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Automatic sewage water diversion system

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ABSTRACT

Pollution caused by sewage water is one of the major problems in cities the world over. Sewage water is drained off into rivers without treatment. Careless disposal of sewage water leads to the creation of a chain of problems like spreading of diseases, eutrophication, increase in Biological Oxygen Demand (BOD), etc. The water used for domestic, industrial and other purposes gets converted into wastewater. It is termed sewage water. In ideal conditions, sewage water is channeled or piped out of cities so that it can be recycled. Sewage contains organic wastes as well as chemicals. The pollution of water occurring from sewage is mainly observed in developing countries. In these countries, sewage water is not disposed ofproperly. In developed nations, a network of sewage pipes is used to take sewage away from cities. Treatment of waste minimizes pollution resulting from it. However, even in developed countries, the older cities may have leaky sewage systems.

Since each day behavior an enormous quantity of mess is generated through residential, institutional, marketable organizations. It includes household ravage liquid commencing toilets, baths, showers, kitchen with sinks draining addicted to sewers. In this project, we are developing a system that can monitor the water pH value, and depends on the pH value it will decide whether we can reuse the water or not. The normal permissible limit of irrigation water is from 6.5 to 8.4. More or less could affect the plants adversely. With the help of an automatic sewage diversion system, we can reuse the wastewater for watering the plants and we can meet the demands of water.

INTRODUCTION

Once freshwater has been used for an economic or beneficial purpose, it is generally discarded as waste. In many countries, these wastewaters are discharged, either as untreated waste or as treated effluent, into natural watercourses, from which they are abstracted for further use after undergoing "self-purification" within the stream. Through this system of indirect reuse, wastewater may be reused up to a dozen times or more before being discharged to the sea. Such indirect reuse is common in the larger river systems of Latin America. However, more direct reuse is also possible: the technology to reclaim wastewaters as potable or process waters is a technically feasible option for agricultural and some industrial purposes (such as for cooling water or sanitary flushing), and a largely experimental option for the supply of domestic water. Wastewater reuse for drinking raises public health, and possibly religious, concerns among consumers. The adoption of wastewater treatment and subsequent reuse as a means of supplying freshwater is also determined by economic factors.

In many countries, water quality standards have been developed governing the discharge of wastewater into the environment. Wastewater, in this context, includes sewage effluent, stormwater runoff, and industrial discharges. The necessity to protect the natural environment from wastewater-related pollution has led to much-improved treatment techniques. Extending these technologies to the treatment of wastewaters to potable standards was a logical extension of this protection and augmentation process.

Water is sometimes recycled and reused onsite. For example, when an industrial facility recycles water used for cooling processes. A common type of recycled water is water that has been reclaimed from municipal wastewater or sewage. The term water recycling is generally used synonymously with water reclamation and water reuse.

Another type of recycled water is "gray water”. Gray water, or gray water, is reusable wastewater from residential, commercial, and industrial bathroom sinks, bathtub shower drains, and clothes washing equipment drains. Gray water is reused onsite, typically for landscape irrigation. Use of non-toxic and low-sodium (no added sodium or substances that are naturally high in sodium) soap and personal care products is required to protect vegetation when reusing gray water for irrigation.

In the field of the respectability of “NeeruChettu”, “Haritha Haram” Andhra Pradesh, Telangana with new states in addition to supplementary names are payments change intended for escalating shrubbery on the road to convalesce rain next decrease the prompt of climate change. in the sphere of this piece, the existing tool helps in the sphere of conserving fill up in addition to caring for the plants since drying.

Options for water reuse

- Ornamental landscape water features and golf course water features such as ponds and fountains
- Fire protection
- Dust control and concrete mixing on construction sites
- Vehicle and window washing
- Toilet flushing in public, commercial, and industrial buildings

LITERATURE SURVEY

Before going into the details of our Automatic sewage water diversion system-based Water Quality Monitoring system, we will review some of the existing systems in vogue about Water Quality.

Traditional Water Quality Monitoring:In the traditional water quality monitoring system, different instruments have been used to monitor the quality of water which include “Secchi disks (measure water clarity), probes, nets, gauges, meters”, etc[1-3]. The traditional method is just not enough to measure water quality and identify any drastic changes in it. This method not only impedes accurate water quality measurement but also at times fails to predict sudden changes in the water system[4-5]. Hence, Information is also derived from satellite and aerial photographs by observing the surrounding environment and the changes in specific parameters such as flow of water, color in large overview, the direction of water flow, etc[6].

In this system they are using GSM module for sending the notifications to farmers mobile. The system water cool monitors is connected to the ardunio uno and it is acts as remote to control the overall module [10]

There are three major steps to execute traditional water quality monitoring. These three steps indulge different experts at different levels of the process. The major three steps are as follows:

- Water sampling
- Testing the samples

- Investigative analysis

Automatic sewage water diversion system

The existing Water Quality monitoring system employs human towards sampling the water Quality, Testing, and perform the analysis. Currently, some amount of technological innovation has been applied in water quality monitoring by using robotic fish, Digital cameras, and laser beam. Also, research has been done by employing wireless sensors also in water quality monitoring[1].

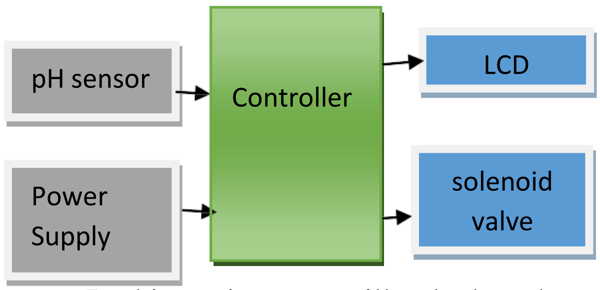
In addition to monitoring the water quality, very limited work was carried out in employing machine learning techniques in analyzing the quality of waterbased on collected water parameters for analysis rather than false alarm notification[2].

The challenge with the existing system is that there is no fully automated water Quality monitoring system employing Sensors[3]. Also,the system possesses no intelligence as such which allows for analyzing the data for prediction. These systems so developed communicate within a small geographical area[4].

So, with the advent of Machine-to-Machine Communication, we here have developed an intelligent IoT-based Water Quality monitoring system where PH Sensors are deployed in water tanks in a residential area that communicates through the Arduino Microcontroller. The system here consists of four components. The first component is the Arduino Microcontroller, pH sensor, solenoid valve, and 16*2 LCD. Sensors deployed in Water are connected to Microcontroller which gives the PH Water Quality. The data received by Arduino and then control solenoid valve and displays pH value in the display. In our project we have two solenoid valves depends on pH value one solenoid valve will be enabled and the second solenoid valve will be disabled so we can divert the water flow. So that the reusable water will be sent to the irrigation water tank.

PROPOSED SYSTEM

The proposed method is used to overcome the drawbacks present in the existing method. Here we are using Arduino Uno as core controller and pH sensors to monitor the water quality. The block diagram of our system is shown in Figure 1. We are connecting different sensors Arduino to monitor the conditions of the water. The Arduino will access the data from different sensors and then processes the data. The sensor data can be viewed on the LCD.

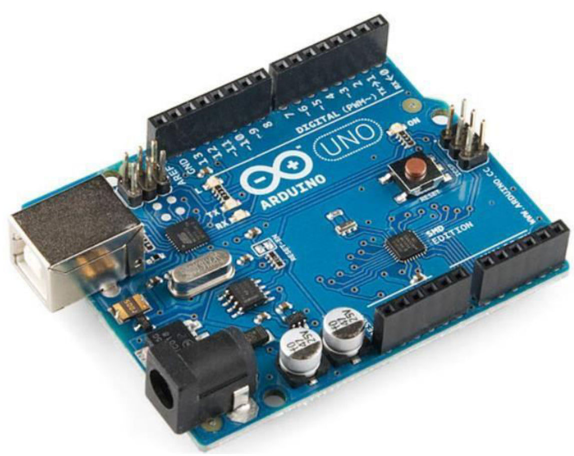


In this project, we will calculate the pH value of water and we will switch the solenoid valve.

The readings from the sensors are displayed in a 16x2 LCD which is directly connected to the Arduino microcontroller. This is useful when we are using the device indoors or only to get the readings on a screen. The LCD is also functional when the device is connected to a laptop where the readings are recorded. There is an onboard switch provided to turn on/off the LCD to preserve the battery in case we are powering the device using external batteries. There is a switch provided to turn on/off the LCD's back-light display. The back-light display consumes a lot of battery power. This is useful when we want to preserve the battery and also keep the LCD on.

Hardware Components:

Arduino Uno: Arduino platform based on ATMega-328 is used as our sensor node controller to acquire and process sensor data. Arduino is selected because it is an open-source platform, inexpensive, and provides sufficient analog/digital I/O pins for customizable applications. It operates at 5V and is powered with Atmel's ATmega328 microcontroller with a clock speed of 16 MHz's It has a flash memory of 32 KB and Static Random-Access Memory (SRAM) of 2 KB. It has 6 analog pins and serial ports. One of the serial ports is connected internally to Universal Serial Bus (USB) port.



pH Sensor: pH sensor (SKU:SEN0161) is a sensor that detects the pH value of water. This sensor is shown in Figure 3. The term "pH" is set off from Latin and is an acronym for "potentiahydrogenii" or "the power of hydrogen". pH is the hydrogen-ion concentration in water-based solutions, which indicates the acidity and alkalinity in the solution.

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The pH scale is a logarithmic scale whose range is from 0-14 with a neutral point being 7. Values above 7 indicate a basic or alkaline solution and values below 7 would indicate an acidic solution. The normal range of pH is 6 to 8.5

Solenoid valve:

A solenoid valve is an electromechanical device in which thesolenoid uses an electric current to generate a magnetic field and thereby operates amechanism that regulates the opening of fluid flow in a valve.

LCD:

16x2 LCD is used to display the readings in a real-time manner. This is also a human interface to the system. **6×2 LCD** is named so because; it has 16 Columns and 2 Rows. There are a lot of combinations available like 8×1, 8×2, 10×2, 16×1, etc. But the most used one is the 16*2 LCD, hence we are using it here

APPLICATION

- This system is used in commercial and domestic use.
- Mainly helpful for Water Supply Agencies.
- For the health department to identify the reason for water diseases.

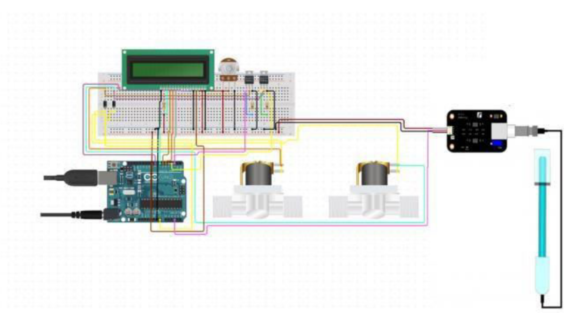
ADVANTAGES

- Automation will reduce the time to measure the parameters.
- This is economically affordable for common people.
- Low maintenance.

IMPLEMENTATION RESULTS AND ANALYSIS

In our proposed system pH sensors are connected to the Arduino Uno. This measures the pH parameter of the water when it dipped in water.

Then Arduino will access the data from these sensors and process the data and displays it on the LCD. Finally depends on the pH value it will switch on the solenoid valve. The pH value of the water ranges between 0 and 14. Based on the pH value, water is classified as acidic, normal, and basic. If the value is below 7 it is considered as acidic, above 7 as basic, and 7 as normal or good water. In acidic, it is again classified as low acidic (3 to 6) and high acidic (0 to 2). In the same way, basic water is also classified into two types. They are low basic (8 to 10) and high basic (11 to 14)



Circuit Diagram

FUTURE SCOPE

In the future, this system can be widely used in a variety of parameters for water, such as DO (dissolved oxygen), COD (chemical oxygen demand), BOD (biological oxygen demand), etc. Combined with the Internet of Things, regardless of where the user is located, the user can receive instant messaging, taking real-time monitoring technology to the next level.

REFERENCES

[1] A Novel Water Quality Monitoring System Based on Solar Power Supply & Wireless Sensor Network Ruan Yue, Tang Ying College of Information Science and Technology Zhejiang Shuren University Hangzhou, Zhejiang Province, China.

[2]The design of a Water Quality Wireless Sensor Network (WQWSN).

[3] Wireless Sensor Network (WSN) for Water Monitoring System: Case Study of Kuwait Beaches.

[4] V. D. of Sustainability and Environment, "Monitoring and reporting -results," April 2012. [Online]. Available: http://www.water.vic.gov.au/monitoring/river-

1. Angelakis, A.N.; Gikas, P. Water Reuse: Overview of current practices and trends in the World with an emphasis in EU. Water Utility J. 2014, 6, 67–78.

2. Boller, M. (1997). Small wastewater treatment plants - A challenge to wastewater engineers. Water Science and Technology, 35: 1-12.

3.Caribbean Environment Programme Technical Report #40 (1998). Appropriate technology for sewage pollution control in the Wider Caribbean Region.

4. Deb, P.K., A.J. Rubin, A.W. Launder, and K.H. Mancy (1966). Removal of COD from wastewater by fly ash. In proceeding of 1966. 21st Indiana Waste conference. D.E. Bloodygood Ed.Published by Purdue University, W. Lafayette, Indiana. pp: 848 – 860.

5.Escher, B.; Leusch, F. Bioanalytical Tools in Water Quality Assessment; Chapman, H., Poulsen, A., Eds.; IWA Publishing: London, UK, 2012. 13.

6.Escher, B.I.; Allinson, M.; Altenburger, R.; Bain, P.A.; Balaguer, P.; Busch, W.; Crago, J.; Denslow, N.D.; Dopp, E.; Hilscherova, K.; et al. Benchmarking Organic Micropollutants in Wastewater, Recycled Water and Drinking Water within Vitro Bioassays. Environ. Sci. Technol. 2014, 48, 1940–

7.Harada, H., A. Tawfic and A. Ohashi (2006). Sewage treatment in a combined up-flow sludge blanket (UASB)-down flow hanging sponge (DHS) system. Biochemical Engineering Journal, 29:210-219.

8.Johansson, L. and L. Hylander (1998). Phosphorus removal from wastewater by filter media: retention and estimated plant availability of sorbed phosphorus. Journal of Polish Academy of Science, 458: 397-410

9.Kumar, R., R.D. Singh, and K.D. Sharma (2005). Water resources of India. Current Science, 89: 794-811.

10. A Precision water saving irrigation system using IOT. Mrs.P. Bhagya sri1, Mrs.Y.Lavanya2. 1Assistant Professor, Department of ECE, Ramachandra college of Engineering JES Publications Vol 11, Issue 4 , April/2020 ISSN NO:0377-9254