

Simultaneous Localization and Mapping (SLAM) Problem – description of selected algorithm

Tomasz Małecki ¹⁾, Janusz Narkiewicz ²⁾

¹⁾ Warsaw Institute of Aviation, Engineering Design Center / Warsaw University of Technology PhD student

²⁾ Warsaw University of Technology, Faculty of Power and Aeronautical Engineering, Department of Automation and Aeronautical Systems

Abstract:

A simultaneous localization and mapping (SLAM) algorithm was developed for prospective of on-line application on mobile platforms. There are several approaches to this task [1]–[3]. The task of the algorithm is to search and map the operation area, avoiding contact with obstacles. The theoretical background of the problem, the model of the system and the operation scenario will be presented. The approach is similar to [4]. The algorithm, which was implemented in MATLAB[®] software, is based on linear discrete-time state transition model for determination of platform position and orientation, and ‘force’ points method, for collision avoidance and prediction of the next-step of platform motion. The uniform, 2D motion of a rigid platform operating in a confined space filled with landmarks of polygonal shape was considered. An ideal operation of single sensor was assumed. The developed solution was tested against defined special cases to determine applicability and to indicate directions for future work. It is expected that proposed approach might be applicable in cases of real-time applications for limited computational resources.

References:

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