Debris collection in water using purification techniques: A review

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ABSTRACT

In earth for living organisms' water is a significant source for surveying, and it is natural resources. Water covers most of our earth, and it is approximately 98% of water is seawater and is unusual for drinking. As clean (i.e. freshwater) water becomes rarer, a new invention offers hope, with the potential to clean up polluted waterways and make them suitable for drinking once again. To do this, we have two techniques that are implementing nowadays. These include Water cleaner robot and River water treatment plant. The Watcleaner is a robot, which floats on the surface of the water and automatically filters the oil, trash and other pollutants. It can detect the fish, dolphins, and all living organs which are in the water, making sure that none harmed during the cleaning process. Whereas the treatment plant removes microbiological, chemicals and radiological contaminants through four stages, ultra-filtration treatment, process stages include coagulation, clarification membrane filtration granular activated carbon- filtration and chlorine treatment. But by implementing Watcleaner, some disadvantages arise, i.e. the garbage is collected by the Watcleaner and sent it to disintegrators, and it stores for a long time, and it causes pollution again. To overcome the problem, nano bytes into the disintegrators and dissolve the garbage instantly. Whereas the River water treatment plant requires more space and large equipment, but it works efficiently than Watcleaner. In Watcleaner, instead of using power generators, replace them with solar panels and batteries can save power. Also, the Global Positioning System tracking systems helps to track the exact location.

Keywords: Watcleaner, Global Positioning System,Natural resources, River water treatment

1. INTRODUCTION

Water is a source of living organisms and regarded as the most essential of natural resources. Water covers most of us; However, about 98% of this water not used for drinking as it has a high concentration of salt and other dissolved particles. 2% of the planet's water is fresh, but 1.6% is polar ice caps and is trapped in glaciers [1]. Another 0.36% is found underground in aquifers and wells. Therefore, only 0.036% of the planet's total water supply is available in lakes and rivers [2].

Furthermore, existing freshwater sources are gradually polluting and are not available due to human or industrial activity. Increasing pollution of freshwater systems with thousands of industrial and natural chemical compounds is one of the significant environmental problems facing humanity worldwide. Increasing global population and industrialization are creating more demand than ever for the rapidly growing water supply, which makes it more valuable in more countries. Water is a vital commodity in some parts of the world.

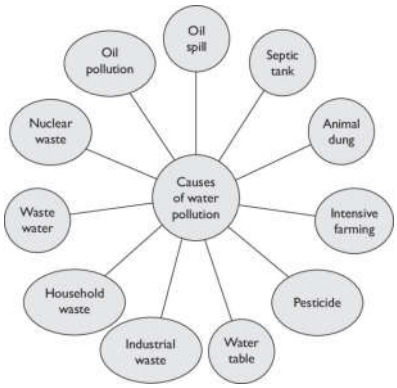

Figure 1. Water pollution sources [3]

Nowadays, these water pollution techniques are overcoming by using the two advanced technologies.

They are (a) Watcleaner technology.

(b) River water treatment plant technology.

The Watcleaner technology was designed and created by Chinese industrial designer Ye Yao, which floats on the water surface and automatically filters oil, trash and other contaminants. It can detect fish, making sure no one is harmed during the cleaning process [4].

River Water Treatment Plant technology has been designed and created by Australasia persons, in which it is the most sophisticated water treatment plants.This treatment plant was opened in 2002. Currently, it can purify up to 125,000 m3 of water per day; Upgrades are currently underway to increase the water capacity to 150,000 m3 per day.

2. RELATED WORK

As the purification techniques include "watcleaner technology" and "River Water Treatment Plant technology" the brief description about these are:

(a) Watcleaner technology:

The Watcleaner has detectors thatdetect water contaminant on the bottom surface, everything from essential trash oil, and clean the water. At the top of the absorbent socks absorbs oil to watcleaner and clean it. Moreover, garbage is taken and directed to a disintegrator. Clean water is then scattered through the top of the Watcleaner and returned to the water system. Also, it detects the fishes while cleaning in particular areas.

Watcleaner not only cleaning the water also transmit the condition of water contaminant by pollution. Beyond just cleaning the water of contaminants, the Watcleaner is also set up to transmit water condition to land-based controllers and Ask you for help if it faces too many contaminated conditions to handle alone [5].

The WatCleaner has a large number of disintegrators which stores garbage which is collected or absorbed by the Watcleaner robot. After filling of garbage into the disintegrators it pumps or sends out. In this way, the Watcleaner works efficiently resulting in producing potable water using either for drinking purpose or some other specific purposes.

(b)River water treatment plant technology [6]:

The treatment plant eliminates microbiological, chemical and radiological contaminants through four-step, ultra-filtration treatment process, described below.

i. Coagulation and Clarification
ii. Membrane Filtration
iii. Granular Activated carbon filtration
iv. Chlorine treatment

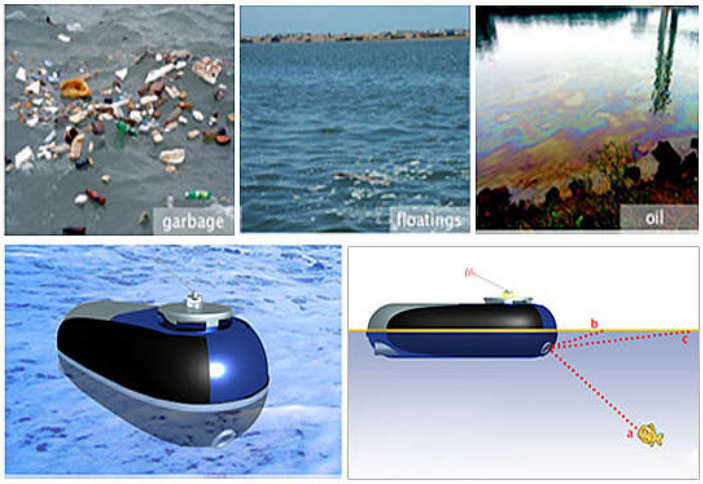

Figure 2. WatCleaner robot

i). Coagulation and Clarification [7]:

After passing through the screening filter to remove large debris such as leaves and twigs. Coagulant (aluminium sulfate or alum), lime and carbon dioxide are mixed

with water. This allows small dust particles to stick together and be easily removed. The water is then pumped into the tanks, where a mixture of alum and dirt (called flocc) sinks to the bottom of the tank.

ii). Membrane Filtration [8]:

Clearwater is treated with an advanced, ultra-filtration membrane technology to eliminate pathogens. The pores of the membrane filters are so small that they do not allow parasites likeGiardia and Cryptosporidium to pass through the pores of thefilter.

iii). Granular Activated carbon filtration [9]:

At this stage, certain chemicals particularly organic compounds, chemicals that give objectionable odoursor tastesto water such as hydrogensulfideare removed bygranular activated carbon particles from water.

iv). Chlorine treatment [10]:

In the final stage, chlorine is mixed with water to kill any residual viruses and prevent bacterial overgrowth during storage and transport.

Figure 3. River water treatment plant

3. PROPOSED WORK

IDEA/MODELS:

The robot, WatCleaner, detects dust and other particles in the water, engages them and sends them to the fragments and stores. Using this method, the contamination can be increased and the trash can be melted by using nano bits of the breakage. These nano bytes pass through the trash and raw materials that break down and readily dissolve the garbage to minimize contamination.

The WatCleaner is now implemented using force. Solar panels and batteries can be used instead of electricity so that we can save energy.

The river water treatment plant occupied more space due to the use of larger equipment. It requires more power. Hence to cut down on power sources, it can be replaced with solar panels.

WORKING PROTOTYPE DETAILS:

Introducing solar panels and batteries to the water cleaner reduces power supply usage

Figure 4. WatCleaner using a solar panel

They readily dissolve trash particles by sending broken nanoparticles. These nanoparticles stick to the garbage, and the garbage is quickly dissolved into smaller particles without being stored for long periods [11].

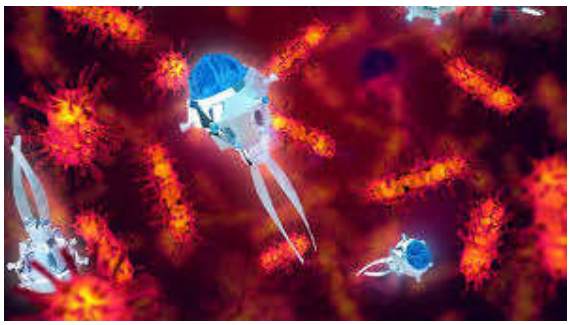

Figure 5. Dissolving garbage using nanobots

IMPLEMENTATION TECHNIQUES [12-16]:

In this proposed work,both thermal image scanning processing (by heat detection) and artificial intelligence are implemented in Watcleaner to detect the living organisms like aquatic animals. WatCleaner can move from one place to another by using the mapping system to collect the debris and G.P.S. tracing systems helps to track the exact location of Watcleaner.The observer can maintain the statistical data of how much quantity of debris is collected by the WatCleaner in a weekly bases by using a supervised machine learning technique. The observer can also maintain the data in a cloud so that byanalyzing previous weeks data,the analysis can analyses how much pollution is occurring in the ocean.

4. RESULT

Various methods for wastewater treatment have been developed due to various pollutants. This increases the cost of getting clean water. Developed Process Especially in underdeveloped countries, the cost of operation can also be substantial when the water shortage has to reach the poorest people. Additionally, safe water awareness is still not sufficiently understood by many in the world.

Research and developments in wastewater treatment systems should reach a global audience as soon as possible. These advanced technologies, such as water cleaner and river water treatment plant methods, can be used to make wastewater to provide more freshwater on the ground, reduce drinking water shortages, and reduce lots of wastages and chemicals released by industries into the waterbodies.

5. CONCLUSIONS

There is a need to emphasize environmental issues and develop solutions in close collaboration with science, governments, industry and other relevant stakeholders. Research and development in the area of water treatment should reach real applications wherever necessary.

These techniques play an essential role in water purification and are more effective than other purification methods and increase the percentage of freshwater on land.Reclaiming resources from sewage can increase global importance.

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