AUTOMATIC WATER TANK CLEANER USING IOT

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ABSTRACT

The purpose of this project is to detect the quality of water and clean the domestic cylindrical water tank automatically with the help of mechanical system using IOT Technology. Every day we use the water tank for brushing and bathing, for cleaning and moping, for washing clothes and in other household chores with the passage of time, sediments scale and algae get deposited on the walls, ceiling and floor of the water tank. This can eventually clog pipes. It is not hygienic , which results in damaging the skin and it will effects health of individuals . As we know the prime source of many diseases is water, diseases like Cholera, Typhoid etc. So it is very important to use clean water. This project is able to read the Electrical Conductivity of water which is a important parameter of water quality as we know impurities are mainly consist of salts and it increase the conductivity of water hence voltage drop of water get decreased Which ultimately tells us the water is getting impure using these reading user can activate the automatic water tank cleaning system using IOT , then the gear and motor arrangement starts to work and brushes attached with motor rotates and side wall of tank gets cleaned

KEYWORD

IOT, AVR microcontroller, sensors, rack and pinion gear, linear and circular motion, ESP8266 wifi module

INTRODUCTIONS

Cleaning is the process of removing unwanted substances, such as dirt, infectious agents, and other impurities, from an object or environment. Cleaning occurs in many different contexts, and uses many different methods. Several occupations are devoted to cleaning.

The water that's pumped to our home is undoubtedly clean, but is the place where it gets stored clean as well? Yes, we are talking about the overhead water tanks. The health of your water largely depends on how clean your water tank is. Hence, cleaning overhead water tank is very necessary.

Every day we use the tank water for brushing and bathing, for cleaning and moping, for washing clothes and in other household chores. With the passage of time, sediments scale and algae get deposited on the walls, ceiling and floor of the water tank. This can eventually clog pipes. It is not hygiene, which results damages the skin and it, will effects on the health. Hence, water tank cleaning is very important. . Manual Cleaning water tank method is the traditional method of cleaning the water tank where a labour would get into tank and scrub the wall. The water tank can also be cleaned by using chemicals to remove the dirt and sediments. The chemicals used may affect the human health. Pressurized water can be sprayed on the walls of the tank, which will

remove the dirt. from the tank surface. These methods are time consuming and require more efforts for cleaning. Tank cleaning is extremely hazardous activity. When working in confined space personnel are exposed to a number of hazards that in some cases have led to injury or even death. There are various definition of a 'confined space' through are consistently applied. "a place which does not have benefit of natural

ventilation" and, "a place which difficult to enter therefore present hindrance to rapid escape in case of an emergency."

Cleaning overhead water tank on your own may be difficult because you need different types of tools, equipment and most importantly the time. However, overhead water tank cleaning is important too and it must be cleaned at least once or twice a year. A Dirty overhead tank can be terrible because it will accumulate dirt that can easily dissolve in the water contained in it. Frequency of overhead water tank cleaning completely depends on the quality of the water being supplied in your area. If you are supplied with hard water or water containing solvents, then you need to clean your tank more often, at least more than once or twice a year. And to ensure better and effective cleaning you can hire professional water tank cleaners, because they have trained employees and proper equipment to clean overhead water tank.

Reasons for Cleaning Water Tanks:

If you need to know some more important reasons to clean your water tank, then here are the three main reasons why cleaning your water tank is necessary:

1) Waterborne Internal Diseases*:* If you keep your water tanks uncleaned for months, there are high chances that many bacteria or virus will contaminate the water. In addition, if harmful bacteria and virus contaminate your tank water, then there is a high chance for you to get sick along with your family. Internal water-borne diseases such as diarrhoea, typhoid and cholera are the most common type of diseases in India that is caused by contaminated water. Usually, this happens in the case of drinking contaminated water from outside; but still, if your water tank remains untidy then these diseases can hit you through your overhead tank. Sometimes, malaria is also caused through water; therefore, keep the lid of your tank shut, so that mosquitoes cannot breed there.
2) Skin Diseases*:* Why just internal diseases, contaminated water can also cause skin diseases. It is obvious that you would not be using your tank water just for drinking right. You will bathe with it and wash your clothes and utensils. Therefore, while you keep in touch with such contaminated water, some skin diseases can definitely attack you. You must know that hard water ruins your hair, right. Similarly, if your water contaminated by some toxic matter or some germs, don't you think it will harm your skin? Of course, it will! Do not think just ground water can cause skin diseases, an uncleaned tank may also result in contamination of water.
3) Foul Odour*:* If you water is uncleaned for ages, then it is obvious that it is going to smell as foul as drain water. This is the result of residues and sediments that is mixed in your drinking water. Sometimes foul odor in the water may not be harmful to your health, but you may not be able to drink it because of its foul smell.

METHODOLOGY

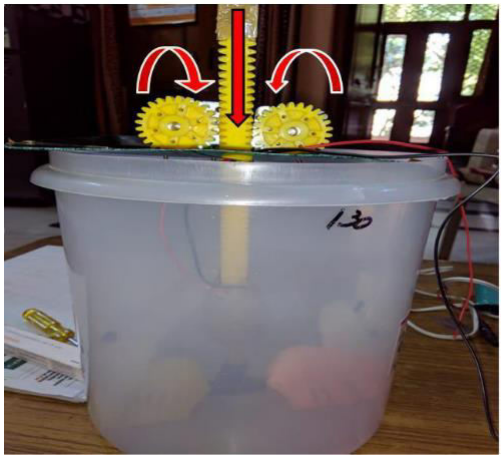
The whole project is categorized into two parts:

a. Mechanical System

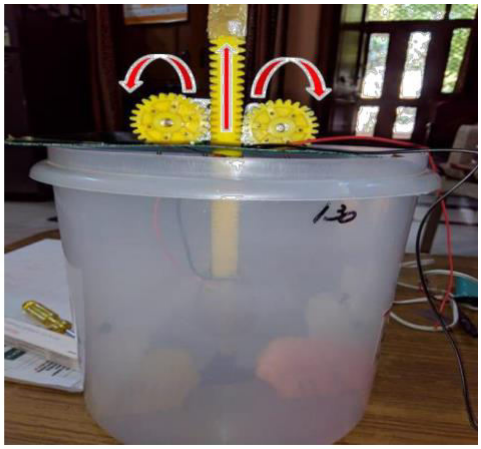
b. Electronic System

a. Mechanical System:

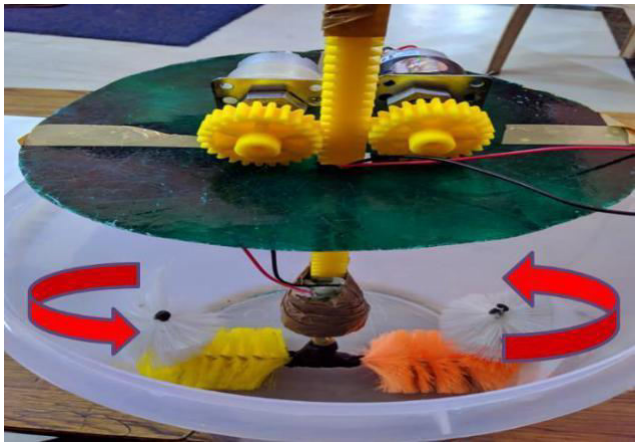
Mechanical Hardware is a structural design based on gears and motors. There are two circular gears which supports the one linear gear and these two circular gears rotate by two individual DC gear motor which is operated at 12V and have 30 rpm, below the linear gear an another DC gear motor with 100 rpm configuration attached with U-shape brush which rotate and clean the side wall and bottom of water tank as motor rotate.



Downward linear motion



upward linear motion



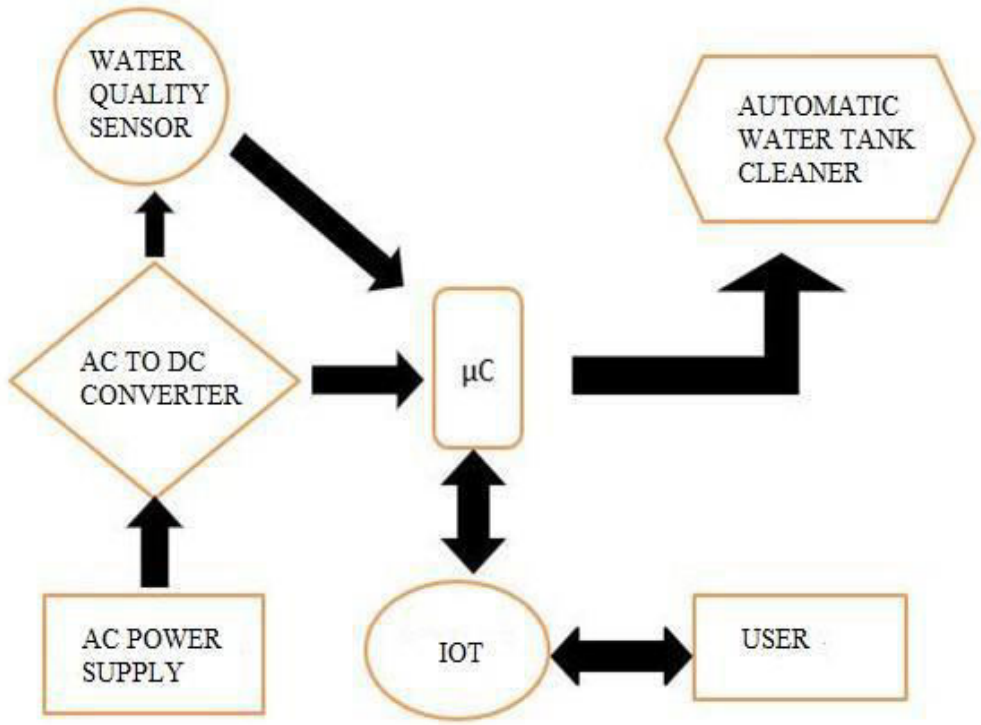
Circular motion

b. Electronic System:

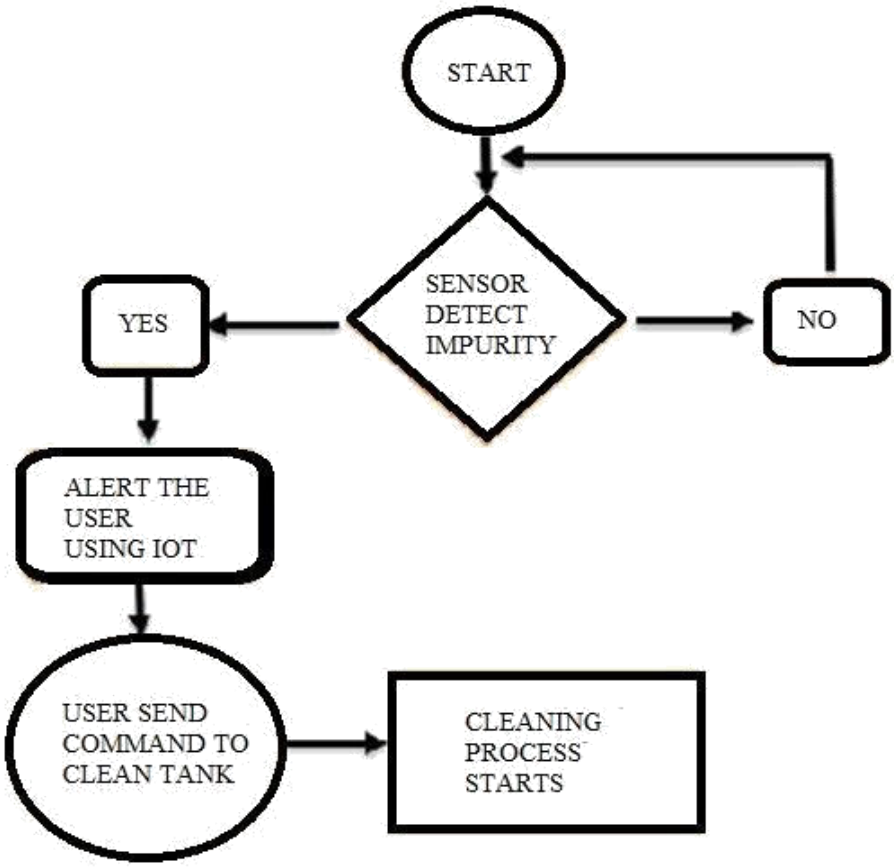
In this section, two water quality sensors are used -one is turbidity sensor and other one is TDS sensor which are attached to the mechanical hardware and controlled by Arduino-UNO microcontroller. To provide an interaction between microcontroller and user, a Wi-Fi-module is used, so that user can interact what is going on microcontroller side.

When power supply is on, first of all water quality sensor comes into play and send the data about the quality of water to the microcontroller using IoT which process this data according to the health standards. With the help of Wi-Fi module, microcontroller sends alert message to the user. On receiving the notification, user can send the command to start the water tank cleaning mechanism.

The microcontroller activates the solenoid valve which allow the extra water to flow out from the tank while in between, when water level reaches at lower level, microcontroller deactivates the solenoid valve so that flow of water gets stopped. Then the motors which is mounted on the top of water tank, starts rotating the rotational gears in opposite direction to each other. As a result, the linear gear starts going down simultaneously, the third motor which is just below the top surface of water tank and through which the whole tank gets cleaned. After that, all remaining muddy water again flow out from solenoid valve. Now, the water tank is get cleaned and empty. Ultimately, the user can start the water pump to fill the fresh water in the tank.



Basic block diagram



FLOW CHART

CONCLUSIONS

This project will consume less human efforts and time and proved to be more effective and safe.It also contributes to reduce health issues which arised due to unclean water.

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