2D -Maze Solver Using A* Algorithm

MINOR PROJECT REPORT

Submitted in partial fulfillment of the requirement for the Degree of

Bachelors of Engineering in Computer Science & Engineering

Submitted To:

[PARUL UNIVERSITY, VADODARA, GUJARAT (INDIA)]

Submitted By:

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Under The Guidance of:

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(Assistant Professor, Computer Science and Engineering)

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

PARUL INSTITUTE OF TECHNOLOGY VADODARA, GUJARAT

SESSION: AY 2023-2024

Parul University
Parul Institute of Technology

(Session: 2023 -2024)

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

<u>CERTIFICATE</u>

This is to certify that **SONAWANE GAURAV [200305105031]** Students of **CSE VI Semester** of **"Parul Institute of Technology, Vadodara"** hascompleted their **MINOR Project** titled **"2D MAZE SOLVER"**, as per thesyllabus and has submitted a satisfactory report on this project as a partial fulfillment towards the award of degree of**Bachelor ofTechnology** in **Computer Science and Engineering** under **Parul University,Vadodara, Gujarat (India)**.

Mr. Mohitkumar Rathod	**Prof. Sumitra Menaria**	**Dr.Swapnil Parikh**
(Assistant Professor)	**Head (CSE)**	**Principal**
(CSE)	**PIT, Vadodara**	**PIT, Vadodara**

DECLARATION

We the undersigned solemnly declare that the project report "**2D -Maze Solver**" is based on my own work carried out during the course of our study under the supervision of **Mr. Mohitkumar Rathod, Assistant Professor, Computer Science and Engineering**

We assert the statements made and conclusions drawn are the outcomes of my own work. I further certify that

1. The work contained in the report is original and has been done by us under the general supervision of our supervisor.
2. The work has not been submitted to any other Institution for any other degree / diploma / certificate in this university or any other University of India or abroad.
3. We have followed the guidelines provided by the university in writing the report.

Whenever we have used materials (data, theoretical analysis, and text) from other sources, we have given due credit to them in the text of the report and giving their details in the references.

SONAWANE GAURAV [200305105031]   **SIGNATURE** _____

SAVALIYA HEMIL [200305105044]   **SIGNATURE** _____

ACKNOWLEDGEMENT

In this semester, we have completed our project on **"2D -Maze Solver"**. During this time, all the group members collaboratively worked on the project and learnt about the industry standards that how projects are being developed in IT Companies. We also understood the importance of teamwork while creating a project and got to learn the new technologies on which we are going to work in near future.

We gratefully acknowledge for the assistance, cooperation guidance and clarification provided by **"Mr. Mohitkumar Rathod"** during the development of our project. We would also like to thank our Head of Department **Prof. Sumitra Menaria** and our Principal **Dr. Swapnil Parikh** Sir for giving us an opportunity to develop this project. Their continuous motivation and guidance helped us overcome the different obstacles for completing the Project.

We perceive this as an opportunity and a big milestone in our career development. We will strive to use gained skills and knowledge in our best possible way and we will work to improve them.

SONAWANE GAURAV [200305105031]   **SIGNATURE** _____

SAVALIYA HEMIL [200305105044]   **SIGNATURE** _____

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Abstract—A maze is one type of puzzle where we have given starting point and destination point with obstacles. We have to find path from starting point to destination point. In this project Python Language is used and PyGame module is used for making GUI. We are using A* Algorithm for finding minimal path from starting point to destination. The pathfinding algorithm solves the problem of determining the shortest path from origin to destination while avoiding obstacles. Agent movement is one of the most difficult challenges in designing realistic Artificial Intelligence (AI) in computer games. Pathfinding strategies are typically used as the foundation of any AI movement system. The A* search algorithm is used in this work to find the shortest path between the source and destination on an image representing a map or a maze. Finding a way out of a maze is a fundamental computer science problem that can take many forms. Pathfinding and graph traversal make extensive use of the A* algorithm. To test the system's performance, various map and maze images are used (100 images for each map and maze).The overall performance of the system is acceptable, and it can find the shortest path between two points on the images. More than 85% of images can find the shortest path between the two points of interest.