Using Robots in Hazardous Environments

Description: There have been major recent advances in robotic systems that can replace humans in undertaking hazardous activities in demanding or dangerous environments. Published in association with the CLAWAR (Climbing and Walking Robots and Associated Technologies Association), this important book reviews the development of robotic systems for de-mining and other risky activities such as fire-fighting.

Part one provides an overview of the use of robots for humanitarian de-mining work. Part two discusses the development of sensors for mine detection whilst Part thee reviews developments in both teleoperated and autonomous robots. Building on the latter, Part four concentrates on robot autonomous navigation. The final part of the book reviews research on multi-agent-systems (MAS) and the multi-robotics-systems (MRS), promising tools that take into account modular design of mobile robots and the use of several robots in multi-task missions.

With its distinguished editors and international team of contributors, Using robots in hazardous environments: landmine detection, de-mining and other applications is a standard reference for all those researching the use of robots in hazardous environments as well as government and other agencies wishing to use robots for dangerous tasks such as landmine detection and disposal.

- Reviews the development of robotic systems for de-mining and other risky activities
- Discusses the development and applications of sensors for mine detection using different robotic systems
- Examines research on multi-agent-systems and multi-robotics systems

Contents:

Part 1 Humanitarian demining: The evolution of robots and the challenges: Introduction: Mobile robotics systems for humanitarian de-mining and risky interventions
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Sustainable and appropriate technologies for humanitarian demining
Some problems of robotic humanitarian demining evolution. Part 2 Sensors for mine detection and robotics: Sensing capabilities for mobile robotics
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Contribution of geophysics for landmines and UXO detection: Case study in the Egyptian environment
Detecting landmine fields from low-resolution aerial infrared images
GPS data correction using encoders and INS sensors. Part 3 Autonomous and teleoperated robots for humanitarian demining: Environment-adaptive antipersonnel mine detection system: Advanced mine sweeper
Mechanical mine clearance: Development, applicability and difficulties
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The robust autonomous vehicle for off-road navigation
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Fuzzy logic control in support of autonomous navigation of humanitarian demining robots
Human victim detection and stereo-based terrain traversability analysis for behavior-based robot navigation
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Estimation of the distance by using the signal strength for localization of networked mobile sensors and actuators. Part 5 Multi robotics systems: Navigation and cooperation
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Laser based cooperative multi-robot map building for indoor environments
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A light-weight communication protocol for tele-operated Robots in risky emergency operations.

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