

# IOT Based Trash Collector Boat

## Overview

This project focuses on developing an IoT-based trash collector boat designed to clean debris from water bodies like lakes, ponds, and rivers. The boat uses a conveyor belt mechanism to collect surface trash and deposit it into a container. The boat can be controlled remotely, providing a practical solution for reducing water pollution with minimal human intervention.

## Features

- **Remote Control:** Operated via an HTML web page with live video streaming.
- **Trash Collection:** Conveyor belt mechanism collects floating debris.
- **Real-time Monitoring:** ESP32-CAM provides live video feed for precise control.
- **IoT Integration:** Uses NodeMCU and ESP8266 for connectivity and control.

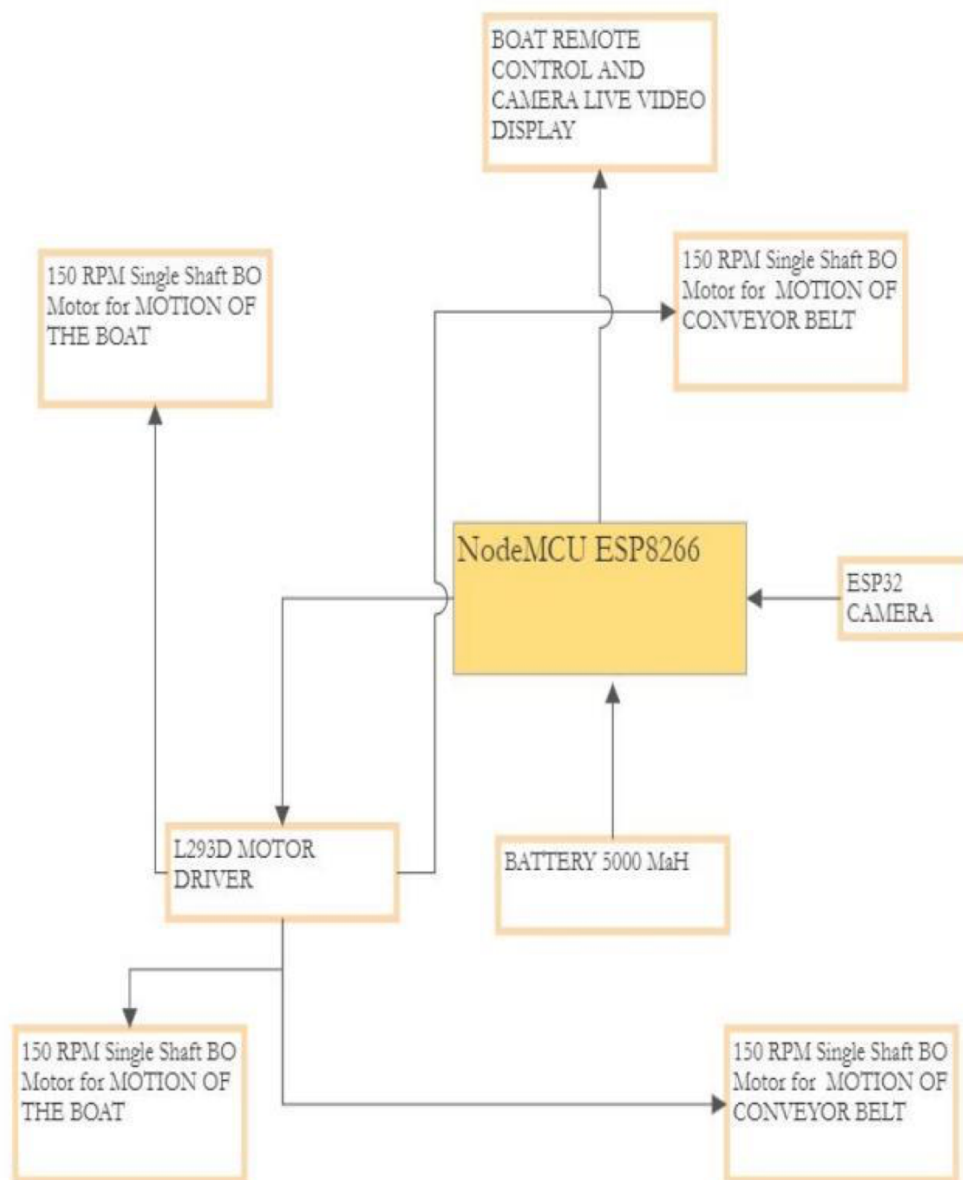
## Hardware Components

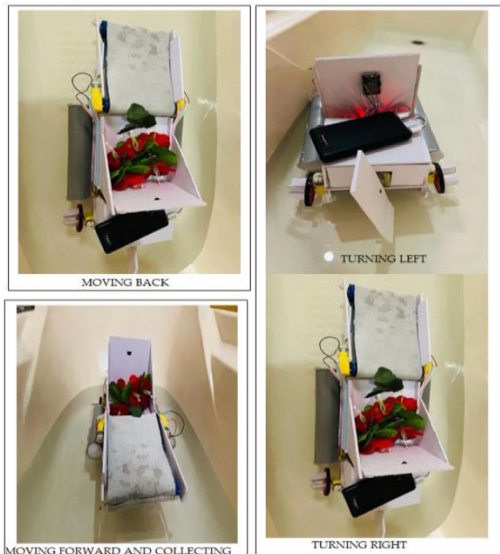
- **NodeMCU (ESP8266)**
- **ESP32-CAM**
- **DC Motors**
- **L298N Motor Driver**
- **Conveyor Belt**
- **Lithium-Ion Battery (5000 mAh)**
- **Boat Structure**

## Software Requirements

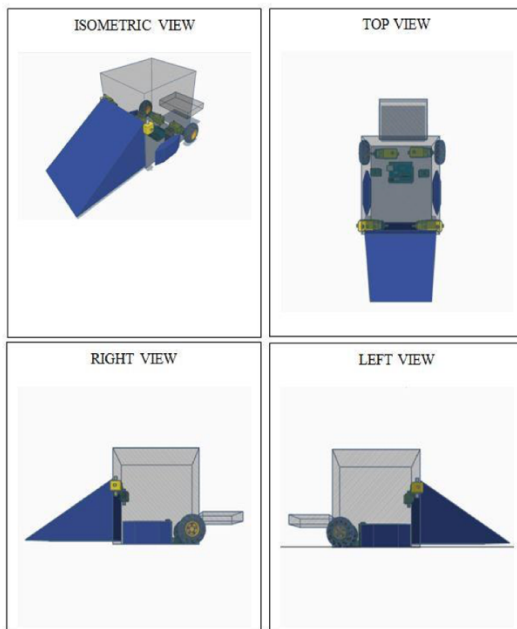
- **Arduino IDE**
- **TinkerCAD (for prototyping)**
- **Proteus (for simulation)**

## B. BLOCK DIAGRAM





## TINKERCAD



## Working

1. **Initialization:** The boat is powered on, and the system initializes.
2. **Remote Control:** The boat is controlled using an HTML web page that sends commands to the NodeMCU.
3. **Trash Collection:** The conveyor belt collects trash from the water surface and deposits it into a container.
4. **Monitoring:** Live video feed from the ESP32-CAM helps in navigating and controlling the boat.

## Methodology

### 1. Controlling the Boat:

- The boat is equipped with an ESP32-CAM for live video streaming.
- Controlled via an HTML web page with "Forward", "Backward", "Left", "Right", and "Stop" commands.

### 2. Trash Collection:

- A conveyor belt at the front collects floating debris and deposits it into a trash container.

## Results

- **Simulation:** Successfully tested the boat's movement and trash collection in Proteus.
- **Prototype:** Demonstrated effective trash collection from the water surface in real-time conditions.

## Limitations

- **Load Capacity:** Can collect up to 5 kg of trash.
- **Depth Limitation:** Operates at a depth of 100 mm.
- **Battery Life:** Limited by the battery capacity.

## Conclusion

The IoT-based trash collector boat effectively reduces surface water pollution. The prototype demonstrates a practical solution for waste collection in narrow water bodies, improving environmental cleanliness with minimal human intervention.