ABSTRACT

The utilization of autonomous intelligent robots in search and rescue (SAR) is a new and challenging field of robotics, dealing with tasks in extremely hazardous and complex disaster environments. Autonomy, high mobility, robustness, and modularity are critical design issues of rescue robotics, requiring dexterous devices equipped with the ability to learn from prior rescue experience, adaptable to variable types of usage with a wide enough functionality under different sensing modules, and compliant to environmental and victim conditions. Intelligent, biologically inspired mobile robots and, in particular, serpentine mechanisms have turned out to be widely used robot effective, immediate, and reliable responses to many SAR operations. This article puts a special emphasis on the challenges of serpentine search robot hardware, sensor-based path planning, and control design.