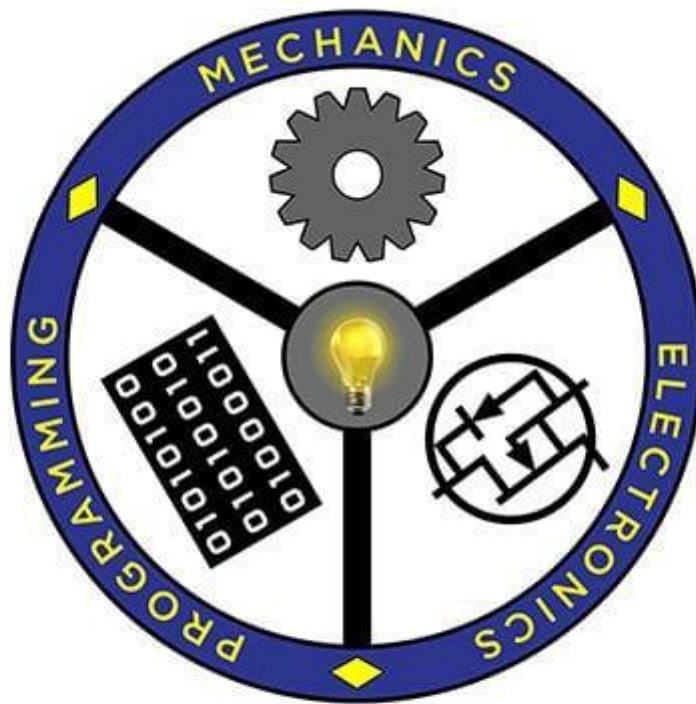


Project Report on
SWATCH NEER

Submission to THE ROBOTICS CLUB - SNIST as a part of INDUCTION'22

TEAM NO - 01



THE ROBOTICS CLUB

Integrating Knowledge...

THE ROBOTICS CLUB-SNIST

SREENIDHI INSTITUTE OF SCIENCE AND TECHNOLOGY

(AUTONOMOUS)

(Affiliated to JNTU University, Hyderabad)
Yamnapet, Ghatkesar, Hyderabad – 501301.

2022

CERTIFICATE

This is the project work titled '**SWATCH NEER**' by 'Praneeth Reddy, Hari Ram charan, Sai Ganesh, Rajmohan, Bharath Chandra, Harathi, Srikar, Savitha Reddy, Himaja' under the mentorship of 'Tarun Aditya, Tapaswini' and is a record of the project work carried out by them during the year 2021-2022 as part of INDUCTION under the guidance and supervision of

Mr. BHUVAN PRATAP AGARWAL

&

Mr. S. V. REDDY

Technical head

Mr. Md. NIHAL ASJAD

The President of

THE ROBOTICS CLUB

Dr. A. PURUSHOTHAM

Faculty Advisor

Mechanical Department

DECLARATION

The project work reported in the present thesis titled “**SWATCH NEER**” is a record work done by Team 1 in **THE ROBOTICS CLUB** as a part of **INDUCTION-2022**.

No part of the thesis is copied from books/ journals/ Internet and wherever the portion is taken, the same has been duly referred in the text. The report is based on the project work done entirely by TEAM 01 and not copied from any other source.

ACKNOWLEDGMENT

This project report is the outcome of the efforts of many people who have driven our passion to explore into implementation of **SWATCH NEER**. We have received great guidance, encouragement and support from them and have learned a lot because of their willingness to share their knowledge and experience.

Primarily, we would like to express our gratitude to our mentors, **TARUN ADITYA and TAPASWINI**. Their guidance has been of immense help in surmounting various hurdles along the of our goal.

We thank our technical heads '**Mr. BHUVAN PRATAP AGARWAL and Mr. S. V. REDDY** for being with us till the end of the project completion.

We thank all the members of **Steering Body, Executive Body, Technical Advisory Board, Club's Incubation and Competence Committee** of **The Robotics Club** for helping us with crucial parts of the project. We are deeply indebted to **Mr. Md. NIHAL ASJAD** – The President, **Mr. KARUMURI JAYANTH SIVA MADHAV**- The Vice President and **Mr. GELLI KUSAL VENKATA SAI SHRAVANTH** – SAB Chairman and **Ms. RUSHIKA REDDY** – General Secretary **THE ROBOTICS CLUB** respectively and also every other person who spared their valuable time without any hesitation whenever we wanted.

We also thank our faculty advisor **Dr. A. PURUSHOTHAM**, Professor, Mechanical Department, who encouraged us during this project by rendering his help when needed.

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ABSTRACT
THE ROBOTICS CLUB-SNIST
INDUCTION 2022
TEAM-01

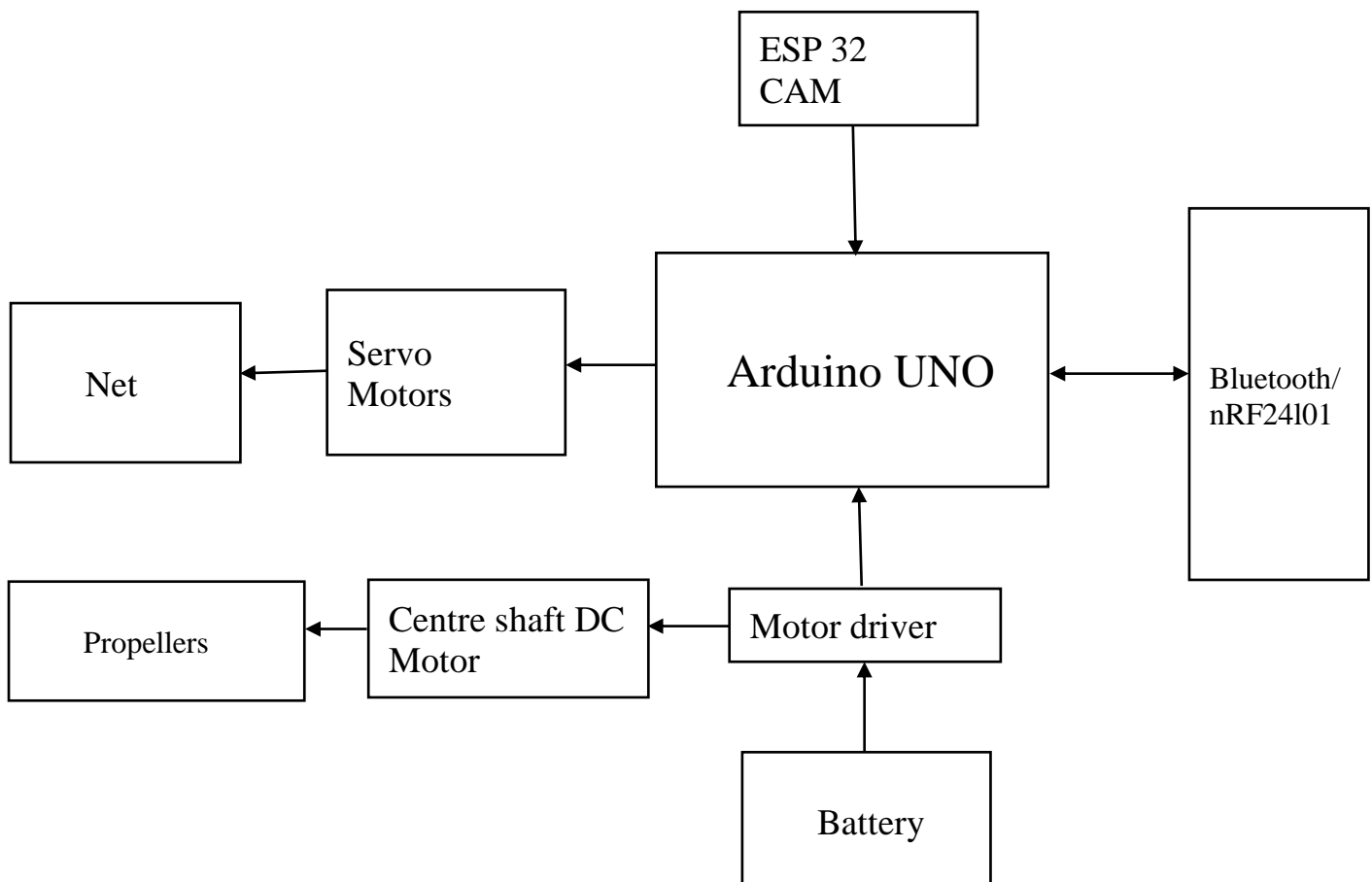
THE PROBLEM:

Nowadays due to urbanization and industrial development there is huge contamination of water bodies. This leads to water pollution and death of aquatic life. The increased levels of particulate matter in water bodies decreases the amount of dissolved oxygen in water, posing threat to water animals and the trash disposal decreases the cleanliness and sanity of the water bodies.

THE TEAMS APPROACH TO THE PROBLEM: -

This problem can be resolved by making a bot which can remove the waste and check the pollution level in the water bodies. This robot is remote-operated. The bot helps in finding ppm using TDS meter and pH of water bodies by IOT and modern, innovative technology. Bot collects plastic and other noticeable waste from the water bodies. A net is used to collect the garbage. Water cleaning bot is a small helping hand to the people who cleans the water bodies manually. It reduces their time.

BLOCK DIAGRAM:



TITLE OF THE PROJECT: - SWATCH NEER

What inspired you to select the problem?

We see every time garbage is trought in water bodies, which is a huge problem for the living beings living in the water bodies. Also cleaning the water bodies manually is a huge task. By using a Water cleaning bot, we can mimic the manual work. This water cleaning bot is remotely operated, and we can the surface of the water with ease.

What do you feel is the most innovative part of the problem?

A robot floating on water and collecting trash, while being controlled and supervised by a person, through a camera, from the land without much effort clean water bodies such as rivers, is what I think is the most innovative part of the problem.

SWATCH NEER

Abstract: Nowadays due to urbanization and industrial development there is huge contamination of water bodies. This leads to water pollution and death of aquatic life. The increased levels of particulate matter in water bodies decreases the amount of dissolved oxygen in water, posing threat to water animals and the trash disposal decreases the cleanliness and sanity of the water bodies.

Introduction: Now a days the environment is polluting very badly due to various type of pollutions, and not managing the proper rules for waste management system. Thus, people from any surroundings they are not throwing the wastage into certain bins in their respective areas. Some people throwing the garbage into nearby water bodies like rivers and ponds, which ultimately leads in resulting full amount of garbage in the oceans. Meanwhile many factories dump their wastage in the rivers and ponds, and the release harmful chemical into the water bodies, this all together get into the ocean. Thus, we cannot go through the ocean to clean the garbage on the surface of the ocean and detect the chemical percentage in the ocean. Therefore, to overcome this situation, we can use a water bot which cleans and pick up the garbage even on the surface of the ocean without any human involvement. These functions may save a lot of human effort

and provide a sustainable solution to the pervasive problem. Meanwhile we have bots to collect the garbage and we have some bots to detect the chemicals in the oceans. This work aims at developing a more versatile and efficient system by the usage of the aqua robot. This robot has an excellent opportunity to expand its functions in the future.

Let's briefly discuss about working principle of the bot and what are the components we used while making the bot, we will explain in detail even by an algorithm, flowcharts and with equivalent diagrams.

Problem Statement: As we there is huge contamination of water bodies due to growth of industries and population. We see people trough garbage or sewage into the near by waterbodies, which is making water bodies to contaminate. To resolve this issue we have planned to built a bot which cleans the surface of the using Nets and collect the waste which is present at the surface of the water, by remote controlling.

Literature Survey: We all discussed about the problem statement and putout our own ideas and changes to bring this small-scale project which can be made fast. We saw multiple videos and read many articles about the swatch neer. And what the important information and sensible information which will be lost and be important to store.

ARCHITECTURE:

List Of Components: -

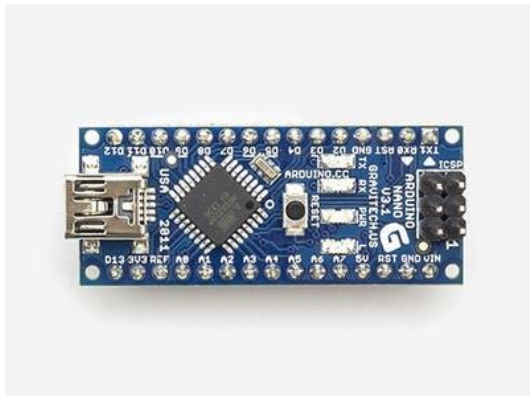
1. Arduino Uno microcontroller:

The Arduino Uno is an open-source microcontroller board created by Arduino.cc that is based on the Microchip ATmega328P microprocessor. A variety of expansion boards (shields) and other circuits can be interfaced with the board's sets of digital and analogue input/output (I/O) pins. The board has 6 analogue I/O pins, 6 digital I/O pins, and 14 digital I/O pins, six of which can be used for PWM output. It can be programmed using the Arduino IDE (Integrated Development Environment) using a type B USB cable. It accepts voltages between 7 and 20 volts, but it can also be powered by an external 9-volt battery or by a USB cable.



2. Arduino Nano:

Based on the ATmega328P, the Arduino Nano is a compact, complete, and breadboard-friendly board that was introduced in 2008. The Arduino Nano has 30 male I/O headers that are arranged in



a DIP-30-like format and can be programmed using the Arduino Software integrated development environment (IDE), which is available both online and offline and is shared by all Arduino boards. The board can be powered by a 9 V battery or a type-B mini-USB connection.

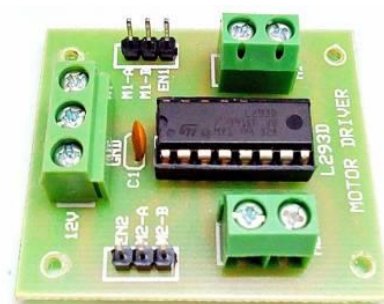
3. MG996R Servo Motor:

A metal gear servo motor with a maximum stall torque of 11 kg/cm is the MG996R. The motor rotates from 0 to 180 degrees depending on the duty cycle of the PWM wave given to its signal pin, just like other RC servos.



4. Motor Driver Module-L293D

The L293D is a triple half-H driver with high current. At voltages ranging from 4.5 V to 36 V, it is intended to deliver bidirectional drive currents of up to 600 mA. Both devices are made to drive inductive loads in positive-supply applications, including relays, solenoids, dc and bipolar stepping motors, among others. All inputs are compatible with TTL. Each output features a complete totem-pole driving circuit with a pseudo-Darlington source and a Darlington transistor sink.



5. Center shaft 12v dc Motor

These motors are simple DC Motors featuring gears for the shaft for obtaining the optimal performance characteristics. They are known as



Center Shaft DC Geared Motors because their shaft extends through the center of their gear box assembly. These standard size DC Motors are very easy to use. The L298N H-bridge module with onboard voltage regulator motor driver can be used with this motor that has a voltage of between 5 and 35V DC. This DC Motor – 100 RPM – 12Volts can be used in all-terrain robots and a variety of robotic applications.

6.ESP32 CAM

ESP32 is a series of low-cost, low-power system on a chip microcontrollers with integrated Wi-Fi and dual-mode Bluetooth. The ESP32 series employs either a Tensilica Xtensa LX6 microprocessor in both dual-core and single-core variations, Xtensa LX7 dual-core microprocessor or a single-core RISC-V microprocessor and includes built-in antenna switches, RF balun, power amplifier, low-noise receive amplifier, filters, and power-management modules. ESP32 is created and developed by Espressif Systems, a Shanghai-based Chinese company, and is manufactured by TSMC using their 40 nm



process.^[2] It is a successor to the ESP8266 microcontroller.

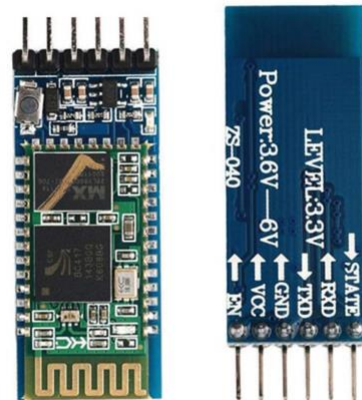
6. TDS Meter

A TDS meter is a tiny, portable instrument used to measure the amount of total dissolved solids (TDS) in a solution, often water. Due to the fact that dissolved ionized solids, such as salts and minerals, enhance a solution's conductivity, a TDS meter detects the solution's conductivity and infers the TDS from that value.



7.HC-05 Bluetooth Module:

HC-05 Bluetooth is an easy-to-use Bluetooth SSP (serial port profile) module, designed for transparent wireless serial connection setup. Its communication is via serial communication which makes an easy way to interface either controller.



Software Used:

1.Arduino IDE: -

Arduino is an open-source hardware and software company, project, and user community that designs and manufactures single-board microcontrollers and microcontroller kits for building digital devices. Its hardware products are licensed under a CC BY-SA license, while software is licensed under the GNU Lesser General Public License (LGPL) or the GNU General Public License (GPL), permitting the manufacture of Arduino boards and software distribution by anyone. Arduino boards are available commercially from the official website or through authorized distributors.

2. Fritzing:

Fritzing is an open-source initiative to develop amateur or hobby CAD software for the design of electronics hardware, intended to allow designers and artists to build more permanent circuits from prototypes. It was developed at the University of Applied Sciences Potsdam. Fritzing is free software under the GPL 3.0 or later license, with the source code available on GitHub and the binaries at a monetary cost, which is allowed by the GPL.

3. Fusion 360:

Fusion 360 is a commercial computer-aided design, computer-aided manufacturing, computer-aided engineering, and printed circuit board design software application, developed by Autodesk. It is available for Windows and macOS, with simplified applications available for Android and iOS. Fusion 360 is licensed as a paid subscription, with a free limited home-based, non-commercial personal edition available.

Stimulation:

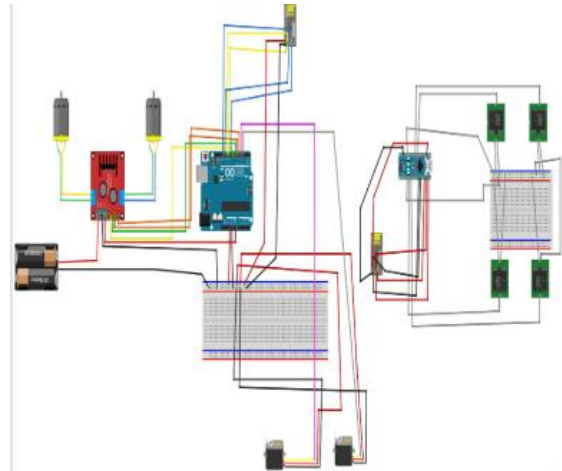


Fig. Circuit diagram

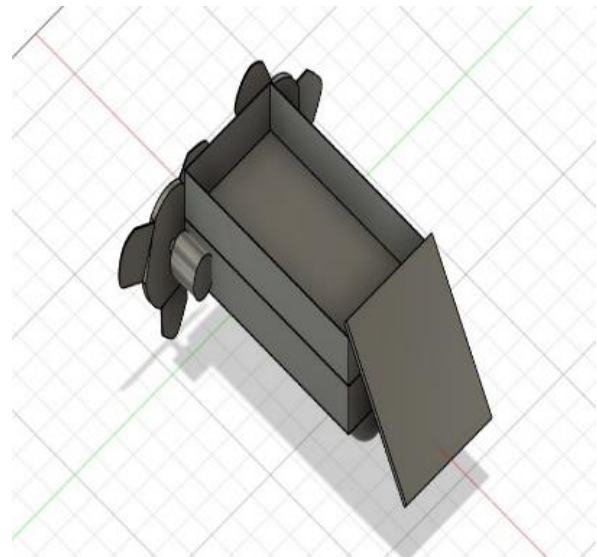


Fig. CAD Design

EXPERIMENTAL RESULT:

When the bot is released in the water, with the help of servo the wastage materials is collected and dumped into the waste bin which locates above the bot. This bot is controlled by Bluetooth transmission.

Future enhancement:

The Swatch Neer can further extended by adding sensors to make it autonomous without any need of human involvement to control it.

Conclusion:

Finally, we conclude that our bot (swatch neer) which is operated by remote control is a small helping hand to those who clean water bodies manually. As it takes very small effort for a person to operate a robot than a person working himself to clean the water body. This reduces manpower and is environmentally friendly.

SOURCE CODE:

```
#include <SoftwareSerial.h>
#include<Servo.h>
//SoftwareSerial BT (A0, A1);
Servo myservo1;
Servo myservo2;

int pos1=0;
int pos2=180;

//int motor_r2 = 6;
//int motor_r1 = 7;
//
//int motor_l2 = 8;
//int motor_l1 = 9;

int data, state;

void setup()
{
  myservo1.attach(4);
  myservo2.attach(3);

  pinMode(5, OUTPUT);
  pinMode(6, OUTPUT);
  pinMode(7, OUTPUT);
  pinMode(8, OUTPUT);

  // initialize serial communication at 9600 bits per second:
  Serial.begin(9600);
  // BT.begin(9600); // Setting the baud rate of Software Serial
  Library
  delay(1000);
}

void loop()
{
  data = 0;
  //if some date is sent, reads it and saves in state
  if(Serial.available(>0))
  {
    data=Serial.read();
    Serial.print(data);
  }
  delay(500);

  for (pos1=0;pos1<=30;pos1++){
    myservo1.write(pos1);
    delay(40);
  }
  for(pos2=180;pos2>=150;pos2--){
    myservo2.write(pos2);
    delay(40);
  }
  for (pos1=30;pos1<=60;pos1++){
    myservo1.write(pos1);
    delay(40);
  }
  for(pos2=150;pos2>=120;pos2--){
    myservo2.write(pos2);

    delay(40);
  }
  for (pos1=60;pos1<=90;pos1++){
    myservo1.write(pos1);
    delay(40);
  }
  for(pos2=120;pos2>=90;pos2--){
    myservo2.write(pos2);
    delay(40);
  }
  delay(3000);
  for(pos1=90;pos1>=60;pos1--){
    myservo1.write(pos1);
    delay(40);
  }
  for(pos2=90;pos2<=120;pos2++){
    myservo2.write(pos2);
    delay(40);
  }
  for(pos1=60;pos1>=30;pos1--){
    myservo1.write(pos1);
    delay(40);
  }
  for(pos2=120;pos2<=150;pos2++){
    myservo2.write(pos2);
    delay(40);
  }
  for(pos1=30;pos1>=0;pos1--){
    myservo1.write(pos1);
    delay(40);
  }
  //if(BT.available() > 0){
  //state = BT.read();
  //Serial.println(state);

  switch(data)
  {
    case 49: forward(); break;
    case 50: turnRight(); break;
    case 51: turnLeft(); break;
    case 52: backward(); break;
    case 53: s_top(); break;
  }
  delay(500);
}

void forward(){
  digitalWrite(5,HIGH);
  digitalWrite(6,LOW);
  digitalWrite(7,HIGH);
  digitalWrite(8,LOW);
  Serial.println("forward");
}

void backward(){
  digitalWrite(5,LOW);
  digitalWrite(6,HIGH);
  digitalWrite(7,LOW);
  digitalWrite(8,HIGH);
}
```

```
void turnRight(){  
    digitalWrite(5,LOW);  
    digitalWrite(6,HIGH);  
    digitalWrite(7,LOW);  
    digitalWrite(8,LOW);  
}
```

```
void turnLeft(){  
    digitalWrite(5,LOW);  
    digitalWrite(6,LOW);  
    digitalWrite(7,HIGH);  
    digitalWrite(8,LOW);  
}
```

```
void s_top(){  
    digitalWrite(5, LOW);  
    digitalWrite(6, LOW);  
    digitalWrite(7, LOW);  
    digitalWrite(8, LOW);  
}
```

RECORD OF EXPENSES:

Component	Quantity	Price
Arduino UNO	1	685
Arduino NANO	1	675
Propellers	2	96
Li-ion Batteries	5	375
Battery holders	3	65
Motor Driver L293D	1	140
12v DC center shaft motors (150 rpm)	2	260
Jumper wires	20	40
NRF module	2	500
Push buttons	3	18
Plastic boxes	3	195
Servo motors	2	480
Net	1	30
	Total:3559	

MEMBERS	SCOR		
	E: MECH:	ELE:	PROG:
1. PRANITH REDDY			
2. RATNALA SAI GANESH			
3. K. BHARATH CHANDRA			
4. RAJ MOHAN			
5. HARI RAM CHARAN			
6. HARATHI			
7. KEERTHI SRIKAR			
8. HIMAJA			
9. SAVITHA			

REMARKS: