

Trundl: An Exploration of Particle Filters

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Abstract

1 Definition

1.1 Project Overview

For this project, I decided to look at the problem of robot localization and pathfinding under uncertainty. I first started to understand how interesting a problem this could be when I saw a video from Sebastian Thrun's AI for Robotics course at Udacity. The video showed a particle filter localizing a robot in a

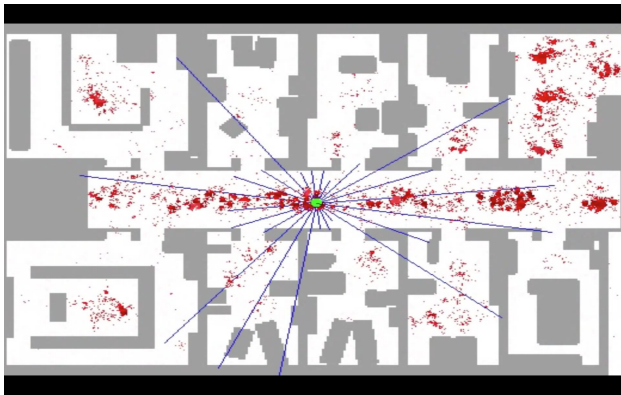


Figure 1: Framegrab from [?] showing a simulated robot localizing itself within a set of rooms.

- 1.2 Problem Statement
- 1.3 Metrics
- 2 Analysis
 - 2.1 Data Exploration
 - 2.2 Exploratory Visualization
 - 2.3 Algorithms and Techniques
 - 2.4 Benchmark
- 3 Methodology
 - 3.1 Data Preprocessing
 - 3.2 Implementation
 - 3.3 Refinement
- 4 Results
 - 4.1 Model Evaluation and Validation
 - 4.2 Justification
- 5 Conclusion
 - 5.1 Free-Form Visualization
 - 5.2 Reflection
 - 5.3 Improvement

References

- [1] Peter Zatko, Ivan Poupyrev, Rachid El Guerrab, and Regina Dugan. Some cool motion sensor stuff.