight of this system is that we can monitor the system where ever we are through an Android application which has an efficient and simple user interface. The bridge between the system and the android application to transfer the data from the gas monitoring system to the android application is Node MCU. Node MCU which has ESP8266 is also called as WIFI module where it transfers the data from the system to the cloud through internet. And from the cloud we can get the data to the android application and display the required values.

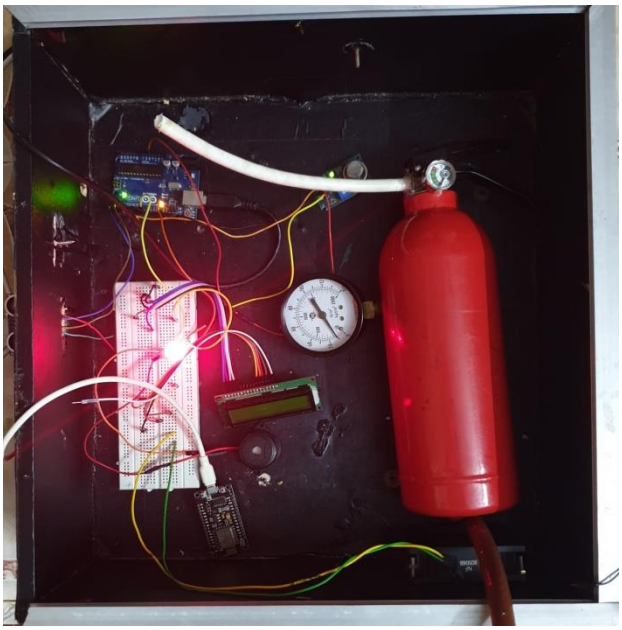

Fig. 2 Sewer pant model

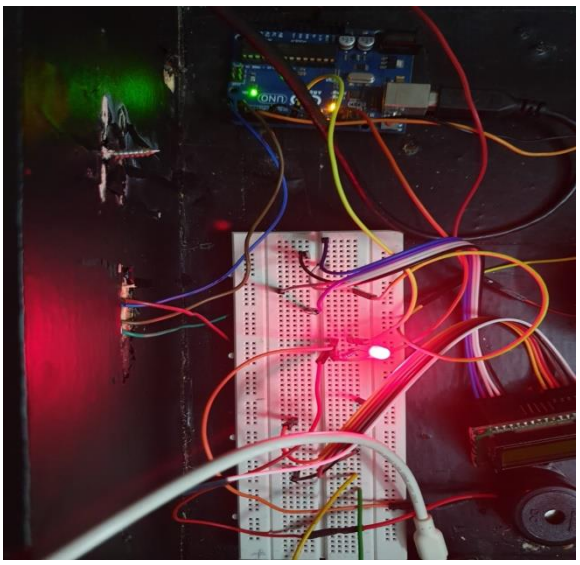

Fig.3 Circuit

4.ANDROID APPLIATION:

We have developed and android application for our system using Android Studio. The programming language used to develop the application is Java for back end, XML for front end (designing and interface) , Google Firebase for cloud and SQLite for database.

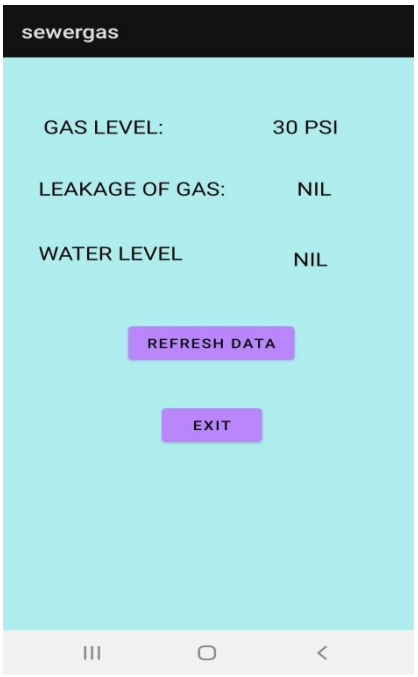

Fig. 4 Android Application

5. CONCLUSION:

The proposed system makes the gas detection and its prevention easier for quite user, whether technically sound or not. This technique wirelessly transfers alert notification to the user and therefore the user can easily connect the devices

through a Smartphone from any location. It's utilized in wide selection of applications in present day society and introducing a vast scope to the longer term. This easy control over the devices like exhaust fan makes the environment less accident- prone. Using the Arduino microcontroller also makes the system cheaper. Quick access and control makes the system very useful.

USES:

These sewage gases can be used as an alternative for cooking gas. It can also be used for generating electricity and can be used for automobile gas.

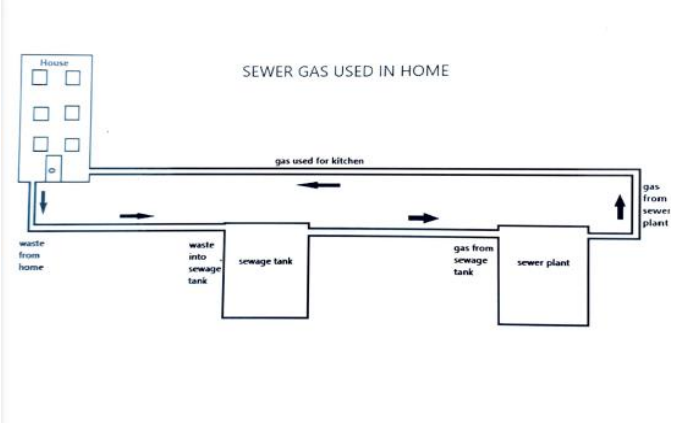

Fig. 5 Sewer gas plant in home

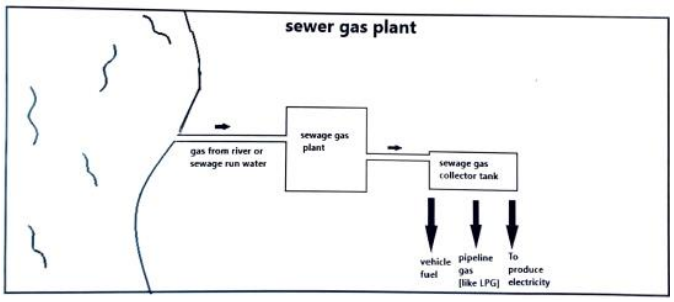

Fig. 6 Sewer gas plant in river

FUTURE ENHANCEMENT:

We can use solar powered pumps to extract the gas from the sewage system so that we can extract enormous quantity of sewage gas or sewer gas.

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