



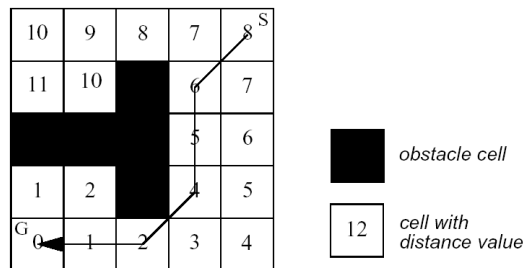
Lecture 7-1: Metric Path Planning

Introduction to AI Robotics (Sec. 10.4 – 10.6)

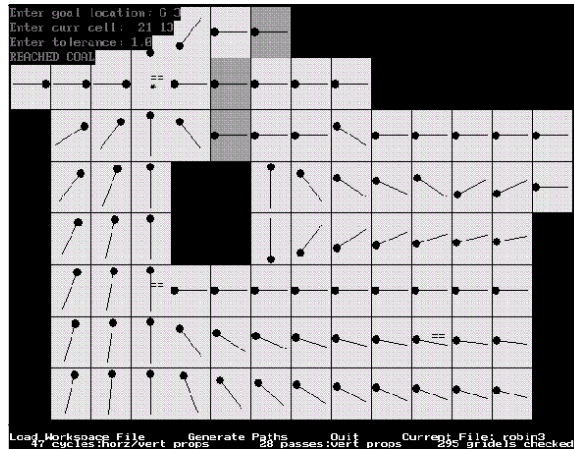
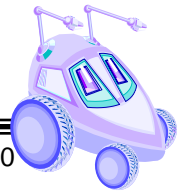
Objectives:

- Define Cspace, path relaxation, digitization bias, subgoal obsession, termination condition
- Explain the difference between graph and wavefront planners
- Represent an indoor environment with a generalized Voronoi graph, a regular grid, or a quadtree, and create a graph suitable for path planning
- Apply wavefront propagation to a regular grid
- Explain the differences between continuous and event-driven replanning

One of the most popular graph based planners is approximate cell decomposition or _____ or grassfire because it is efficient and simple to implement b finding routes in fixed-size cell arrays. The cells are marked by distance to the goal.

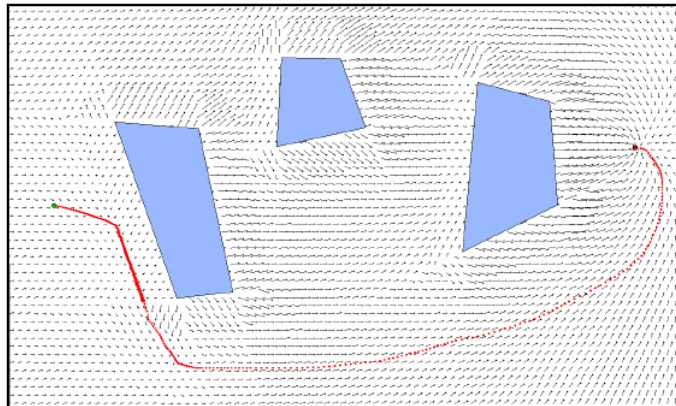


The result of a wavefront propagation is a map that looks like a potential field and these are like sensor observations that the robot can use to move. The Trulla planner is one of the most popular implementations were undesirable routes can be given a weighting so that the robot avoids that cell.

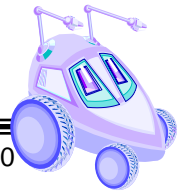


In order to avoid subgoal obsession and lack of opportunistic replanning, use a D* algorithm based upon the A* search algorithm or continuous replanning to assist the robot in reaching its goal.

_____ creates a field or gradient across the robot's map that directs the robot to the goal from multiple prior positions. It looks very similar to the Trulla planner created from the wavefront algorithm.



The way to remove the robot from a local minima situation in a potential field navigation is to introduce noise or keep track of the robot's state.



There are also obstacle avoidance algorithms based upon tangent and visibility graphs shown below:

