Autonomous Robots and Environmental Mapping

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Abstract

In the field of signal processing, compressed sensing is a technique used for reconstructing signals and images from very few samples and is commonly used in fMRIs and medical imaging. We aim to apply compressed sensing to allow autonomous robots to map an environment and identify areas of interest which are significantly different from the surrounding area. In our experiment, we program a robot equipped with sensors to travel along a path, do on-board summation of sensor readings, and send that sum (or path integral) to a server. We then apply reconstruction algorithms to the data, which consists of sensor readings and the travelled paths, to reconstruct the environment.

Contents

1 Introduction

2 Experiment settings

3 Models and assumptions

4 Algorithm for solving the inverse problem

5 Conclusions and Further Work