AUTONOMOUS ROBOTIC BOAT FOR MARINE PLASTIC WASTE COLLECTION

1. MAJOR AREA	:	Robotics
2. PROBLEM STATEMENT	:	Marine plastic pollution threatens ecosystems and human health, requiring an efficient cleanup solution. An **Autonomous Robotic Boat** uses sensors, and solar power to detect, collect, and remove floating plastic waste for proper disposal.
3. TOTAL COST	:	The estimated cost for the project is ₹ 12,000. This includes expenses for hardware, Research user testing, Software and project document.
4. COLLEGE CODE - NAME	:	8224 – MRK INSTITUTE OF TECHNOLOGY
5. GUIDE NAME	:	
DESIGNATION	:	
MOBILE NO	:	
EMAIL ID	:	

6. STUDENT TEAM DETAILS :

S.NO	Student Reg. No	Name of the student	Branch	Mobile No.	Email ID

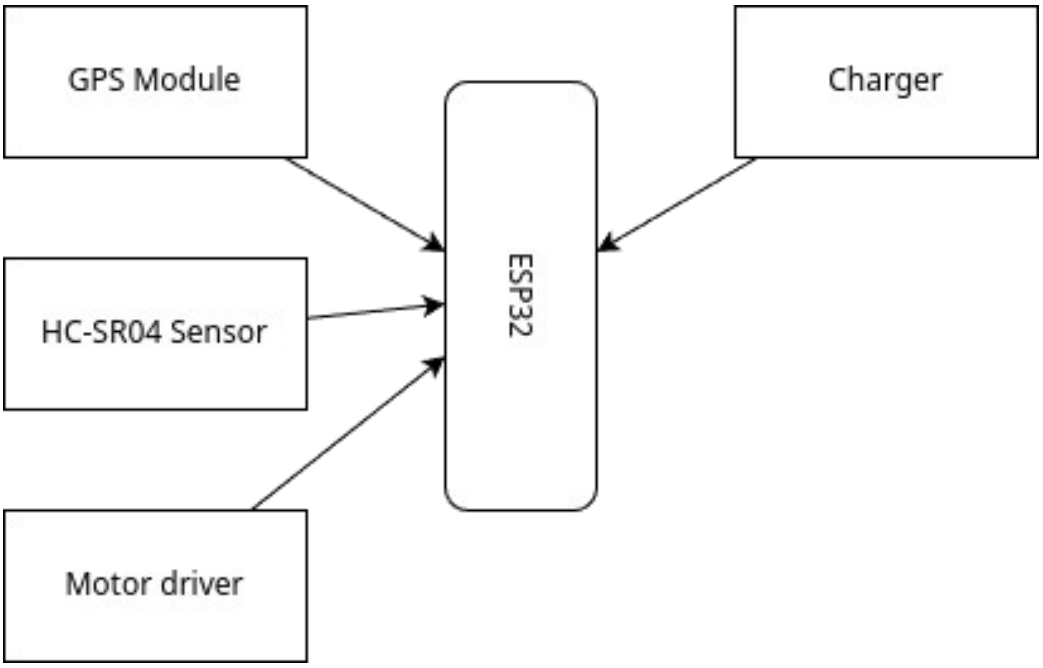
7. PROJECT SUMMARY / ABSTRACT :

Marine plastic pollution poses a significant threat to aquatic ecosystems and human health, requiring an efficient and autonomous cleanup solution. This project proposes an Autonomous Robotic Boat that utilizes AI, sensors, and IoT to detect, collect, and store floating plastic waste. The system integrates GPS-based navigation, a waste collection mechanism, and solar power for continuous operation. Real-time data transmission enables remote monitoring and optimization of cleanup efforts. This innovative approach enhances marine waste management, promoting sustainability and environmental conservation.

8. PROPOSED SOLUTION WITH METHODOLOGY:

The proposed solution is an Autonomous Robotic Boat designed to detect and collect floating plastic waste from water bodies using AI, sensors, and IoT technology. The system utilizes image processing and ultrasonic sensors to identify waste, while a robotic arm or conveyor mechanism collects and stores it for proper disposal or recycling. Powered by solar panels, the boat operates continuously with minimal human intervention. The IoT integration enables real-time monitoring and data transmission for tracking pollution levels. The methodology involves waste detection, collection, storage, and disposal, ensuring an efficient and sustainable approach to marine plastic pollution control.

9. BLOCK DIAGRAM FOR PROTOTYPE MODEL:



10. WORK PLAN / TIME SCHEDULE :

The project is scheduled to commence on March 2025, and conclude on April 2025. The Timeline is structured as follows:

Date	Activity	Description	Objective	Expected Outcomes
07-Apr to 10-Apr	Project Planning and Requirement Analysis	Identify system requirements, components, and technologies to be used.	Define system goals and components	Clear system scope and finalized requirement list.
11-Apr to 13-Apr	Component Procurement	Purchase and test sensors (moisture, conductivity, capacitive, inductive), ESP32, etc.	Obtain hardware parts	All required components procured and tested individually.
14-Apr to 18-Apr	Hardware Setup & Assembly	Assemble prototype	Mount sensors and bins, wire up ESP32 and motors into frame.	Physical structure with connected components.
19-Apr to	Software	Write code to process	Develop control	Codebase ready and

23-Apr	Development	sensor data and control mechanical sorting.	logic	testable with hardware.
24-Apr to 27-Apr	Integration & Testing	Integrate ESP32 logic with hardware; test with different waste items.	Combine hardware and software	Functional prototype that segregates waste.
28-Apr to 02-May	System Optimization & Enhancements	Fine-tune classification accuracy, test for edge cases, consider IoT features.	Improve performance	Reliable, accurate, and responsive waste segregation.
03-May to 07-May	Final Review & Presentation	Prepare slides and demonstrate working prototype to faculty or audience.	Present to evaluators	Reviewed, validated, and presentable final project.

Milestone	Work Done	Deadline
1	Designing hardware system	March
2	Hardware final result	April

11. LIST OF FACILITIES AVAILABLE IN THE COLLEGE:

Our college provides state-of-the-art facilities crucial for the successful development of the "Mechatronics and IoT" platform:

Mechatronics & IoT Lab:

Equipped with the latest software and hardware required for development.

Research & Development Cell:

Innovative meeting rooms where the project team can collaborate with ease and engage in brainstorming sessions.

Extensive Library Resources:

Access to an extensive collection of academic literature and resources related to education technology and inclusive learning.

12. NATURE OF INDUSTRY SUPPORT:

MS Equipment can assist in promoting the IoT platform . Industry support is seen not only as a source of guidance but as a means to ensure the scalability and sustainability of the "Robotics".

13. DETAILS OF FINANCIAL ASSISTANCE REQUIRED:

The estimated financial assistance required is broken down as follows:

Software Licenses: ₹. 1000
Hardware : ₹ 6000
User Testing: ₹.1000
Miscellaneous Expenses: ₹ 4000
Total : ₹12000

14. EXPECTED OUTCOMES / RESULTS:

The Robotics system project anticipates the following outcomes:

The **Autonomous Robotic Boat** successfully detects, collects, and removes floating plastic waste using **AI and sensor-based technology**. Its **solar-powered and IoT-enabled** design ensures continuous operation with minimal human intervention. This system offers an **efficient, scalable, and eco-friendly** solution for reducing marine plastic pollution.

UNDERTAKING

1. The college will provide the basic infrastructure and other required facilities to the students for timely completion of their projects.

2. The college assumes to undertake the financial and other management responsibilities of the project.

3. The college will ensure that the funds provided are utilized only for the purpose provided and any remaining amount will be returned back to the University after the time of completion of the project.

Signature of the Faculty Guide

Signature of the principasl