Design of a Simultaneous Active Localization, Mapping and Navigation Algorithm

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Abstract: During my work I designed a software agent whose purpose is to enable a Lego NXT robot to localize itself, while it simultaneously maps a partially known environment. The robot detects obsatcles with its sonar sensor and matches the measurements with its map, however there are some obstacles not initially marked on the map. The software agent's final goal is to navigate the robot from an unknown starting location to a predefined goal location. To this end a software architecture is designed that integrates the capabilites of the FastSLAM algorithm with the Anytime D search algorithm. To furter enchanse the effectiveness of the process the software agent preforms active localization. This document gives an explanation of the problem, the proposed sotfware architecture, which includes a virtual representation of the problem, a short explanation of the applied algorithms and the insights gained during the project.*

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