

Public Abstract

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Title:Scene Matching between a Quantitative Map and a Qualitative Hand Drawn Sketch

The goal of this work is to perform scene matching between a sketched map and the scene depicted by the sketch, e.g., as represented by a precise physical map or an occupancy grid map (OGM) built by a robot. In this thesis, a novel method known as the Evolutionary Algorithm for Scene Matching (EASM) has been proposed for accomplishing this task. The method makes use of spatial relations and an evolutionary algorithm for accomplishing this task. The spatial relations between different objects in a scene are captured using the histogram of forces method and then an evolutionary algorithm is used to find the best histogram relational map. This histogram relational map is then translated into an object mapping. Experiments were run using two different scenes and several hand drawn sketches of each scene, which were collected during a user study. Scene matching was performed between a quantitative map and the qualitative sketches. Scene matching was also performed between occupancy grid maps and the sketches. A comparison was made between the proposed approach and the Fuzzy Sequential Nearest Neighbor (FSNN) approach. Experiments were also run for cases where the sketches and the maps had unequal number of objects.