



USAR

Urban Search and Rescue

Carnegie Mellon University



RETSINA

Intelligent Multi-Agent System

What is an agent?

An autonomous, intelligent, collaborative, adaptive, computational entity. Given certain goals, an agent needs to have abilities to execute needed actions and seek and incorporate relevant information

:: Objective

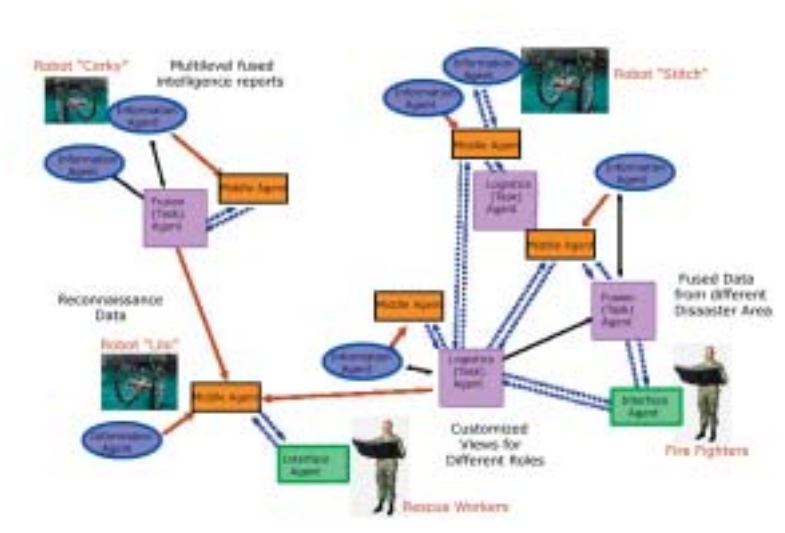
To create a system where humans, agents, and robots work together in teams to coordinate information, goals, plans and tasks in order to provide aids as quickly and safely as possible in the event of urban disaster

:: System Requirements

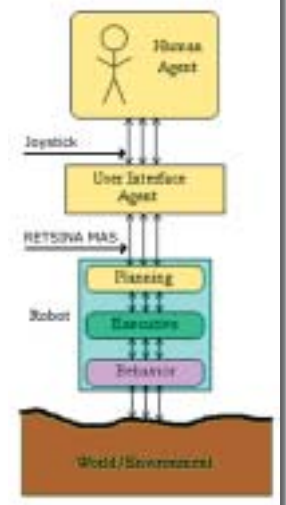
- Dynamic team coordination
 - necessary to support teamwork between heterogeneous teams of entities possessing different capabilities
- Adjustable autonomy
 - methods for adaptively sharing control, responsibilities, and commitments at all task abstraction levels and by all types of team members (robot, agent, and human)
- Abstraction-based tiered robot architecture
 - provides robots participating in heterogeneous search and rescue teams with an architecture that consists of incremental functional abstractions with real-time behavior based controllers, executive near-term explicit reasoning and scheduling, and declarative planning and communication
- Scalability
 - helps teams to effectively scale to large numbers of robotic and software agents without affecting the team goal through loss of coordination

:: Advantages of RETSINA based multi-agent system (MAS)

- All agent members share goals with each other
- Each cooperative agent plans their own goals in order to contribute to the overall goal
- Each agent can monitor team progress
- Agents can request for help from another agent possessing the required capabilities
- Agents can dynamically adopt plans and adjust to any changes in environment



A more complex example of the proposed architecture framework



Framework of a single robot controlled via teleoperation

