Master Thesis Proposal

Learning High-Level Environment Dynamics

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November 20, 2017

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1 Introduction

- With growing demand for personal robots that could assist the elderly, perform the daily repetitive tasks in households and offices, there is a persistent need to develop robots that could operate autonomously over a long period of time.
- There are a number of challenges to overcome, to develop and maintain a robot that can perform tasks in a dynamic unstructured environment and co-exist with human beings.
- One of the problems of working in a dynamic unstructured environment is the robot has to foresee all possible circumstances it has to handle.
- A robot which operate over a long time should have the capability to learn from its experience, to be robust.

- Navigation is one of the essential ability for a personal robot to do the tasks and interact with an environment.
- We focus on the problem of improving navigation in a dynamic environment.
- Traditionally, a map which is created once after exploring in the environment is used for navigation. Any discrepancies from the initially created map is considered as sensor noise.
- Dynamic changes are not taken into account for constructing a map.
- A robot has to replan whenever there was a moving obstacle.
- In this project, we try to learn the dynamic changes over time to improve navigation in indoor environment.

2 Related Work

3 Problem Formulation

4 Approach

5 Deliverables

- **Minimum**
- **Expected**
- **Maximum**

6 Work Plan

Task Name	Start Date	End Date	Duration (Months)
Master Thesis	**12/01/17**	**05/31/18**	**6**
Research	**12/01/17**	**01/15/18**	**1.5**
Literature Review			
Bayesian Inference			
Intelligent Exploration			
Implementation	**01/15/18**	**04/15/18**	**3**
Scenario Setup in Simulation			
Bayesian Modeling			
Implementation of selected Techniques			
Evaluation	**04/15/18**	**04/30/18**	**0.5**
Testing the effectiveness of proposed model			
Report	**05/01/18**	**05/31/18**	**1**