

Design and Development of Tracking System for Mines Detector Robot

Abstract

This paper presents the design and development of tracking system for the mines detector robot. The scope for the tracking system covers two important tasks: 1. Design of optimum tracking path to cover maximum scanning area of an enclosed field, and 2. Obstacles avoidance system to be able avoid the various types of obstacles during the scanning process. The tracking algorithms were designed and simulated using Webots simulation software. Upon successful simulation where all design objectives have been achieved, the algorithms were programmed in microcontroller to implement the tracking system on the mines detector robot. Experimental test rig for the robot was a flat surface, enclosed 3m x 3m area where several obstacles of different sizes and shapes were randomly placed. Several metal samples representing the metal detonator of minefield were also placed to test the sensing system of the robot. Infra-red (IR) sensors were used for the system to detect the obstacles and also to detect the end-path boundary of a routine scanning cycle. While simulation test results have shown achieved design objectives, experimental results shown 90% achievement and limitation on evading big size of circle-type obstacle.

Keywords; Mines Detector Robot, Obstacles Avoidance System, Tracking Path, Tracking System