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Top-level Ontology For Disaster Management Operations

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Disaster relief requires many resources, e.g. certain kinds of people, search robots, maps, communication and detection devices, search and organization procedures, software and algorithms. It also depends on many parameters, e.g. the available resources, the nature of the disaster, the terrain and the weather. Autonomous search robots (drones, rovers, ...) are needed for exploring the disaster area, mapping the new terrain (collapsed buildings, ...) and performing terrain mapping (cartography, ...) and Search & Rescue since there are many places that people cannot explore for reasons of time, security (theirs and the one of victims) and possibilities (detectors, ...). Disaster relief organizers need to deploy specialized people and robots that can – both collectively and autonomously – perform as much as possible, exploit as many parameters as possible, and share their findings. Particular kinds of people and robots can be selected for particular disaster configurations. Via the selection of robot elements, robots may also be adapted or assembled for particular configurations.

One key notion for disaster relief is then the organization and sharing of information by people and robots: information about (the characteristics of) as many parameters and available resources as possible. Nowadays, for disaster managements, information sharing focuses more on hardware and software supporting (mostly synchronous) communications but information organization is as important. This article focuses on it.

This article is not about techniques or features for the Knowledge Web but about the way all the elements related to Search & Rescue operations can be represented and organized into a knowledge web (e.g. into one well organized KB) via a top-level ontology of Search & Rescue. An ontology is the part of a KB that gathers its terminology – i.e., the formal or informal terms that each KB user may have given to certain objects in the KB – and the partial/full definitions of these terms, and thus many of the relations between these terms or, if these terms are types, between their instances. The other part of a KB is its "base of facts", i.e. its relations between particular instances – the counterpart of an ontology in a database or in a structured document is its "schema", which is predefined, partially implicit and small compared to the whole database or document. Thus, an ontology may be viewed as an "explicit specification of a conceptualization" (e.g., of a domain) and hence is a way to "study what exists" (which was the meaning of "onto-logy" as a branch of philosophy).

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