

BANGLADESH UNIVERSITY OF ENGINEERING AND TECHNOLOGY



Department of Electrical and Electronic Engineering

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Course Title: Control System I Laboratory

Section:C2

Project Name: Developing of a floating garbage cleaning robot for water body surface.

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Abstract:

The objective of our project “Developing of A Floating Garbage Cleaning Robot for Water Body Surface” is to design and implement a robot that will help cleaning the dirt form the surface of a water body . As water is our daily necessity ,it needs to be cleaned for betterment. This project is designed in such a way that will easily collect the floating wastes from the water body.

Objective:

The main objectives of this project are :

- 1) Time and resource saving
- 2) Compatible with miniature to big size systems
- 3) User friendly
- 4) Waste free water body
- 5) Remote controlled direction

Methodology:

Software Implementation:

For the software implementation ,basically the conveyer rotation was checked in proteus and tinkercad.

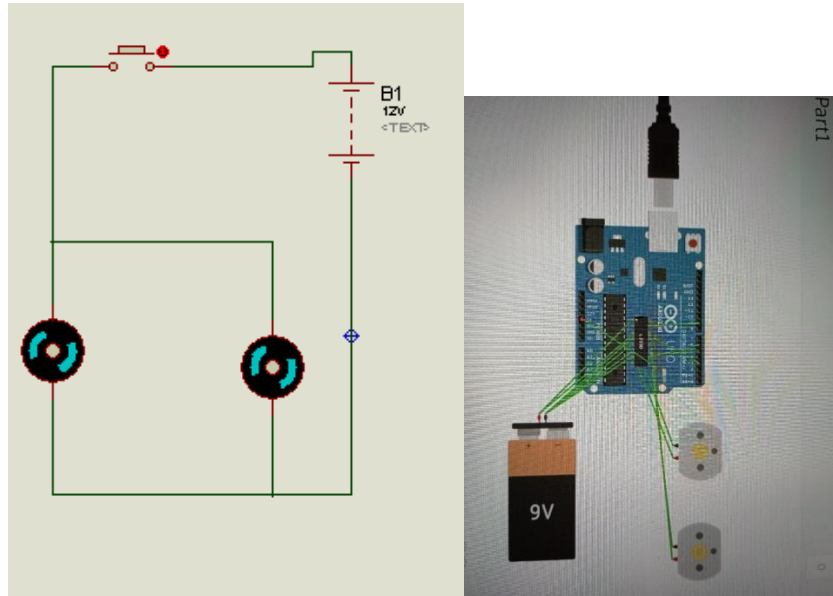


Fig01:Conveyer

A Bluetooth app was built for controlling the rotation via Bluetooth module .

Here is the picture of the main screen of our app.

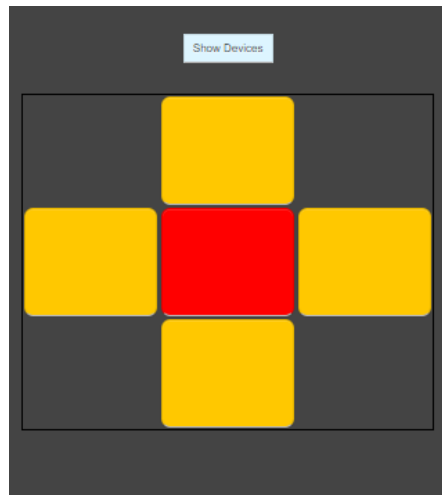


Fig02:Bluetooth app screen

And here the backend design of our app:

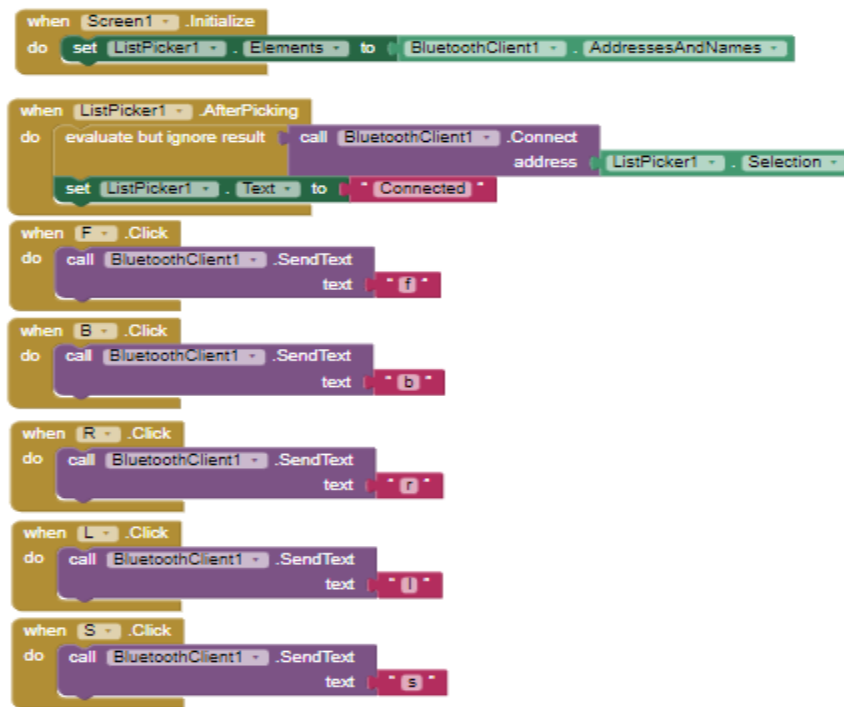


Fig03: Backend Design of the app

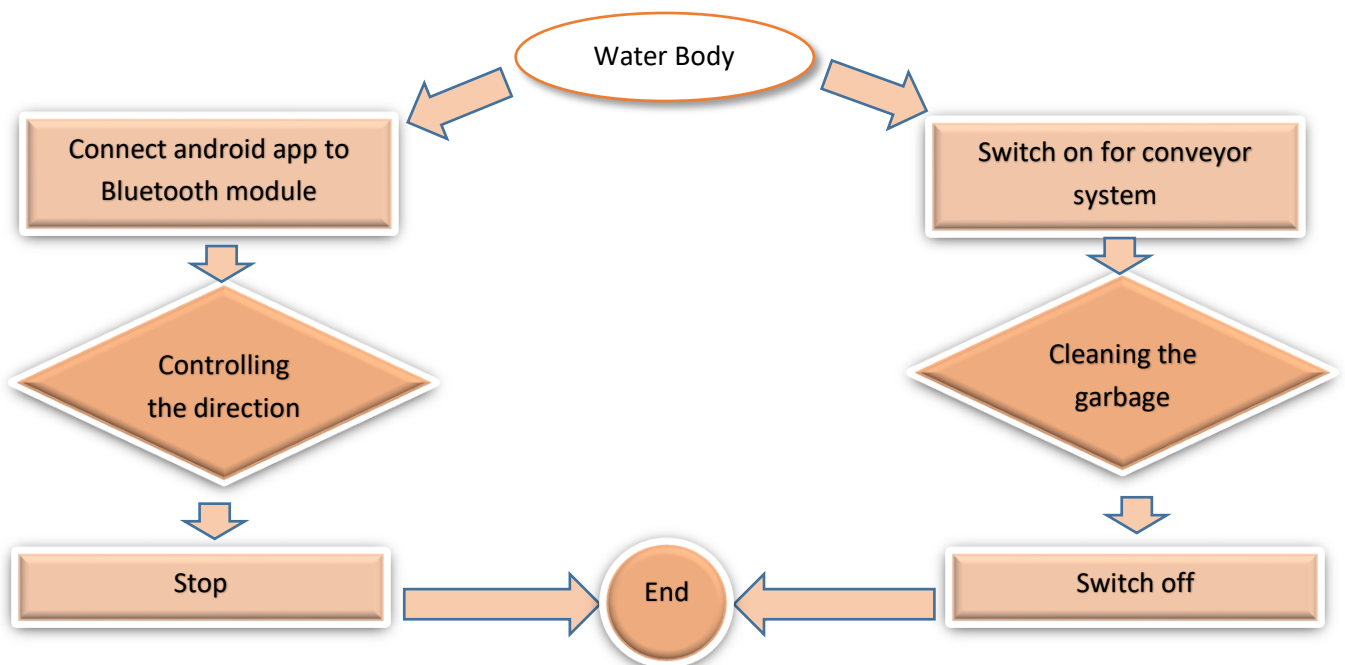


Fig04:Software Implementation Flowchart

Hardware Implementation:

Components Used:

- 1) Battery
- 2) Wheel
- 3) Servo Motors
- 4) High Torque Motors
- 5) Table mat
- 6) Switch
- 7) Breadboard
- 8) Arduino Uno
- 9) Motor Driver
- 10) Bluetooth Module
- 11) PVC boards(3types)
- 12) Pipe
- 13) Connecting Wires
- 14) Battery Casing (2 battery , 4 battery)

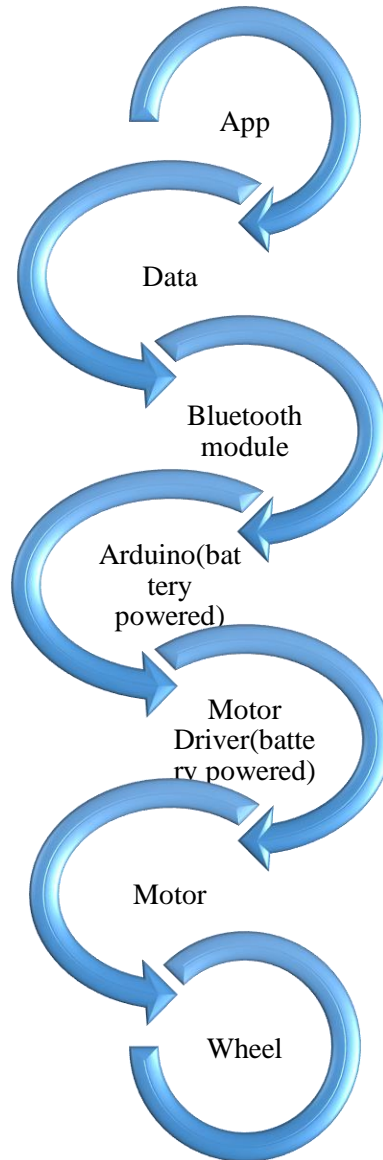


Fig05: Circuitry Working procedure(Step by step)

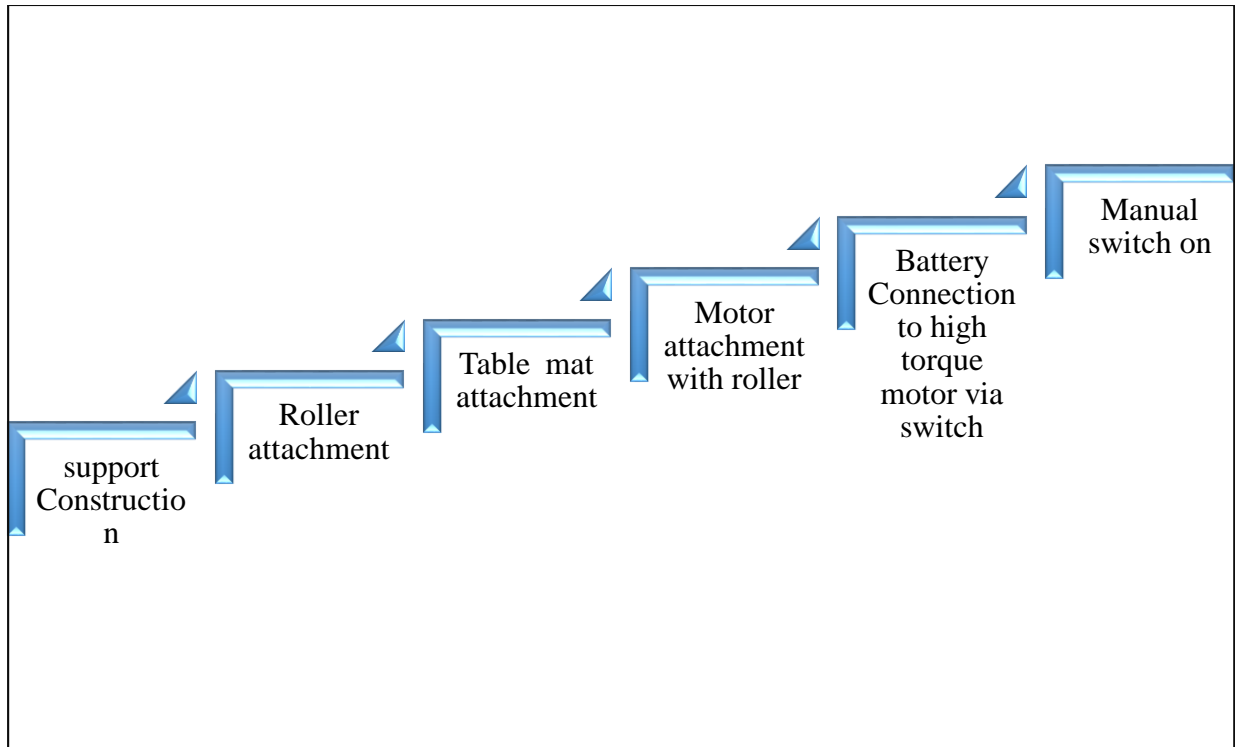


Fig 06: Conveyor construction and working procedure (step by step)

For the hardware part , as it can be seen from the fig 5, the connection was given like this:

App → Bluetooth module → Arduino → Motor driver → Servo motor → wheel

This portion needed pvc board for the external structure and also for the fin type wheel. For the conveyor system the support was solely built by hard pvc board and the roller used were basically pipes attached with the table mat as a medium of transferring the wastes to the place dedicated for waste collection.

Project Setup:

Here is the project setup:

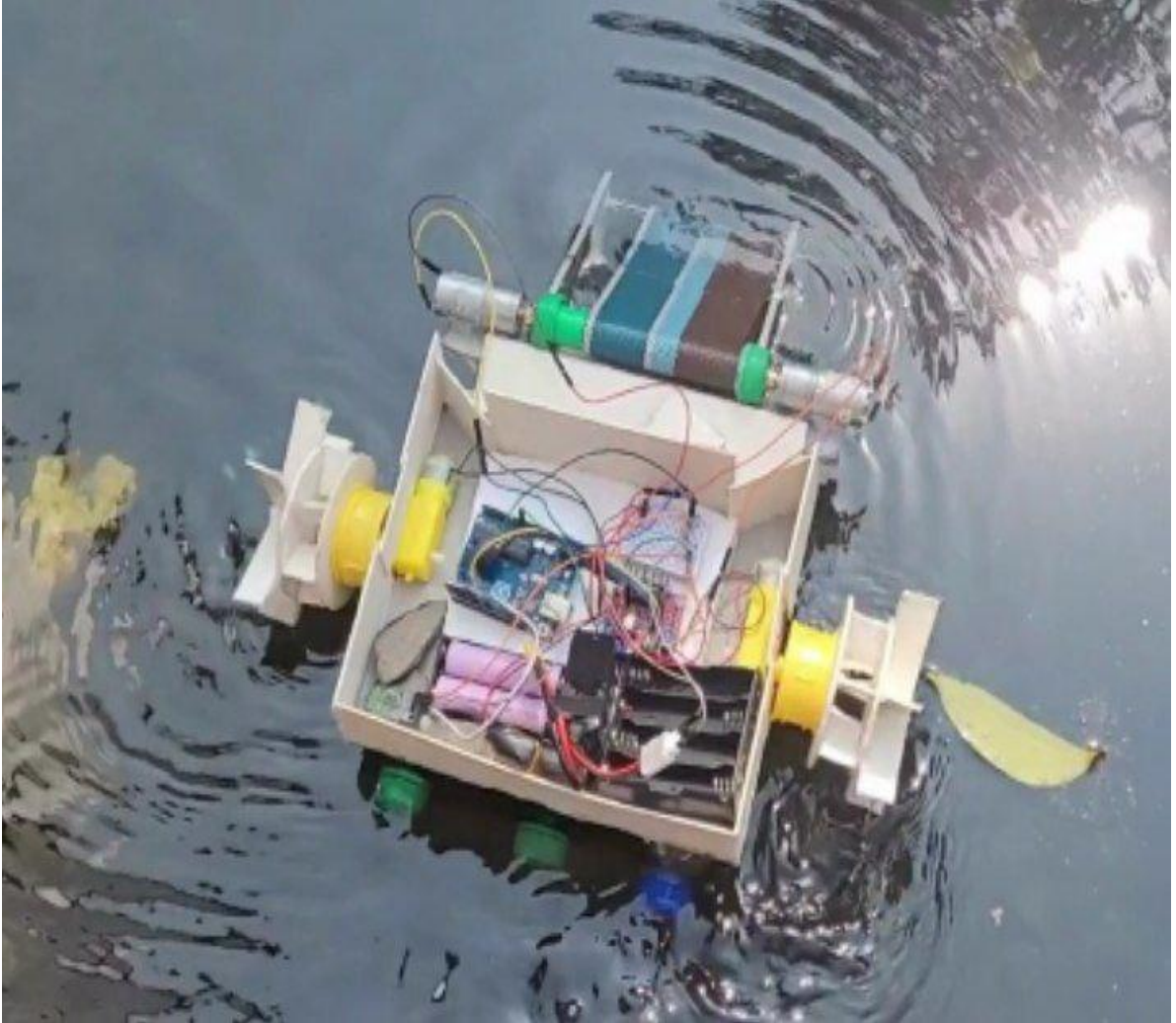


Fig 07: Final Project

Result:

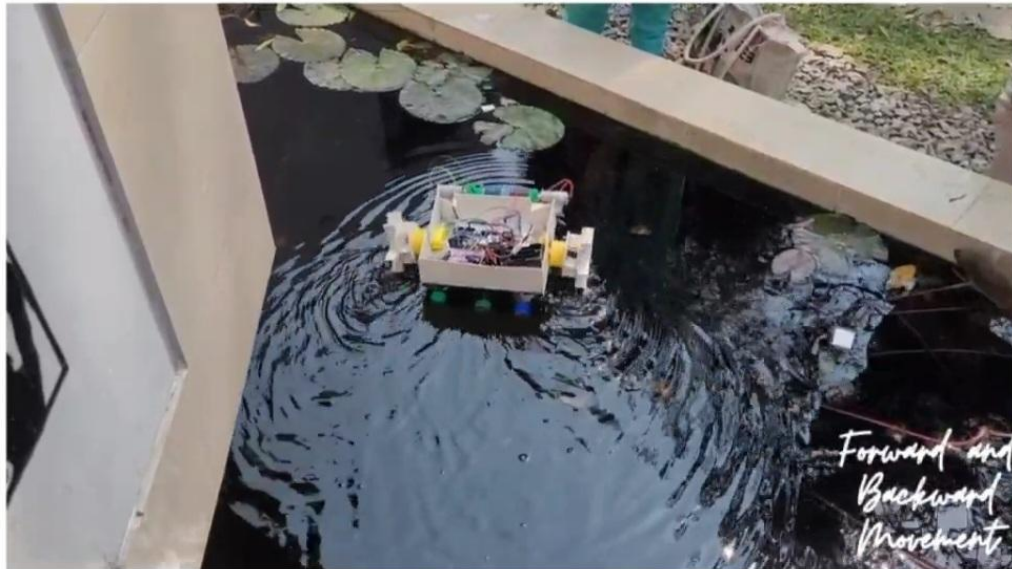


Fig08: Forward Movement



Fig09: Backward Movement



Fig 10: Rightward Movement



Fig11:Leftward rotation



Fig12:Garbage Collection with conveyor movement

These are the results of the whole procedure .

- 1) As it can be seen that it has successfully completed the rotation and taken many types of garbage.
- 2) Also the whole system was not autonomous .

Failure and Improvement:

Failure:



Fig13:Failure of the design

The conveyor support was too much slopy . That's why it couldn't capture all the wastes . Basically if the slope was made less slopy it would have been easier to collect all the wastes.

Improvement

There are a few scope for improvement in this project:

- 1)Making the whole system autonomous
- 2)Cascading a garbage detection system if possible
- 3) Water quality monitoring system can also be added

Discussion:

The aim of this project was directed by the **clean environment motivation**. It can be a major solution to good water quality. The project is done as a demo of a big project implementation. Due to less budget and capability of components also the trial and error procedure not every part was done perfectly. Hopefully, in bigger project implementation those errors and challenges we have faced would be removed and the project can be improved further.

References:

1) **Hsing-Cheng Chang, Yu-Liang Hsu, San-Shan Hung, Guan-Ru Ou, Jia-Ron Wu**

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<https://www.mdpi.com/988408>

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