Using a Sketch Pad Interface for Interacting with a Robot Team

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Researchers at the University of Missouri-Columbia and at the Naval Research Laboratory have been working on human-robot interaction and communication. Our goals have been to make such interactions more intuitive and natural, as much as human-human communication is facilitated by shared modes of interaction.

At AAAI 2005, we are exhibiting a sketch interface to control a team of mobile robots. Users can draw environment landmarks and label them, as well as indicate goal points and paths for robot navigation for a single robot or a group of robots, by drawing on the sketch pad of a tablet PC. Editing operations are also supported in the sketch interface, so that the user can move or delete environment landmarks and redraw goal points and robot trajectories.

The sketch interface employs an approximate representation of the environment and landmarks with which the human user can interact. The interface extracts qualitative spatial information from the sketched landmarks on the map and the path drawn through the field of landmarks. This information is then relayed to the robots for subsequent action. From the robot's point of view in attempting to navigate, the task is based on its real-time sensing and the relative position of paths and landmarks, not the absolute positions of the sketched artifacts. The path or trajectory that the robot must take and information about objects in the environment are based qualitatively on the information which the human provides via the sketch pad and quantitatively by the onboard robot sensors obtained in real time.

Fig. 1. The team of Pioneer AT robots

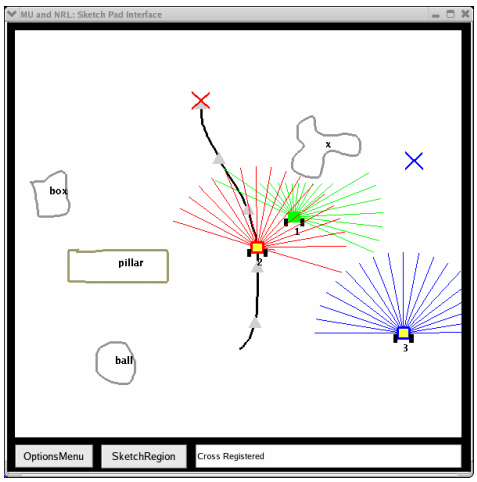

Fig. 2. A sample sketch