# Remote Controlled Waste Collecting Machine from Fresh Water Resources

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**Abstract**: Water is the basic need for all living beings are now polluted due to many reasons such as industrialization, discharge of domestic waste, radioactive waste, population growth, excessive use of pesticides, etc. Lake pollution is due to rapid urbanization and industrialization. So the water quality of lakes becomes unfit for the needs appointed. Lake restoration is being practiced for the past several years by central and state governments and local bodies. Even many NGO and private firms are also involved in the restoration programme of polluted lakes. The restoration programme has been implemented in some popular lakes in India such as Katchrali Lake, Ooty Lake, Kodaikanal Lake and Hussain Sagar Lake in the past years. The restoration of impurity in the lake is simply within the rain-fed tanks and seasonal tanks. It is terribly robust within the system tanks and perennial lakes. From the past expertise, it has been observed that the restoration action plan consists of desilting of lakes and strengthening of weirs and bunds. In this proposed system the machine is operated with the remote control to collect the waste from the surface and underwater. The robotic arm is used to lift the wastes and in turn, a bucket is used to collect them.

**Keywords** -surface and under water waste removal, remote control, robotic arms, bin, environmental friendly.

## I.    INTRODUCTION

The water is a basic need for all humans. The WHO reports that 80% of diseases are waterborne. The impurities present in water can cause venturesome diseases. Impurities in drainage water can be like empty bottles, polyethylene, paper, etc. Nowadays, more and a lot of individuals migrate from country to geographical area for his or her higher living. In Tamilnadu, the urban population already crossed % 40 that is beyond the other state in India. The people, who cannot afford the cost for land and home generally occupy the banks, bunds and even in water spread area of the urban lakes. The urban lakes are polluted over the agricultural lakes. Massive quantities of floating plastic waste in lakes and waterways brought in by stormwater drains and sewers are cutting off the supply of oxygen to plants and fishes resulting in the death of aquatic ecosystems.More than 600 km of river stretches in Tamilnadu are polluted according to a report submitted by the ministry of environment, forest, and climate change. In Tamilnadu, the rivers such as the Bhavani, the Cauvery, the Palar, the Sarabanga, the Thamirabarani, the Thirumanimuthar, and the Vasista were extremely contaminated in the districts of Salem, Vellore, Erode, Namakkal, and Tirunelveli. Lakes are the life supporting system of society.

Many thousands of lakes have already been disappeared because of urbanization and also the remaining lakes are impure with wastewater and solid wastes. The conservation of remaining lakes for the future generation is the need of the hour. Pollution interference and restoration of impure lakes are the essential elements of the lake development programme .Water pollution of rivers is one among the key environmental issue in the Republic of India, most of the mini stream, lakes, seasonal water stream, and major rivers flow through the Indian cities are contaminated due to solid waste, coliform bacteria, untreated waste, and domestic waste. The most contaminated rivers of Indian metro cities are Buddha Nullah, Oshiwara River, Najafgarh Drain, Nagzari Nala, Hooghly River, and Thane creek.

## II.    PROBLEM STATEMENT



The problem of water logging due to plastic, glasses and metal leads to pest growth and it favours diseases like malaria, typhoid etc. This is unsafe for human life and hence the idea of this project emerged. The objective of the proposed project is to collect the waste particulate from water in order to prevent humans from getting affected by various diseases from the infectious microbes present in the lakes, pond while cleaning manually. This proposed system is to minimize or overcome the problem by designing a remote operated machine to clean the lake effectively.

### OBJECTIVE



- To overcome the difficulties of removing waste particulates in lake.
- To design a robot that replaces human force for collecting the waste.
- To design a remote operated machine to clean lake effectively, efficiently and eco-friendly.
- Our product shouldn't be restricted to gather only1 kind waste. It should diversify it's perform to accomplish the given task. It should not harm the aquatic animals.

## III.    METHODOLOGY

In our project, the machine is operated with remote control to collect the waste from surface and underwater.  The machine consists of two robotic arms at front and back respectively. The back arm look like a basket and is used to collect the surface wastes.  The front arm picks the underwater waste. The lifted wastes are transferred into the collector which is placed at the centre of the machine.

### a. Robot unit



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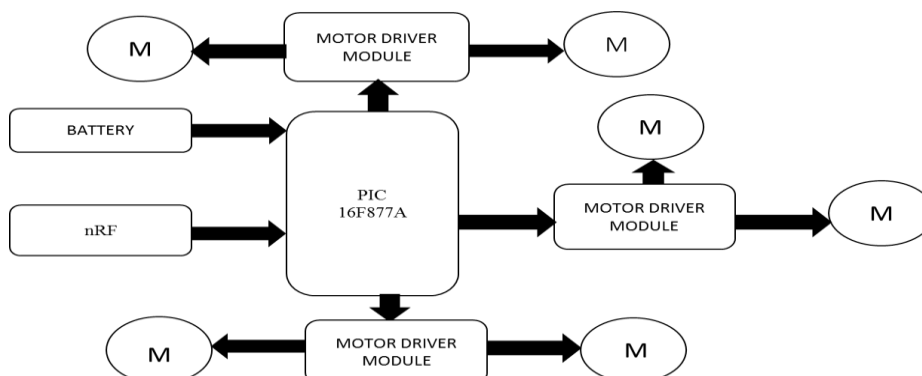
**b.Remote unit**
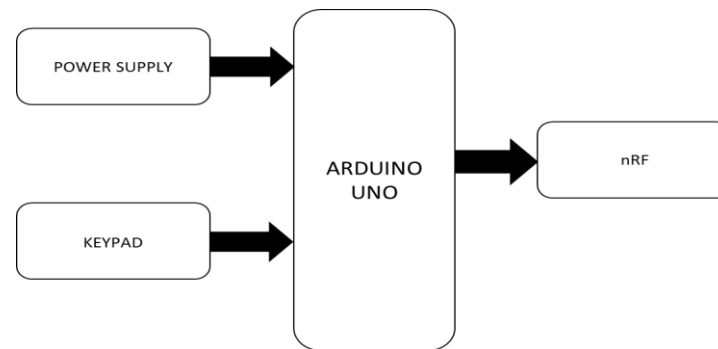


## HARDWARE REQUIREMENTS

- Motor Driver L293D
- PIC 16F877A
- Battery 12V
- nRF24L01
- DC Motor 12V
- Keypad 8 x 8
- PIC kit2

## SOFTWARE REQUIREMENTS

- MPLab IPE
- Proteus

**PIC 16F877A**

The PIC microcontroller PIC16f877a is one of the most renowned microcontrollers in the industry. PIC16f877a finds its applications in a huge number of devices. It is used in remote sensors, security and safety devices etc. There are 40 pins of this microcontroller IC. It consists of two 8 bit and one 16 bit timer. Capture and compare modules, serial ports, parallel ports and five input/output ports .The PIC microcontroller architecture comprises of CPU, I/O ports, memory organization, A/D converter, timers/counters, interrupts, serial communication, oscillator etc.

**NRF**

The nRF24L01 is the 2.4 GHz transceiver module. It consists of a fully integrated frequency synthesizer, a power amplifier, a crystal oscillator, a modulator, demodulator etc. It covers about 50-200 feet with the baud rate about 250 kbps to 2 mbps. The module can use 125 different channels which give a possibility to have a network of 125 independently working modems in one place. The power consumption of this module is just around 12mA during transmission, which is even lower than a single LED. The operating voltage of the module is from 1.9 to 3.6V.

**Arduino Uno**

The Arduino Uno is a microcontroller board based on the ATmega328. It has 14 digital input/output pins, 6 analog inputs, a 16 MHz ceramic resonator, a USB connection, a power jack and a reset button. It contains everything needed to support the microcontroller. It consists of 2KB SRAM, 32KB of flash memory, and 1KB of EEPROM. It can be powered via the USB connection or with an external power supply.

**DC Motor**

DC motors are electric motors that are powered by direct current (DC), such as from a battery or DC power supply. DC motors normally have just two leads, one positive and one negative. It gives torque of 1.2kgcm at a maximum speed of 100 rpm. It is used to drive wheels, gears that need to turn. They are used primarily for robotic applications.

**Motor Driver**

L293D is a dual H-bridge motor driver integrated circuit (IC). Motor drivers act as current amplifiers since they take a low-current control signal and provide a higher-current signal. This higher current signal is used to drive the motors.L293D contains two inbuilt H-bridge driver circuits. The L293D is a 16 pin IC, with eight pins, on each side, dedicated to the controlling of a motor. It can simultaneously control the direction and speed of 2 motors. Its operating voltage range from 4.5 to 36v.

**Proteus Simulation Software**

Proteus is a circuit analysis and physical simulation software launched by British Lab center Company.  Isis's main function is to schematic design and simulation, while ARES is mainly used for printed circuit board design. Friendly User-Interface, Wealth of Experimental Resources, Powerful Virtual Instrument, and Unique Simulation Approach are its main features.

## IV.    RESULTS AND DISCUSSION
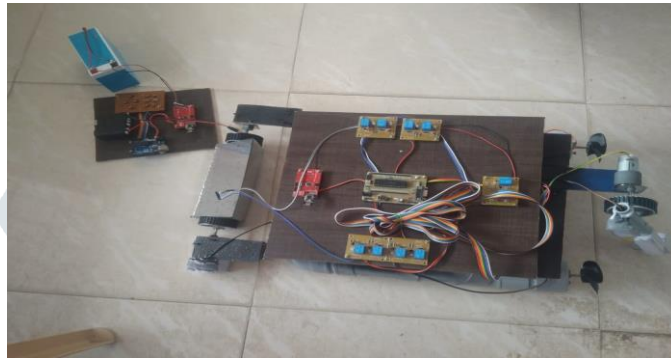


Our project consists of 2 units. Arduino UNO is powered by power supply. Input from keypad is provided to Arduino. The input is transmitted to robot unit by means of NRF. The input is received by NRF in robot unit. The whole system is controlled by PIC. Motor is connected to Arduino through motor driver module. The robot consists of 2 arms at front and back. The front arm picks the underwater waste and the back arm collects the surface wastes. The lifted wastes are transferred into the collector which is placed at the centre of the machine.

# ARM MOVEMENTS



    Figure c                              Figure d

Figure e                                        Figure f

The above figures represents the directions of robot as well as the arm movements. The back arm is used to collect the underwater wastes. The keypad consists of ten keys. The first four keys are used to control the direction of the robot. The directions are forward, reverse, left, right respectively. The next four keys are used to control the back arm in upward, downward and also for opening and closing of back arm respectively. The remaining two keys are used to rotate the front arm in clockwise and anticlockwise direction.

## V. ADVANTAGES

- Environment friendly system
- Easy in operation
- It overcomes the water pollution

## VI. APPLICATIONS

- It is applicable to reduce water pollution in rivers & ponds
- It is useful to remove the sediments present in swimming pool to keep it clean

## VII. CONCLUSION

Natural lakes and all kinds of artificial lakes make the living environment beautiful. However, with the increase of the activities of a human being, the pollution of the floating garbage on the surface of the lake is more and more serious. Governing the pollution of the floating garbage on the surface of the lake is more and more urgent. Lakes are life supporting system of the society. Many thousands of lakes have already been disappeared because of urbanization and also the remaining lakes are impure with waste water and solid wastes. It's our responsibility to restore the remaining lakes for the future generation. The existing system was able to collect only the surface wastes in water. Our proposed project will help in collecting the wastes from surface and underwater and thus safeguarding the lives.

## VIII. FUTURE SCOPE

The product right now is remote controlled however through automation techniques like detector technology, it is created self-automated. The product can be used for many other purposes in the future. It is changed to throw lifejackets throughout rescue operations. This can be achieved by fixing applicable propellers with higher motor rpms. We can conjointly replace battery with solar panels and create it fully work on alternative energy.

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