Path Generation Of Cleaning Bot

CCTech

Centre for Computational Technologies

Transforming human life by democratization of technology

Content Reviewer : Vinayak Sutar

Revision Date : 07 May 2024

Version : 1.0

1.Introduction

- **Purpose**

    The purpose of the Path Generation of Cleaning Bot project is to create an intuitive user interface where users can define the boundaries of their cleaning area , the system generates a path for the cleaning bot to follow within the defined boundary, ensuring comprehensive coverage while avoiding obstacles and outer boundaries.

- **Scope**

    This project aims to develop a user-friendly web application enabling users to visually outline the boundaries of their indoor spaces for cleaning purposes. The system will generate an efficient cleaning path for a bot to navigate within the specified boundary, avoiding obstacles and outer edges.

2. System Overview

The web-based application, built with React and TypeScript on the frontend, allows users to define boundaries of their cleaning area. To stores the relevant data in a data structure using typescript.

3. Functional Requirements

1. Interface:

Provide a user-friendly interface for inputting specifications such as drawing the boundary of different shapes.

2. Boundary Definition:

The system should provide a closed boundary box interface for users to define the perimeter of the cleaning area.

3. Path Planning:

The system should be able to generate efficient paths for the cleaning bot to cover the entire cleaning area.

4. Recharge Station:

The system should integrate with the recharge station for automatic recharging.

5. Obstacle Avoidance :

The system should detect and avoid obstacles such as furniture, walls, and other objects in the cleaning area.

4. Tools

- Frontend: React with typescript for web frontend
- Rendering: Three.js
- Visual Studio Code

5. Milestones and Timeline

Sr. No.	Milestones	Date
1	Project Problem Definition	06-05-2024
2	SRS Presentation & Approval	07-05-2024
3	Discussion on User Interface & DS	07-05-2024

4	Implementation of User Interface	08-05-2024
5	Development of Track Generation Algorithm	10-05-2024
6	Project Completion and Submission	12-05-2024
7	Final Presentation and Demonstration	13-05-2024

6. User Interface
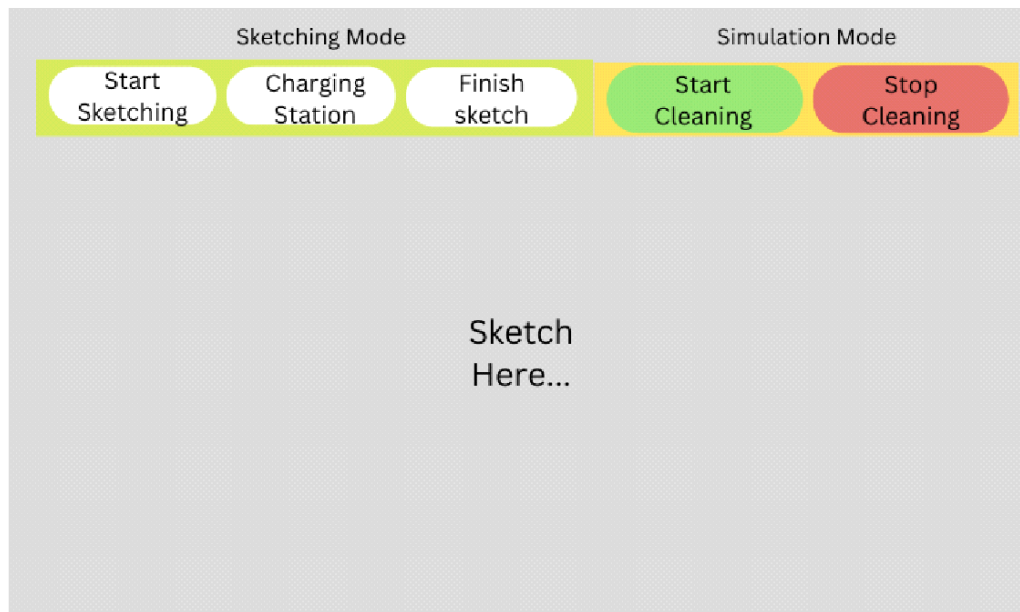
7. Conclusion

The Path Generation for Cleaning Bot project utilizes modern web technologies to create a user-friendly application. By combining React with TypeScript for the frontend, the system simplifies the process of defining cleaning boundaries and generating optimized paths. With features like obstacle detection, cleaning pattern selection, and recharge station integration, it ensures efficient cleaning operations while providing a seamless user experience.