Path Finding Mobile Robotics

Louie Huang
Advisors: Dr. George Pappas, Hadas Kress-Gazit
Introduction

- Path-Finding and Motion-Planning
  - Fundamental and Challenging Topic in Robotics
  - Point of Origin and Destination

Sample 2-D Environment

Robot

X Goal
Project Background

- Specify Directions in Temporal Logic Formula
- Generate Continuous Path Plan

Sample 2-D Environment

Robot

Areas
Overview on Continuous Path Generation

- Temporal Logic Formula
- Environment Map
  - Triangulation
- Discrete Path Plan
- Continuous Path Plan
  - Motion Controls
- Robot
Robot Platform

- ActivMedia Robotics Pioneer 3-DX

Laser Range Finder
Sonar Array

Capable of Localization
Robot Behaviors

- Shortest Path to Destination
- Obstacle Avoidance
- Custom Behaviors

On Board PC
Programming Custom Behaviors

- ActivMedia Robot Interface Application (ARIA)
- Saphira Environment with Colbert
Programming Custom Behaviors

- X: 30000
- Y: 860
- Th: 0

**power**
- TV: 0
- RV: 0

- Mpac: 9
- Spac: 18
- Vpac: 9

Bat: 13.0
Mapping Environment

- Environment Mapped Prior to Implementation

Levine 4th Floor
Mapping Environment

- Resulting Map After Cleanup

Levine 4th Floor
Robot Map Graphical User Interface

- Develop New Maps
- Modify Existing Maps
- Add Regions of Interest
Robot Map Graphical User Interface
Further Development

- Next Step: Triangulation Function
Further Development
Further Development

- Additional Functions
  - Continuous Path Generation
  - Temporal Logic Formula Input

- Expand to Higher Level Directions
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