



Project Report

Bachelor of Technology
In
Computer Science & Artificial Intelligence

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Abstract –

This project focuses more on “Smart River Cleaning Machine”. In India water pollution is increasing day by day so this is becoming serious problem for rivers, ponds etc. This mainly consist of impurities like waste water debris, plastics, garbage on floating water surface. These impurities mainly affect on health of human being and also affect on life of aquatic animals. Normally this project based on renewable energy sources, so there is reduction in use of non renewable energy sources like oil, petroleum, electricity and all type of mineral sources. So by this non renewable energy sources are saved. So this project helps to reduce the water pollution on floating bodies.

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1.INTRODUCTION

1.1 About the project

Generally, conventional method based on manual basis and it is used for collection of water debris, trash, plastic and all other types of impurities which is floating on water bodies or by collecting this impurity by means of boat, thrash skimmer etc. And removed this impurity near river shore and disposed it. But this conventional method requires more manpower; hence this is risky, costly and time consuming method. By considering this all remote operated floating river cleaning machine is more efficient than conventional method and also this is effective and eco-friendly.

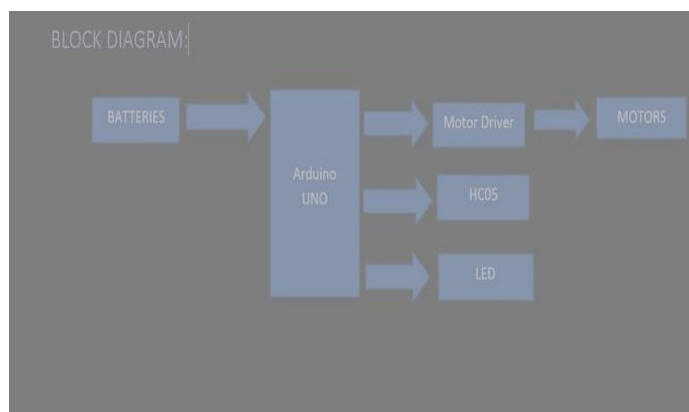
1.2 OBJECTIVES

This machine is remote operated so manpower does not required at all. So this machine is really advantageous for reducing the water pollution on Ganga river which is caused by 'Kumbhmela' And also Government of India has taken charge to clean river and pond due to increasing water pollution , and so that they invest huge capital for many river cleaning project like 'Namami Ganga', 'Narmada bachao'. And also developed many project in various cities like Ahmadabad, Varanasi etc. By taking into consideration, this Remote operated river cleaning machine has designed to clean river floating surface

2. PROJECT DESCRIPTION

2.1 BLOCK DIAGRAM OF THE PROJECT

As show in below block diagram. We know that battery is used to store the energy. This stored energy is given to all this circuitry for overall operation. This circuitry consists of a controller, level sensor, Bluetooth, conveyor system, and motor. In this system controller is a main part



its having input like Bluetooth, level sensor and output consist of conveyor system, and servo motor. Android app is used for overall remote controlling purposes.

2.2 Description of block diagram

2.3 HARDWARE DESCRIPTION

ARDUINO UNO

The Arduino Uno is an open-source microcontroller board based on the Microchip ATmega328P microcontroller and developed by Arduino.cc and initially released in 2010.[2][3] The board is equipped with sets of digital and analog input/output (I/O) pins that may be interfaced to various expansion boards (shields) and other circuits.[1] The board has 14 digital I/O pins (six capable of PWM output), 6 analog I/O pins, and is programmable with the Arduino IDE (Integrated Development Environment), via a type B USB cable.[4] It can be powered by the USB cable or by an external 9-volt battery, though it accepts voltages between 7 and 20 volts. It is similar to the Arduino Nano and Leonardo.[5][6] The hardware reference design is distributed under a Creative Commons At...



Technical specifications

Edit

Microcontroller: Microchip ATmega328P[7]

Operating Voltage: 5 Volts

Input Voltage: 7 to 20 Volts

Digital I/O Pins: 14

PWM Pins: 6 (Pin # 3, 5, 6, 9, 10 and 11)[9]

UART: 1

I2C: 1

SPI: 1

Analog Input Pins: 6

DC Current per I/O Pin: 20 mA

DC Current for 3.3V Pin: 50 mA

Flash Memory: 32 KB of which 0.5 KB used by bootloader

SRAM: 2 KB

EEPROM: 1 KB

Clock Speed: 16 MHz

Length: 68.6 mm

Width: 53.4 mm

Weight: 25 g

ICSP Header: Yes

Power Sources: DC Power Jack, USB Port and the VIN pin (+5 volt only)

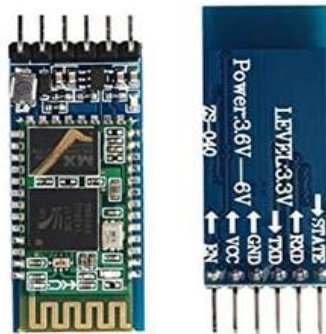
GEAR MOTOR

12V DC geared motors are for robotics and small industrial application, connect to wheel and outer world, very easy to use and available in different RPM, Mounting holes on the body & light weight makes it suitable for in-circuit/pcb placement



HC-05

HC-05 is a Bluetooth module which is designed for wireless communication. This module can be used in a master or slave configuration.



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Bluetooth Module HC-05

Introduction

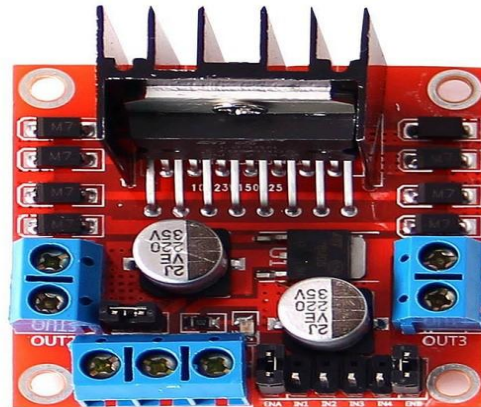
It is used for many applications like wireless headset, game controllers, wireless mouse, wireless keyboard, and many more consumer applications.

It has range up to <100m which depends upon transmitter and receiver, atmosphere, geographic & urban conditions.

It is IEEE 802.15.1 standardized protocol, through which one can build wireless Personal Area Network (PAN). It uses frequency-hopping spread spectrum (FHSS) radio technology to send data over air. It uses serial communication to communicate with devices. It communicates with microcontroller use serial port (USART)HC-05 Bluetooth Module HC-05 is a Bluetooth module which is designed for wireless communication. This module can be used in a master or slave configuration.

L293D MOTOR DRIVER MODULE

L293D is a typical Motor driver or Motor Driver IC which allows DC motor to drive on either direction. L293D is a 16-pin IC which can control a set of two DC motors simultaneously in any direction. It means that you can control two DC motor with a single L293D IC. Dual H-bridge Motor Driver integrated circuit (IC).



Features:

1. Can be used to run Two DC motors with the same IC.
2. Speed and Direction control is possible
3. Motor voltage V_{cc2} (V_s): 4.5V to 36V
4. Maximum Peak motor current: 1.2A
5. Maximum Continuous Motor Current: 600mA
6. Supply Voltage to V_{cc1} (v_{ss}): 4.5V to 7V
7. Transition time: 300ns (at 5V and 24V)
8. Automatic Thermal shutdown is available
9. Available in 16-pin DIP, TSSOP, SOIC packages.

BATTERIES

This is a lead acid rechargeable battery. This machine consists of four batteries which gives output such as 2A, 8V for operation of setup.



CONVEYER BELT

In this machine we used the polyvinyl Conveyor Belt. This is controlled by the arduino uno system using a motor driver circuit. This collects all floating waste from the water surface and discharges it into the dustbin.



Blucontrol [android application]:

This android application is installed in mobile phones to control the setup automatically which can be downloaded from the android app market for free of cost.

2.4 SOFTWARE DESCRIPTION

The software used here is ARDUINO SOFTWARE: The Arduino Integrated Development Environment or Arduino Software (IDE) contains a text editor for writing code, a message area, a text console, a toolbar with buttons for common functions and a series of menus. It connects

to the Arduino and Genuino hardware to upload programs and communicate with them. Programs written using Arduino Software (DE) are called sketches. These sketches are written in the text editor and are saved with the file extension .ino. The editor has features for cutting/pasting and for searching/replacing text. The message area gives feedback while saving and exporting and also displays errors. The console displays text output by the Arduino Software (DE), including complete error messages and other information. The bottom right hand corner of the window displays the configured board and serial port. The toolbar buttons allow you to verify and upload programs, create, open, and save sketches, and open the serial monitor.

```

1 char t;
2 void setup() {
3   pinMode(13,OUTPUT); //left motor forward
4   pinMode(12,OUTPUT); //left motor reverse
5   pinMode(11,OUTPUT); //right motor forward
6   pinMode(10,OUTPUT); //right motor reverse
7   pinMode(9,OUTPUT); //led
8   Serial.begin(9600);
9 }
10 void loop() {
11   if(Serial.available())
12   {t=Serial.read();
13    Serial.println(t);
14   }
15   if(t=='F')
16   {
17     digitalWrite(13,HIGH);
18     digitalWrite(11,HIGH);
19   }
20   else if(t=='B')
21   {digitalWrite(12,HIGH);
22    digitalWrite(10,HIGH);}
23   else if(t=='L')
24   {digitalWrite(11,HIGH);}
25
26   else if(t=='R')
27   {digitalWrite(13,HIGH);}
28   else if(t=='W')
29   {digitalWrite(9,HIGH);}
30   else if(t=='w')
31   {digitalWrite(9,LOW);}
32   else if(t=='S')
33   {digitalWrite(13,LOW);
34    digitalWrite(12,LOW);
35    digitalWrite(11,LOW);
36    digitalWrite(10,LOW);
37   }
38   delay(1000);
39 }

```

```

4   pinMode(12,OUTPUT); //left motor reverse
5   pinMode(11,OUTPUT); //right motor forward
6   pinMode(10,OUTPUT); //right motor reverse
7   pinMode(9,OUTPUT); //led
8   Serial.begin(9600);
9 }
10 void loop() {
11   if(Serial.available())
12   {t=Serial.read();
13    Serial.println(t);
14   }
15   if(t=='F')
16   {
17     digitalWrite(13,HIGH);
18     digitalWrite(11,HIGH);
19   }
20   else if(t=='B')
21   {digitalWrite(12,HIGH);
22    digitalWrite(10,HIGH);}
23   else if(t=='L')
24   {digitalWrite(11,HIGH);}
25
26   else if(t=='R')
27   {digitalWrite(13,HIGH);}
28   else if(t=='W')
29   {digitalWrite(9,HIGH);}
30   else if(t=='w')
31   {digitalWrite(9,LOW);}
32   else if(t=='S')
33   {digitalWrite(13,LOW);
34    digitalWrite(12,LOW);
35    digitalWrite(11,LOW);
36    digitalWrite(10,LOW);
37   }
38   delay(1000);
39 }

```

3.PROJECT IMPLEMENTATION:

3.1WORKING

In this project the foremost aim of this machine is to lift waste debris from the water surface and dispose of it within the tray. It consists of an arrangement of conveyor which is placed on the shaft of the motor. Due rotation of motor conveyor rotated. Because the conveyor is moved, it collects water debris, waste garbage and plastics from water bodies. because the machine is placed within the water the waste debris in water will get lifted and it moves in an upward direction. because the waste debris reaches the upper extreme position it'll get dropped within the tray. Hence this will end in cleaning of water surfaces and safe collection of waste debris from water. Propeller is used to drive the machine on the river and run with the help of a PMDC motor. The total electrical devices are controlled by an RF transmitter and receiver which are used to manage the machine remotely.

3.2 CODE

```
char t;

void setup()
{
    pinMode(13,OUTPUT); //left motors forward
    pinMode(12,OUTPUT); //left motors reverse
    pinMode(11,OUTPUT); //right motors forward
    pinMode(10,OUTPUT); //right motors reverse
    pinMode(9,OUTPUT); //Led
    Serial.begin(9600);
}

void loop()
{
    if(Serial.available())
    {
        t = Serial.read();
        Serial.println(t);
    }
    if(t == 'F')
    {
        //move forward(all motors rotate in forward direction)
```

```

        digitalWrite(13,HIGH);
        digitalWrite(11,HIGH);
    }
else if(t == 'B')
{    //move reverse (all motors rotate in reverse direction) digitalWrite(12,HIGH);
digitalWrite(10,HIGH);
}
else if(t == 'L')
{//turn right (left side motors rotate in forward direction, right side motors //doesn't
rotate)
digitalWrite(11,HIGH);
}
else if(t == 'R')
{    //turn left (right side motors rotate in forward direction, left side motors      doesn't
rotate)
digitalWrite(13,HIGH);
}
else if(t == 'W'){    //turn led on or off)
    digitalWrite(9,HIGH);
}
else if(t == 'w')
{
    digitalWrite(9,LOW);
}
else if(t == 'S')
{    //STOP (all motors stop)
digitalWrite(13,LOW);
digitalWrite(12,LOW);
digitalWrite(11,LOW);
digitalWrite(10,LOW);

```

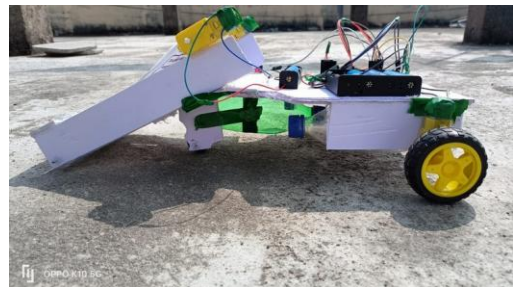
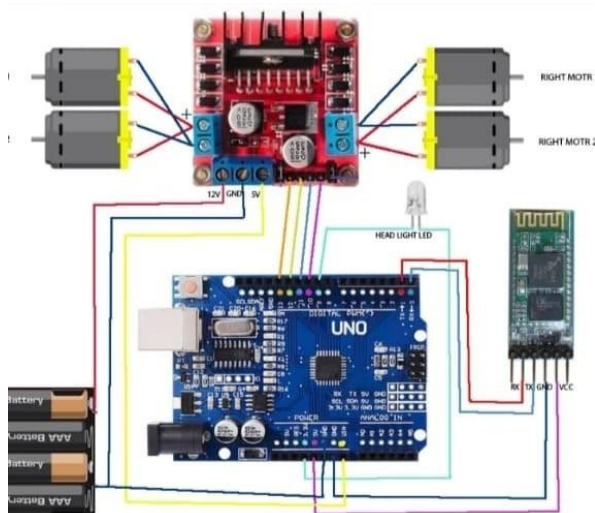
```

}
delay(100);
}

```

3.3 RESULTS:

The " Smart River Cleaning Machine" effectively removes floating waste from water bodies using a conveyor system controlled by an Arduino Uno. It is eco-friendly, cost-effective, and reduces the need for manpower by utilizing renewable energy sources. The machine is easy to operate and has potential for future enhancements to increase its waste collection capacity and scope.



3.4 ADVANTAGES

- *This cleaning system is easy to operate and flexible.
- *This system is Eco-friendly.
- *This requires less man power.
- *This required more use of renewable energy Sources.
- *This system is Cost effective (Initial and Maintenance cost is low).
- *This is efficient method.

3.5 APPLICATIONS

- *Useful to reduce the water pollution in river

*It is applicable to reduce water debris, impurities, and all types of impurities which are floating on water surface in swimming pool.

*It is useful to remove the environmental marine pollution at Godavari River.

* It is useful in fishery plant to collect dead fishes.

3.6 DISADVANTAGES

*Waste collecting capacity is limited.

*Only useful to collect waste which is floating on river surface

4.CONCLUSION

4.1 CONCLUSION

This project is emphasis to provide flexibility in operation. This is easy in operation and cost of maintenance is low. Hence this project “ Smart Floating River Cleaning Machine” is mostly designed to make system very much economical and helpful to remove water impurities like plastics, trashes, water debris which is floating on river and pond surface. This is mainly very useful maintaining human health and for increasing the life of aquatic animals.

4.2FUTURE SCOPE:

Now day by day world facing biggest problem of floating garbage. And it is increasing in tremendous amount so it is very difficult to clean all this floating garbage because of more requirement of manpower. so, in future this remote operated floating river cleaning machine has more scope to remove large capacity of garbage automatically as fast as possible. And by making modifications in this machine, this is used for automatically removing garbage from beaches also.