

A Novel Behavior Based Mobile Robotic Platform for Landmine Detection

By:

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Abstract

Humanitarian demining is an urgent and necessary activity to be carried out to resettle in places where the civilians were used to live before the war. Humanitarian mine clearance technology currently used in various parts of the world is based on the use of very basic equipment, techniques, and procedures developed in early years. Robotics has come into all aspects of life today. It has come into the industrial aspect, the biological and practical sciences aspect, everyday life, and especially in the rescue aspect. Humanitarian Demining is one of the areas where the robots can be used to reduce risk and speed up the process.

A novel behavior based mobile robotic platform for landmine detection is proposed in this thesis. A fully autonomous wheeled mobile robot called Autonomous Mine Detecting Robot (AMDR) was designed and developed for this purpose. A microcontroller based system was developed for processing sensor signals and driving actuators. Networks of microcontrollers were used to implement the whole system while reducing complexity of algorithm. Bumper switches, photoreflectors and sonar sensor were used in the robot to sense the world and two DC motors were used for locomotion.

A Subsumption based behavior based controller was implemented to enable the robot to do simple search operation to detect landmines. Six behaviors were arranged according to its priority level. Behaviors were tuned to give better performance.

This thesis explains about Humanitarian Demining in the first chapter. The design of the robot and design of the proposed controller are explained in consecutive chapters. In the final chapter the results of experiments are summarized.

Declaration

The work submitted in this thesis is the result of my own investigations, except where stated.

It has not already been accepted in substance for any degree, and also not being concurrently submitted for any other degrees.



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