DESIGN AND DEVELOPMENT OF AUTOMATED WATER SURFACE CLEANING DEVICE FOR LAKES AND PONDS

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Introduction

Our project aimed at developing a cleaning device to clean lakes and ponds containing wastes like small water bottles, leaves, thermocols and cigarette butts etc., We developed an Iot (Internet of Things) based remote controlled device which consists of rack and pinion mechanisms to lift the trash using trash tray with the help of the dc geared motor attached to the motor frame on either side of the bot. A translatory mechanism consisting of rack and pinion is made for pushing the trash that is lifted at certain height into the trash bin which can even clean the algae of water by scrapping it.

While trash is fallen into the trash bin the water particles are trapped into filter tub consisting of activated charcoal to reduce its pH level up to some extend and use that water for non-portable water needs.

The analysis was carried for some of the critical components such as trash tray, motor frame and PVC pipe with the help of analysis software called “Ansys”. Results obtained that for a maximum of 10kg of load applied on the trash plate it exerts a bending stress of 65.783MPa and for a load of 1.47N acting on the motor frame it exerts a bending stress of 0.154MPa and for a load of 147.15N acting on the PVC it exerts a bending stress of 0.26MPa.

The results shows that the values of the bending stresses obtained through analysis for the above components are less than the allowable range and hence its safe.

Water makes up over 71% of the earth's surface and is an essential resource for all living things. Only 3 percent of it can be drunk, though. Water is a universal solvent that can dissolve a wide range of things, including chemicals, sewage, hazardous pollutants from factories, and more. As a result, human activity has seriously contaminated water, which is a major issue that all living things are currently dealing. The aquatic environment is harmed by the discharge of trash, sewage, and liquid waste from homes and chemical factories into bodies of water, which is the main source of this contamination. As a result, the water becomes unsafe to drink and endangers people's health.

One innovative solution to this problem is a concept of Iot based water surface cleaning device using Rack and pinion mechanisms. Here we intend to develop our device named "REVA Aqua Bot," as shown in fig1. The V-shape design in the front end of the device helps in collecting and guiding the floating waste toward the lifting tray of the device, which in turn lifts the waste upwards, and with the help of the Rack and pinion mechanism. The waste gets pushed into the trash collecting tray. The trash collecting tray has several holes towards the lower portion of the tray, through which the water coming with the waste gets filtered to the filtration unit of the device.

Fig. 1 REVA Aqua Bot

In the filtration unit, there is a pH sensor that detects the pH levels of the water incoming. There is activated charcoal present in the filter tub which will further help in filtering the incoming water through the bin. Activated charcoal helps in reducing the pH levels of water and the filter paper attached near the pipe entrance ensures no particles pass through it. Thus, filtered water can further be used for non-portable water needs.