

project Proposal



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1. Problem Description

This project addresses a maze pathfinding problem where a rescue agent must navigate a haunted maze to reach a lost child while avoiding AI-controlled monsters.

The environment is non-static, meaning:

- Maze walls can appear or disappear during execution
- Monsters move continuously and have a detection radius
- The agent must replan its path whenever the environment changes

The goal is to find a safe and efficient path to the target under dynamic constraints.

Problem Domain

The problem selected for this project falls under the category of Robotics and Pathfinding, combined with elements of game-based AI search.

The environment is modeled as a two-dimensional grid (maze) containing walls, free cells, a start point, and a goal representing a lost child. Certain areas may be dangerous due to the presence of AI-controlled monsters. Additionally, the maze may include dynamic elements, such as walls appearing or disappearing during execution.

The agent's objective is to find a safe path from the start to the goal while avoiding obstacles and moving threats. The problem is well-suited for applying various search algorithms (uninformed and informed) and allows demonstrating the limitations of local search techniques in complex and dynamic environments.

This problem is an advanced extension of the classical Maze Pathfinding problem.

It is suitable because it:

- Maps naturally to a state-space search problem
- Supports the implementation and comparison of multiple search strategies, including BFS, DFS, Uniform Cost Search, A, and Hill Climbing*
- Demonstrates the limitations of local search in dynamic or constrained scenarios
- Provides flexibility and opportunities for creativity, in line with course objectives

Compared to a static maze, this problem is more challenging and realistic.

REQUIRED ALGORITHMS

