**Multi-Agent Maze Solver**

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The objectives of this project are to gain a better understanding of a multi-agent maze solver and to develop a means to solve the problem using the A\* search algorithm. We are implementing an agent that can help us to navigate through a grid based Maze. In this program we can have many initial points and a final one where those points merge respectively. Here each agent act alone, decision making algorithm applied is heuristic based path planning that has to determine the optimal path avoiding the obstacles and the position of other agents.

The multi-agent maze solver is designed with a feature of an interactive user interface developed in python and pygame for the real time maze designing and dynamic agent addition. There are inbuilt python command that produces random maze and it is used to add more variation to the maze. This project aims to explore the ways to solve a multi-agent maze using A\* search algorithm .We are implementing an agent that can help us to navigate through a grid based Maze. In this program we can have multiple starting points and an end point where they all meet respectively. Here each agent operate independently, using heuristic based decision making to find the most optimal path by avoiding the obstacles and considering other agents’ position.

The significance of this project is the approach that we use at different stages to enhance the solutions of path planning problems in the complex surroundings and multiple-agent systems. In this sense, it illustrates how easy it is to understand and implement algorithms like A\* Algorithm, based on such friendly interfaces, can generate simple yet effective mechanisms for managing the kind of work which steadily accumulates over time, such as route planning, path finding, and spatial reasoning. This is particularly helpful in real life applications such as in task scheduling, transportation of goods and fluid on the road, and in robotics where many applied agents can be put into action to accommodate change as and when it happens. The project provides helpful knowledge in terms of decisional questions when several agents are involved in dynamic environments through the guidance of agents within complex and variable conditions.

The main focus of this project is made on enhancing the interactions of a set of agents in various simulations and actual situations, being time-effective and variable. They explain how flexible integrated systems can transmute to solve progressively complex issues in order to set the stage for future developments in cases such as robotics and autonomous vehicles.

**Keywords:** navigation, A\* search, multi-agent environment, heuristics and a solving maze.