Production of Biogas and Electricity from Sewage Treatment Plant

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Abstract: - **Management of liquid waste becomes a challenge for urban local bodies. Septic tanks are the commonly used onsite sanitation system. Poor designed tanks lead to overflow of sewage. Desludging of septic tanks is critical in certain circumstances and human entry is the only option for desludging human death rate. A new technical way is needed to solve the above problem. The ultimate goal of this challenge aims on eradicating the entry of humans into septic tanks technologically. Due to this technology, economic growth can be upgraded by which can be executed successfully so as to reduce harmful disease.**

Keywords: - Internet of Things, Arduino, Ping Sensor, Ultrasonic Sensor, Float Switch Sensor, Pressure Monitoring Sensor, piezo-resistive transducer.

I. INTRODUCTION

The Internet of Things (IoT) is the network of physical devices, vehicles, home appliances, and other items embedded with electronics, software, sensors, actuators, and connectivity which enable these things to connect and exchange data, creating opportunities for more direct integration of the physical world into computer-based systems, resulting in efficiency improvements, economic benefits, and reduced human exertions.

The number of IoT devices increased 31% year-over-year to 8.4 billion in 2017and it is estimated that there will be 30 billion devices by 2020.The global market value of IoT is projected to reach $7.1 trillion by 2020.

IoT involves extending Internet connectivity beyond standard devices, such as desktops, laptops, smart phones and tablets, to any range of traditionally dumb or non-internet-enabled physical devices and everyday objects. Embedded with technology, these devices can communicate and interact over the Internet, and they can be remotely monitored and controlled.

IMPLEMENTATION OF IOT THROUGH ARDUINO DEVICES
BEFORE READING THIS ARTICLE, LET'S UNDERSTAND WHAT IS ARDUINO? , THEN WHAT ARE THE ESSENTIAL EQUIPMENTS USED? & THEN IN THE FINAL
SHOWDOWN, WHAT THE SEWAGE TREATMENT PLANT HAS TO DO WITH THE ARDUINO TECH?

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. You can tell your board what to do by sending a set of instructions to the microcontroller on the board. To do so you use the Arduino programming language (based on Wiring), and the Arduino Software (IDE), based on Processing.

Over the years Arduino has been the brain of thousands of projects, from everyday objects to complex scientific instruments. A worldwide community of makers - students, hobbyists, artists, programmers, and professionals - has gathered around this open-source platform, their contributions have added up to an incredible amount of accessible knowledge that can be of great help to novices and experts alike. There are many uncountable reasons of why arduino is being chosen for any particular research, here are a few good reason listed out:

➢ Inexpensive - Arduino boards are relatively inexpensive compared to other microcontroller platforms. The least expensive version of the Arduino module can be assembled by hand, and even the pre-assembled Arduino modules cost less than $50

➢ Cross-platform - The Arduino Software (IDE) runs on Windows, Macintosh OSX, and Linux operating

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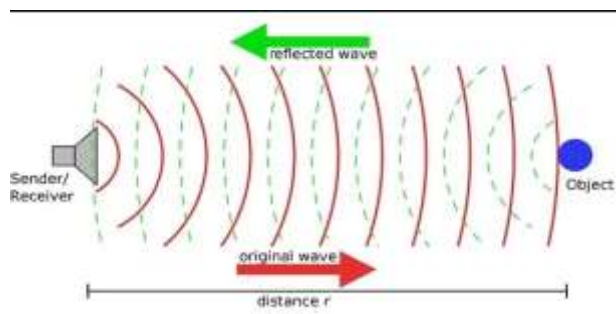systems. Most microcontroller systems are limited to Windows.

➤ Simple, clear programming environment - The Arduino Software (IDE) is easy-to-use for beginners, yet flexible enough for advanced users to take advantage of as well. For teachers, it's conveniently based on the Processing programming environment, so students learning to program in that environment will be familiar with how the Arduino IDE works.

➤ Open source and extensible software - The Arduino software is published as open source tools, available for extension by experienced programmers. The language can be expanded through C++ libraries, and people wanting to understand the technical details can make the leap from Arduino to the AVR C programming language on which it's based. Similarly, you can add AVR-C code directly into your Arduino programs if you want to.

➤ Open source and extensible hardware - The plans of the Arduino boards are published under a Creative Commons license, so experienced circuit designers can make their own version of the module, extending it and improving it. Even relatively inexperienced users can build the breadboard version of the module in order to understand how it works and save money.

SENSORS USED
1. Water Level Indicator
Getting down the stairs to the tank and checking the level manually or you'll you hear the water overflowing from the bottom. But these days electronic water level indicators are available to fix this problem, but they often come with a hefty price tag and are usually difficult to install. Most of the available systems use dipped electrodes or float switches, which can be a headache in the long run. We present a different approach to knowing the water level using an Ultrasonic module with Arduino. The advantage of this method is that it is contactless, so issues like corrosion of the electrodes won't affect this system.
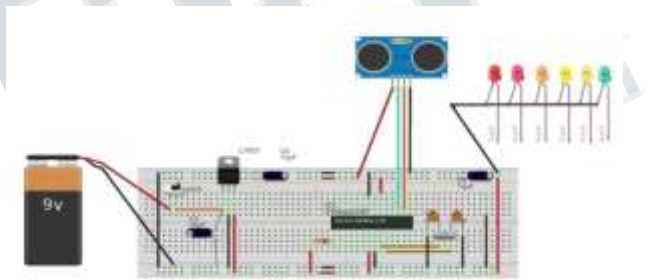
How Does the Arduino Water Level Indicator Work?

This Arduino water level indicator uses an ultrasonic sensor or Ping sensor to determine the level of water in the tank. The Ping sensor measures distance using sonar. An ultrasonic (well above human hearing) pulse is transmitted from the unit and distance-to-target is determined by measuring the time required for the echo return. Output from the Ping sensor is a variable-width pulse that corresponds to the distance to the target. This is then fed to the microcontroller that determines the water level and displays it through a series of LEDs.

Interfacing the Ultrasonic Sensor on the Water Tank
Fix the Ping sensor so it directly faces the water in the tank. The main control board with indication LEDs can be fixed inside the home at any comfortable position. Any multi-cored cables (Ethernet cable) can be used to connect the Ping sensor and the rest of the circuitry. Keep in mind not to increase the length between the components more than 20mts.
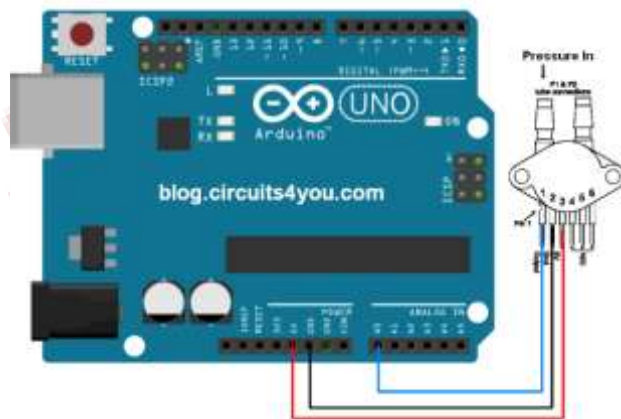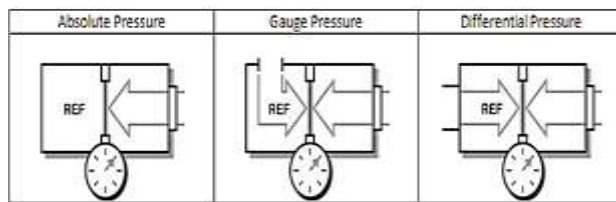

II. FLOAT SWITCH SENSOR
A float switch is a device used to sense the level of liquid within a tank, it may actuate a pump, an indicator, an alarm, or other device. Use them with hydroponics, saltwater tank, freshwater tank, and gardening, aquariums for power head control, pet bowls, fish tanks, filtration, heating, or whatever your project may be.
Contains no mercury

III. PRESSURE MONITORING SENSOR

There are three methods for measuring pressure: absolute, gauge, and differential. Absolute pressure is referenced to the pressure in a vacuum, whereas gauge and differential pressures are referenced to another pressure such as the ambient atmospheric pressure or pressure in an adjacent vessel. The MPX5010 series piezo-resistive transducer is a state-of-the-art monolithic silicon pressure sensor designed for a wide range of applications, but particularly those employing a microcontroller or microprocessor with A/D inputs. This patented, single element transducer combines advanced micromachining techniques, thin-film metallization, and bipolar processing to provide an accurate, high level analog output signal that is proportional to the applied pressure.

Related Work

Many MNCs have started focusing on green projects and some of them have successfully done their R&D in this field. To tackle specific environment problems, many tech startups are using IOT not just to asses direct-on field work, but also in development of 0 man-powers. Take Aibono, for instance, an Indian startup that assesses farms and crunches related data of soil, weather condition and so on, to build an imagery of the region by image processing sensors and assesses the same to advise farmers about the right fertilizer mix to be used based on the soil condition using soil moisture sensors so they get maximum yield returns. Similar services are offered by some other companies and tech startups.

Challenges to Face

Although the use of IOT is promising when it comes to real time situations, the development of IOT can be challenging in a modern world development. The first and foremost block is the regulation of strong connectivity, particularly to efficiently to run the application. Also, for many developing and un-developed countries, non-availability of connectivity from remote areas, and on site field to the city is challenging

Conclusions

Despite the challenges, and the nascent stage that IOT is still at, prospects of cognitive   application to IOT are promising. A tangible indicator of the same is the increase in the number of investments in the sector, particularly in startups working with ML and AI.
Every country's economical balance depend upon it's technological development. Though some might have failed in providing their roles to make this sector an attracting one, but at the same time, we should remember those who have contributed in making this sector aninnvative one. It is very sure that the coming generation will have immense opportunity to give their best to improve the quality of civilization using the technology.

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