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Maze Solver Using AI

1 Introduction

The construction of a Maze Solver AI is the problem statement for this AI project. A maze solver AI is a program that employs AI algorithms to travel through a maze from start to finish. The primary goal of this project is to develop a program capable of solving various sorts of mazes, ranging from simple to difficult. This AI could have a wide range of applications, such as automated navigation systems in industrial plants, autonomous vehicles, and robotics. This project's ultimate purpose is to illustrate the potential of AI algorithms in addressing real-world problems and to propose a novel solution for maze-solving challenges.

How is Maze Solver Useful?

The ability to solve mazes has practical applications in many fields, including robotics, transportation, and logistics. Autonomous vehicles, such as drones and self-driving cars need to be able to navigate complex environments, and solving mazes is a key step in achieving this goal. Manufacturing plants can use maze-solving algorithms to optimize the movement of goods and materials through the plant. Maze-solving algorithms can also be used to develop search-and-rescue robots that must navigate complex environments to find and rescue people in distress. Overall, the ability to solve mazes has important practical implications for designing intelligent systems that can navigate and interact with complex environments in a variety of situations.

2 The Use of AI to solve Mazes

In the field of mazesolving, AI algorithms like intelligent search algorithms offer a number of advantages over brute force algorithm. Firstly, AI algorithms use heuristics to guide searches towards more promising solutions with a view to reducing the space available for searching and improving search efficiency. This applies even more to complicated mazes with many possible paths and ends.

Secondly, AI algorithms can learn and adapt to different environments over time. These

systems can help to simplify the mazes, even in unpredictable conditions, by analysing previous experiences and learning from them. Such adaptability cannot be achieved with brute force algorithms that rely on an exhaustive search of the whole state space.

Third, AI algorithms may be integrated with other artificial intelligence systems in order to reach full solutions for particular tasks. For example, the mazesolving algorithm could be integrated into a computer vision system in order to allow robots to navigate through labyrinths while recognising and avoiding obstacles at real time.

The ideal solution for this project would be a smart search algorithm which relies on heuristics to determine the best possible solutions. In particular, given its effectiveness and the possibility of providing optimum solutions, the A* algorithm should be chosen as a suitable choice for this project. In order to estimate distance between the current location and destination, an A* algorithm uses a heuristic calculation function which then guides search for the shortest path.

3   Conclusion

Finally, the problem statement of this Project is to develop an efficient system that can effectively solve complicated mazes with obstacles, obstructions and a number of paths. The traditional method of brute force for solving the maze can be time consuming and impractical, especially in complex mazes. That's where AI algorithms, such as the intelligent search algorithm, come into play.

This project allows us to demonstrate how AI algorithms can be used to efficiently and effectively solve complex maze navigation problems. Using intelligent search algorithms such as A* offers a viable solution for efficiently navigating complex environments and opens a wide range of possibilities for developing intelligent systems for various applications.

Individual Contributions for the Project

1 CS20B1006 SRAVANTH CHOWDARY POTLURI

- Researched The Existing Solutions/Codebases For Maze Solving Methods

- Developed The process to be followed to implement the maze solver in the CLI

2 CS20B1044 AVINASH R CHANGRANI

- Researched about the Existing AI Paradigms for Maze Solving

- Researched And Documented The Text for the Report Using LaTex

Report submitted to -: Dr. Ram Prasad Padhy