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Aqua Trash Bin

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Abstract -"Aqua trash bin" is afloating bin withseveral clever features, as thename suggests. The major goal ofthis effort is to remove floating garbage from allof the country's waterbodies and make themlitter -free. The Aqua trash binis a trash canthat floats on the water andcan be found at marinas, docks, yacht clubs, and commercial ports. The following threekey components are used to cleanthe ocean:a pumping unit, a catchbag made of waste material, and steel pipes.The Aqua trash bin follows the flowof the tide, gathering any floating trash. Wateris drawn in from the surface andpasses through the Aqua trash bin catch bag.After that, the water is pumped back intothe marina.

Key Words:Water pump, catch bag, Node MCU, proximity Sensor,

1.INTRODUCTION

The various solution which is existing around the globe are such as "OCEAN CLEAN UP" which was launched in 2018. The sad news is that while cleaning up the Pacific Ocean it broke down. So inspired by this, the idea was to build a sustainable floating garbage bin that could collect the water borne plastic and trash 24 hours a day with minimal human interference. The aqua trash bin unit is a floating interception device designed to be installed in the water of river, lake, ocean and any water body with a calm environment and services available. The Aqua trash bin is nothing but a bin floating in over the water and attracts all the floating rubbish in that water body. The Aqua trash bin is basically a water filtering system designed for contained environments like marinas and ports. Since it is sheltered from strong currents and ocean storms, it can work on pollution in visible areas where there is plenty of human activity. The Aqua trash bin is bin like structure that is fixed to a dock along with water pump running on power. The pump sends a current of water through the system, sucking all floating trash and debris into a natural fibre bag. The water is then returned to the water source. Aqua trash bin also separates oil from water to some extent, depending on the quality of the catch bag.

The Aqua Trash Bin is a trash can that floats on the water and can be found at marinas, docks, and yacht clubs and commercial ports. Water is drawn in from the surface and filtered via the catch bag inside the Aqua Trash Bin. The water is then pumped back into the marina, trapping litter and debris in the catch bag, which is subsequently properly disposed of. The Aqua Trash Bin can also capture a proportion of oil and contaminants that are floating on the surface of the water.The Aqua Trash Bin Project is experimenting with 24-volt submersible water pumps that can be powered by alternate energy sources. Depending on the geographical region and current technologies available, this might be done with solar, wave, or wind power. As part of a three-pronged approach to the present global littering problem, the Aqua Trash Bin Project has devised a threepronged approach. The elements listed below are being developed concurrently with the product. Although the following elements are given in order of significanc00e, they are all equally important.

2. METHODOLOGY

As The Aqua Trash Bin is a device which is designed to collect floating debris and waste and pollutants from marinas, ports, and other aquatic environments. The methodology used in the aqua trash bin design involves several components;

1.Suction: The Aqua Trash Bin uses water pump to create a flow of water that draws in floating debris and pollutant.

2.Filtration: Once the water and Debris enter in Aqua Trash Bin, they pass through a filter that collect the debris and pollutants. Filter is designed to be easily replaced and remove when it becomes full.

3.Water Flow: the clean water is the returned to the environment through flow control system that ensures the water is discharged at the appropriate rate.

4.Monitoring: The Aqua Trash Bin is equipped with sensor that monitor the garbage level in catch bag which is used as filter and gives notification on users mobile.

Overall, the aqua trash bin methodology combines a range of engineering, environmental science, and data collection techniques to provide an effective solution for reducing plastic and other pollutants in aquatic environments

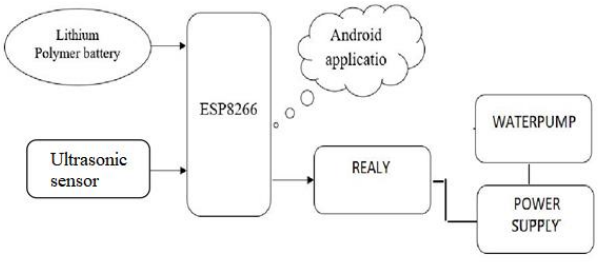

Fig-1: Block Schematic of Aqua Trash Bin

The aqua trash bin moves up and down with the range of tide collecting all floating rubbish. Water is sucked in from the surface and passes through a catch bag inside the bin, with a submersible water pump capable of displacing 25,000 litters per hour, plugged directly into a 110/220V outlet. The water is then pumped back into the river leaving litter and debris trapped in the catch bag to be disposed by properly. The bin's catch bag holds 20 kgs of debris. The estimated average catch is 1.5kg per day including micro plastics down to 2mm small. This equals over ½ ton of debris per year.
when the catch bucket get fully filled with garbage the proximity sensor will sends signal to Blynk platform with that node MCU will send a signal to relay to turn off the motor and simultaneously Blynk platform will sends sms to user. At the same time pulley will lift the catch bag using motor automatically.

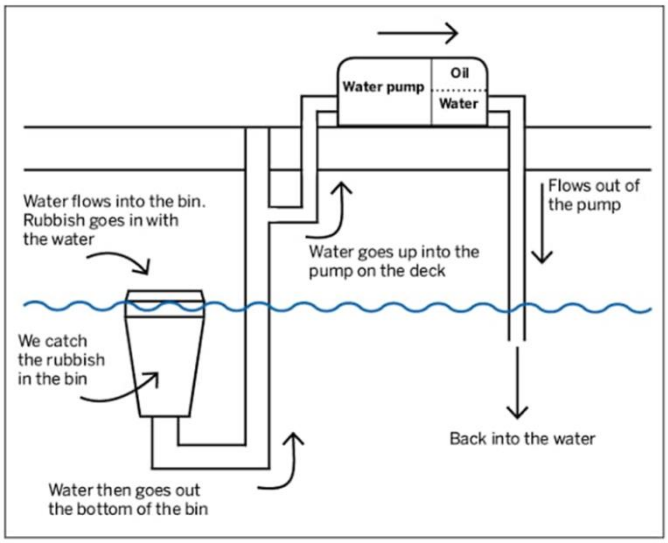

Fig-1: Aqua Trash Bin

3. SYSTEM COMPONENTS

Main body is consist of weights and brackets. It moves up and down up to water level, in which our second component that is catch bag is placed inside main body.

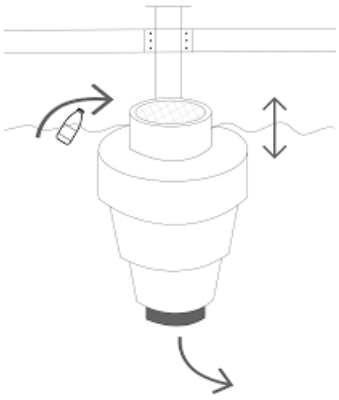

Fig-1: Structure of Aqua Trash Bin

Main body is consist of weights and brackets. It moves up and down up to water level, in which our second component that is catch bag is placed inside main body.

A pump is a machine used to move, compress, or transfer water. There are a number of different types of pumps available: jet pumps, centrifugal pumps, gear pumps, peristaltic pumps, gravity pumps, and impulse pumps. All of them are useful across a number of different industries. For use in daily life, the most commonly used category of pump is the water pump of the centrifugal variety.A submersible water pump that is used to pump water through the Aqua Trash Bin. The pump should be rated for 0.1A at 120V AC and should be compatible with the Aqua Trash Bin.

Image-1: WaterPump

Node MCU is an open-source firmware for which open source prototyping board designs are available. Node MCU is an open-source LUA based firmware developed for the ESP8266 Wi-fi chip.
The Node MCU is a low-cost Wi-Fi-enabled microcontroller that can be used to control the Aqua Trash Bin operation and collect data from the IR sensor. The Node mcu can be programmed to turn off the Aqua Trash Bin water pump when the catch bag is full and send a notification to a support team to indicate that the bag needs to be emptied.
An ultrasonic sensor can be used to detect when the catch bag is full of debris. The sensor can be positioned in the catch bag and will trigger when the debris reaches a certain level, indicating that the catch bag is full.The ultrasonic sensor should be selected based on the range and accuracy required for the project. A sensor with a range of several meters and high accuracy is recommended.

A relay is an electrically operated switch. It consists of a set of input terminals for a single or multiple control signals, and a set of operating contact terminals. The switch may have any number of contacts in multiple contact forms, such as make contacts, break contacts, or combinations thereof. Relays are used where it is necessary to control a circuit by an independent low-power signal, or where several circuits must be controlled by one signal.
A relay can be used to control the Aqua Trash Bin's water pump. When the Node MCU receives a signal from the IR sensor indicating that the catch bag is full, it can activate the relay to turn off the water pump.

4. FEATURES, LIMITATIONS AND APPLICATIONS OF THE SYSTEM:

Features of the system

- The system capture smaller plastics, and maybe even separate oil from the water.
- It has a low energy consumption of $ 1 per day, and works with 110V or 220V

Limitations of the system

- Only captures the floating material, leaving the entire depth of plastics submerged under water.
- These units are suitable for calm waters like the marinas.

Application

- Saving environment from plastic.
- Reducing plastic pollution form water

The article reported that the Nashik Municipal Corporation's (NMC) Solid Waste Management Department had conducted a cleanliness drive along the river banks and removed around 80 metric tonnes of plastic waste in just one month. Additionally, the NMC had deployed four garbage-collecting boats to remove plastic waste from the river, but the amount of waste entering the river was reportedly overwhelming.

So our project is one of the solution to reduce the plastic and debris form the Godavari river.

5. FUTURE SCOPE

These and other features combine to make Aqua Trash Bin a fantastic product that aids in the fight against marine trash in the ocean.

6. CONCLUSIONS

We strive to be as near to zero waste as feasible at Aqua Trash Bin. The catch bag, which actually traps the marine debris, is constructed of jute and is one of the key components of the Aqua Trash Bin. This isn't an issue because jute is completely biodegradable, recyclable, and compostable. When a catch bag approaches the end of its life cycle or breaks, just clean it thoroughly to remove any plastics or impurities, then compost it to produce your own vegetables. These and other features combine to make Aqua Trash Bin a fantastic product that aids in the fight against marine trash in the ocean.
The following are some of the advantages of employing an Aqua Trash Bin in the maritime environment:

- It reduces the amount of effort required by humans to collect trash from the water bodies around us.
- Doesn't require any additional help or attention while working.
- Use of energy to the bare minimum.
- Removes garbage and other floating and suspended debris from water bodies.
- Cost-effective and easy to construct.

ACKNOWLEDGEMENT

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