SENSOR BASED NAVIGATION OF AUTONOMOUS MOBILE ROBOT

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This paper is concentrated on a reactive sensor – based omnidirectional motion mode in in-door robot surrounding. A high accuracy dead – reckoning and obstacle avoidance of the robot is recquired. The method supposes the use of odometer robot means. The model assumes that the wheel distance measurement errors are random zero means white noise. Algorithms developed will be implemented within a generic SW architecture and used on 'OMR III' experimental robot.

Key words: *autonomous mobile robot, path planning, odometric sensor*

1. Introduction

In industrial countries autonomous mobile robots (ALR) are still objects of intensive theoretic and design efforts of research teams in developed countries, mainly for high usability of its intelligent behaviour, adaptability and possibility of supervisor or tele-operated control [2]. Robot's working environment is determining its behaviour, with general classification as surpassable / unsurpassable, inner and outer, with low to high obstacles density, etc. Surrounding environment representation is difficult due to substantial differences of geometrical and physical characteristics. The inner environments are usually structured and therefore easier to represent.

Contribution is focused on two kind of robot navigation. First kind is sensorial (reactive, reflective) and second is knowledge (planning). Reflective navigation does not require global representation of the robot environment. Movement commands are generated in place of sensorial information obtaining. Environment with obstacles is mainly planar, structured and slightly irregular. Sensorial information about obstacles is exploited for robot movement. Knowledge navigation requires planning of robot movements over model of environment of activity. 2D operations plan is generated in dependence of environment complexity. Operations plan utilize description of surpassability/unsurpassability in binary form including elevation map, limitation of stability and collisions. On developed robot, reflective navigation method is subsequently implementing.

The highest level in the generic architecture [1] of autonomous mobile robot is providing its mobility. Basic generated processes of the highest level are mobility, path control, position taking, environment sensing, and obstacle avoidance. Sensorial system of the experimental robot can include CCD cameras, laser scanner, ultrasonic and infrared sensors. Power drives of the wheels are providing robot mobility.

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