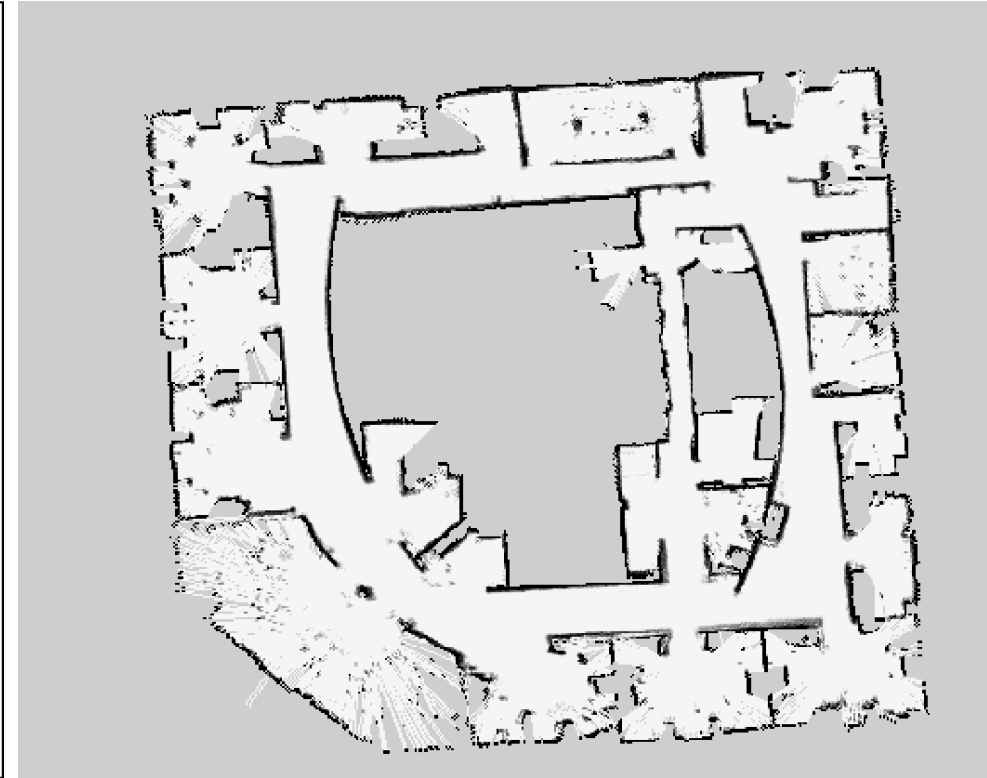
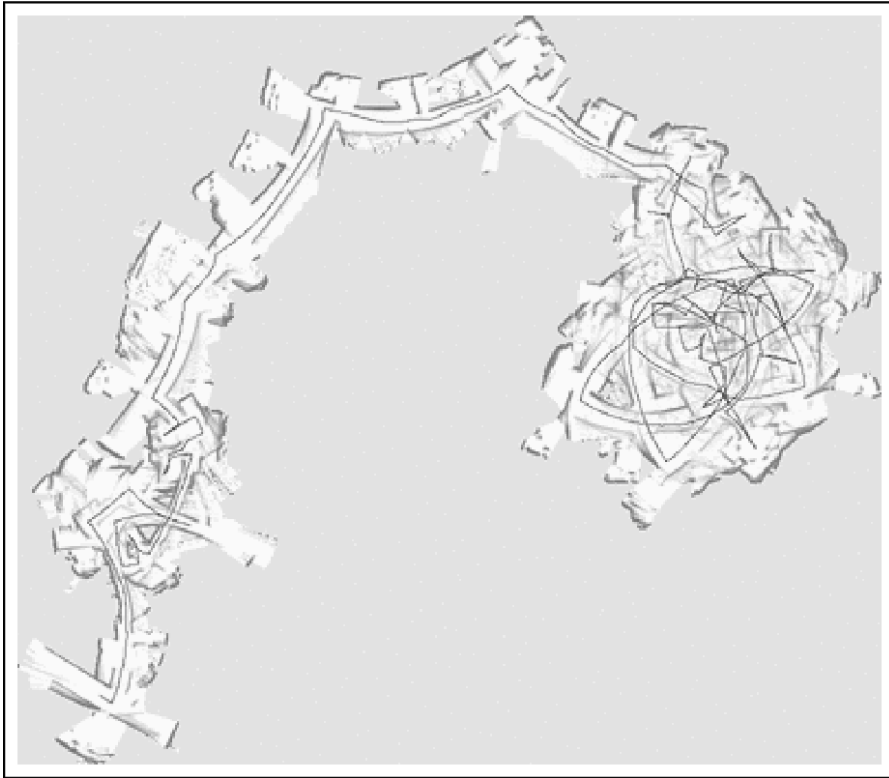


# Simultaneous Localization and Mapping

## Overview

# Introduction

**Simultaneous Localization and Mapping (SLAM)** is the problem of using a mobile robot to build a map of its own environment.



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**Simultaneous Localization and Mapping (SLAM)** is the problem of using a mobile robot to build a map of its own environment.

**Basic idea:** Particle filters. Each particle represents both a possible robot path and a possible map.

Learn this in two steps:

- Probabilistic mapping (without worrying about localization)
- SLAM based on particle filters

# Why is SLAM hard?

Localization and mapping cannot be separated.

Localization usually requires a map against which to match the robot's observations.

Mapping usually requires the robot to be localized, so the locations of observed obstacles can be recorded.