

IoT Based Intelligent Pond Cleaning Device

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Abstract— The degradation of waste into water bodies leads to many diseases to human beings. To separate waste from contaminated water, we have developed innovative methods. The previously existing systems clear the floating waste by using DC motors, RF transmitter, and receiver. In our project, we are going to extract the waste material by automated techniques. The IoT based intelligent pond cleaning device collects the waste garbage from the water. The device consists of Arduino Uno, L293D Motor Driver, Bluetooth, DC geared motors and, solar panel is helpful to extract the floating waste and debris from the water. A proximity sensor can detect the objects. The waste gets crushed and, it segregated to the trash bin.

Keywords—sensor, Arduino, Conveyor belt, controller

I. INTRODUCTION

The “IoT Based Intelligent Pond Cleaning Device” is used to control water pollution by removing waste debris in the water resources. This device aims at collecting and removing plastics and other garbage by the use of conveyor belt. The Arduino UNO is programmed to move in the required directions which can be controlled by Bluetooth in the android smart phone. The conveyor belt helps in the lifting of the water wastes from the water body. This manually operated device improves the quality of water and the life of aquatic organisms. The solid garbage wastes mixed in the water resources from various places like residential areas, industries and by other commercial activities can be cleaned up by this pond cleaning device. This will eventually reduce the risks faced by the underwater or aquatic organisms. Since the wastes in the water bodies pose a great threat to their life. This device is operated by the means of solar energy which is a renewable form of energy. Therefore this device can be energy saving and provides pollution free operation. The proximity sensor is used in this device to detect the garbage in the water body. The device can be operated to move in all the four directions to collect the sewage. The crusher blade which is used in this device can crush the plastic and other wastes efficiently. Thus this device can be beneficial in multiple ways in saving the environment.



Fig.1 Floating waste

II. BLOCKDIAGRAM

Fig 2 represents the block diagram of the pond cleaning system using IoT. Arduino Uno gets dumped by the program. It helps to receive the comments from the mobile phone. Convert the programming character to ASCII code and received it by Arduino through Bluetooth device. 12V DC motor is used But, Arduino has a 5V power supply for this Motor driver is used to control the motors. A proximity sensor can detect the objects in the water. A Solar panel produces electricity and a helpful for a battery rechargeable. The waste materials get transport by using a conveyor belt. To crush the garbage cutter blade is used. Different kinds of sensors used to control the microcontroller. Every data sent to the microcontroller and, then it gets functioned. The gathered data sends to an Arduino board and, data gets controlled by the UI controller. By using the Bluetooth module, the current location device can easily found. The UI controller operations can be controlled on the phone through a wireless connection. The changing of direction in the device is easy and changing of direction data sent to the driver board by using the wheels which are rotated continuously according to the user commands.

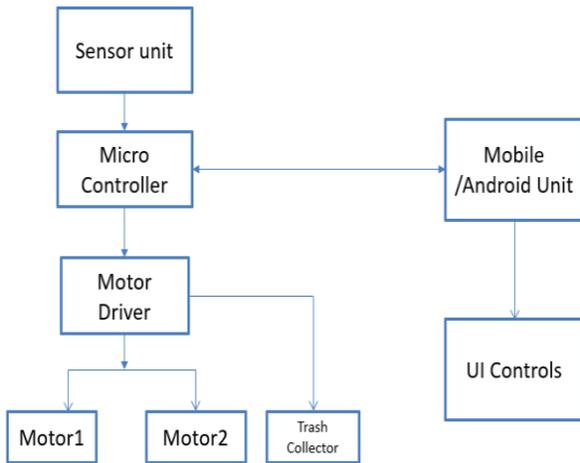


Fig.2 Block Diagram

III. EXISTINGSYSTEM

The working method of old techniques used only to extract floating material from the water. All the functionalities are maintained manually. Maintains cost is high. Only skill laborers required driving the system. A Cleaning robot control by a Microcontroller used in AT89S51 (8051) to work in the serial pattern of communication UART mode configured on 9800bps used to communicate with Bluetooth module.

IV. LITERATURE SURVEY

(1) Mr. Abhijit, M. Ballade proposed system River Cleanup Machine aims to reduce water pollution and saving the life of aquatic organisms. Hydropower renewable resources to clean the water bodies technique is used.

(2) Mr. P. M. Sirsat, This paper deals with the design and fabrication of the river waste cleaning machine. It has been designed to clean the waste material, which deposits over the surface of the water bodies. This remote-controlled machine is more efficient, effective, and eco-friendly comparatively. It consists of an RF transmitter, receiver, DC motors, Propeller, PVC pipes, and a chain drive will a conveyor attached. The attached conveyor collects the waste, garbage, and plastic wastages from water bodies.

(3) Ms. Soumya, H.M. Preethi, and Baswaraj Gadgay designed a Pond Cleaning Robot that removes wastes from water surfaces. The device works on Bluetooth and used in cleaning water bodies from Godavari river, Nashik. It also extracts plastics and garbages.

HARDWARE COMPONENTS

A. ARDUINO UNO:



Fig.3 Arduino board

Arduino UNO is an open-source electronics platform. And the board makes electronic devices smart. Multi-tasking is possible using Arduino. According to the users, Arduino boards are flexible and user-friendly. Arduino UNO uses an STK500 protocol for communication. As Arduino UNO doesn't make use of FTDI USB-to-serial driver chip, it makes some difference between all the other boards and Arduino UNO.

B. L293D Motor Driver:



Fig.4 Motor driver

Motor driver IC is an L293D that is a typical Motor driver that permits DC motor to drive in dual directions. It gets the help of L293D 16-bit IC to control the DC Motors in either direction at the same time. A Motor needs a high amount of current where it works on low current signals. The L293D can control both small and big motors as well. These types of motors are available in all electronics shops also.

C. HC-05 Bluetooth Module:



Fig.5 HC-05 Bluetooth

HC-05 Bluetooth module is a Bluetooth Serial Port Protocol module. Wireless serial connection setups are made transparent. HC-05 consists of a red LED which tells whether the Bluetooth is connected or not. This red LED blinks continuously until the HC-05 Bluetooth module gets connected. HC-05 uses a 2.45GHz frequency band.

D. LEAD ACID BATTERY:

The Lead-acid battery has both positive and negative plates. The positive plate consists of lead dioxide. The negative plate consists of a sponge. These leads are mainly for the conversion of chemical energy into electrical power. Lead-acid Battery has a higher cell voltage. And due to its lower cost, it has been most commonly used in the power stations and substations.

E. VOLTAGE REGULATOR:

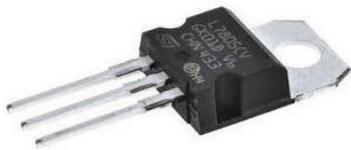


Fig.6 Voltage converter

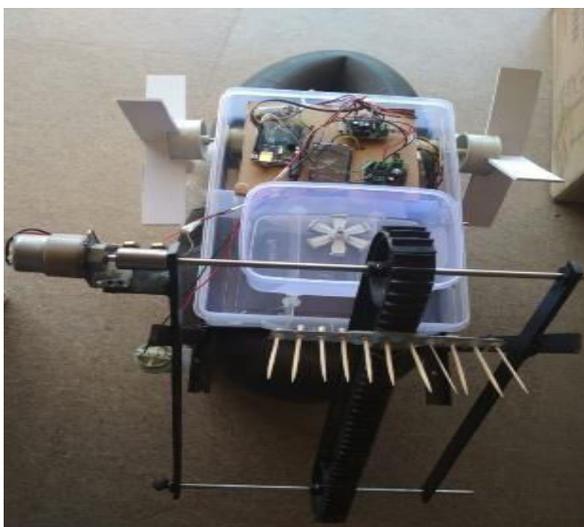
A voltage regulator is a system mainly used for maintaining a constant voltage level. A voltage regulator may include negative feedback. It may also use an electromechanical mechanism. It acts as a buffer for the protection of components from damage. Series and Shunt are the two types of Linear voltage regulators.

F. PULLEYS:

A Pulley consists of a wheel over which a pulled rope runs to change the direction of the pull used for lifting a load. While combining two or more pulleys reduces the workload.

G. CONVEYOR:

In the Pond Cleaning Machine, we have used the conveyor belt. A conveyor is used to collect all the floating garbages in the water. A motor driver is used to control the device. The belt helps to transfer the waste material from one place to another place..



V. WORKING MECHANISM

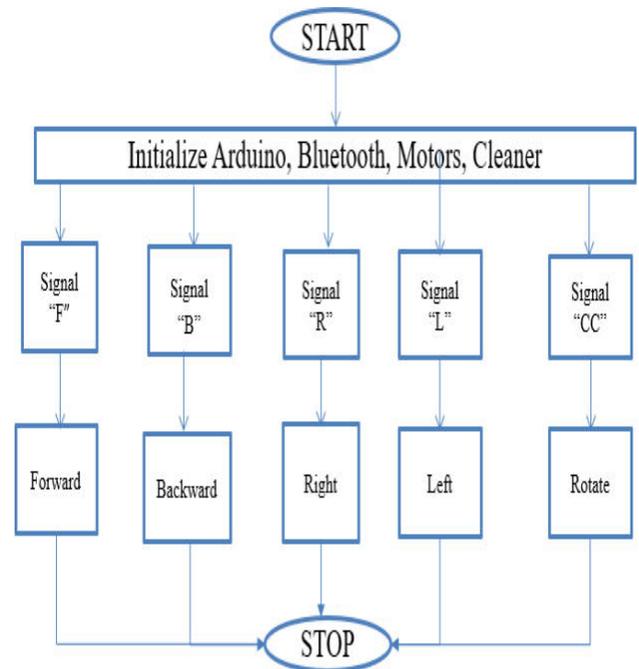


Fig.7 Flow diagram of the system

- A device should connect with mobile through Bluetooth.
- Then initialize the Bluetooth model, Motor driver and the cleaner
- The Bluetooth device is connected to the device to do functionalities based on the comments.
- Now the machine is controlled by mobile through Bluetooth.
- The device collects all the garbages based on user comments.
- Two ways of power supplies were provided to the device to run more hours.
- The user can stop the work as there wish.

VI. CONCLUSION

The issues in waterlogging is because of plastic waste things causing many water diseases to living organisms and also for human beings. The project "IoT Based Intelligent Pond Cleaning Device" extract the waste from the water. It will reduce water pollution in ponds and fully automated.

VII. FUTURE ENHANCEMENT

The future working process can deduct the waste materials by using GPS data to locate the trash position in world coordinates. The capacity of a machine can increase for cleaning the waste materials in the water. This methodology can implement on underground water waste cleaning.

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