1. **PROJECT REFERENCE NUMBER**: 46S_BE_2728
2. **TITLE OF THE PROJECT:** AI BASED AUTOMATIC LAKE CLEANING ROBOT
3. **NAME OF THE COLLEGE AND DEPARTMENT:**

   BANGALORE TECHNOLOGICAL INSTITUTE

   DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
4. **NAME OF THE GUIDE AND STUDENTS:**

   GUIDE: DR S THENAPPAN [Professor, Department of CSE]

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5. **KEYWORDS:** Network Architecture, Alex Net, Arduino uno, IoT, CNN algorithms.
6. **INTRODUCTION:**

   Clean water is a basic need for all living beings. Without water survival in the Earth is not possible. Water covers about 70% of the Earth's surface among that only 3% of that is pure water. Water gets polluted due to any reasons like industry waste, sewage waste, garbage waste. Hence it is important to maintain cleanliness and hygiene of water. We considered this water pollution as a serious issue and start to work on the project. We decided to incorporate technology to get the work done effectively and efficiently. Our project design is in such a way that it collects the waste which floats on water bodies. In present time almost all the people are familiar with robots. We are going to design a very interesting robot that is Smart Phone controlled Robot.

   Traditional method for collecting water surface floating waste are manual basis, by means of boat trash skimmer. The above methods are costly risky and large time consuming. To eliminate the drawbacks of the above-mentioned methods the remote controlled AI based water cleaning machine was designed which helps in cleaning the water surface efficiently and eco/friendly. The water waste cleaning Robot consists of Node MCU, DC motor battery, Ultrasonic sensor, Camera are attached to it for collecting the waste and monitoring the water.
7. **OBJECTIVES:**
   - Collect many types of wastes

- Less human interference
- Collect more amount of waste
- Easy disposal of waste
- Safety for the user

8. METHODOLOGY:

Materials: Ultra Sonic Sensor, H-bridge motor, Micro controller , Camera,Arduino UNO, Node MCU.

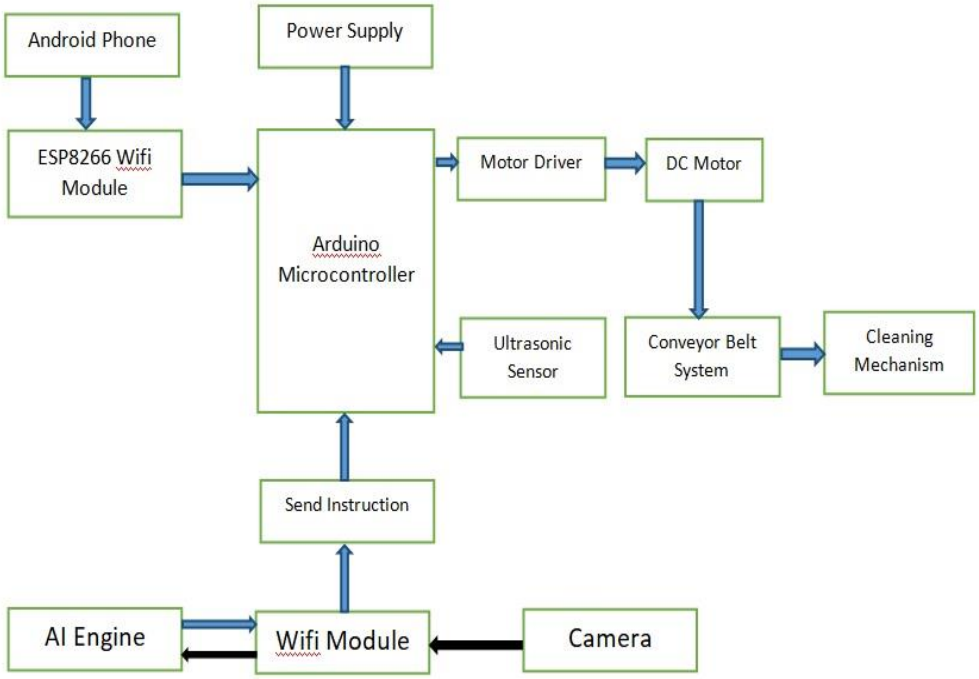
Methods: Crop debris, Waste Management,

Details of work carried out:

Identify waste

Debris Alert.

Diagram of system architecture:



9. RESULTS AND CONCLUSION:

Lake cleaning vehicle has been designed with Arduino Uno Microcontroller, 4 dc motors, H Bridge Motor Controller, Node MCU, Wifi camera and ultrasonic sensor. Design of Android application to control the vehicle movements and sending

instruction to the vehicle for cleaning. Android application is able to communicate with the wifi module of the Lake cleaning vehicle. Vehicle is able to manoeuvre according to signal received from the android application. Vehicle is able to collect garbage from the lake. AI based garbage detection algorithm can predict the garbage on the water surface and send instruction to the boat to control the movement and collect garbage.

10. Scope for Future work:

Enhance the robot's waste collection system to efficiently gather and separate different types of waste, including floating debris, plastics, and organic matter. Integration of sorting mechanisms, such as conveyor belts or suction-based filtration systems, can improve waste management and recycling processes.

Improve the robot's navigation capabilities by integrating advanced sensors, such as LiDAR and computer vision, to enable precise mapping of the lake environment. This would allow the robot to autonomously plan its cleaning routes, avoid obstacles, and efficiently cover the entire lake area. Draw inspiration from nature to develop robots with designs and features that mimic aquatic organisms, such as fish or water insects. Biometric robots can navigate through water more efficiently, reduce energy consumption, and potentially have less impact on aquatic ecosystems. Equip the robot with sensors capable of monitoring water quality parameters such as pH levels, dissolved oxygen, nutrient content, and pollutant concentrations. This data can be used to identify polluted areas and prioritize cleaning efforts effectively.