Project Proposal

1. Title Page

Project Title: MazeMind

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2. Abstract

Understanding how computer algorithms work can be difficult if students only read about them in theory. *MazeMind* is an educational game that shows how the A* pathfinding algorithm works inside a maze. The game allows students to watch the algorithm find the shortest path while they interact with the maze. To make it more engaging, the system includes rewards and scores, so it feels like a game instead of just a demonstration. The aim of the project is to make learning about AI more fun and practical. By the end, we expect to deliver a working software prototype that helps students understand pathfinding in a simple and interactive way.

3. Introduction

Pathfinding is the process of finding the best route from a starting point to a goal. It is used in many real-world applications such as maps, robots, and video games. Students often struggle to understand these algorithms because they are taught mostly through theory and equations. This makes the learning process less interesting. Our project *MazeMind* provides a visual and

interactive way to learn pathfinding. By turning the learning process into a game, students will be more engaged and will find it easier to understand.

4. Problem Statement

Students lack simple tools to learn pathfinding in an interactive and fun way. Existing solutions are either too theoretical or focus only on gaming without any learning element. There is a gap for an educational tool that combines both learning and fun in one place.

5. Objectives

- To build an interactive maze game that demonstrates the A* pathfinding algorithm.
- To allow students to see how the shortest path is calculated.
- To make learning engaging by adding rewards and scoring.
- To provide a simple and clear learning tool for beginners in AI.

6. Scope of the Project

The project will cover:

- Creating maze environments.
- Using the A* algorithm to find paths.
- Adding rewards and score features for interaction.

The project will not cover:

- Advanced AI algorithms beyond A*.
- Online multiplayer or large-scale game features.

Feasibility: The project can be completed within the semester using Python and Pygame on standard desktop systems.

7. Proposed Solution / Methodology

Our solution is to develop a maze game where the A* algorithm finds the path to the goal. The maze will be generated, and the algorithm will be shown working step by step. The user will see the AI process in action and earn points based on interaction.

Tools & Technologies:

- Python
- Pygame library
- Desktop platform

8. Stakeholders

- **End Users:** Students who want to learn pathfinding.
- **Project Team:** Developers of MazeMind.
- **Supervisor/Department:** Provides guidance and assessment.
- **External Users:** Teachers or learners who may use the game later.

9. Expected Outcomes

- A working game called *MazeMind*.
- Visualization of how A* finds the shortest path in a maze.
- Interactive features like scoring and rewards.
- A tool that makes AI concepts easy to understand.

Success will be measured by:

- Correct working of the A* algorithm.
- Smooth user experience.
- Student feedback on learning and engagement.

10. References

AI Basics with Python – Cambridge Crash Course