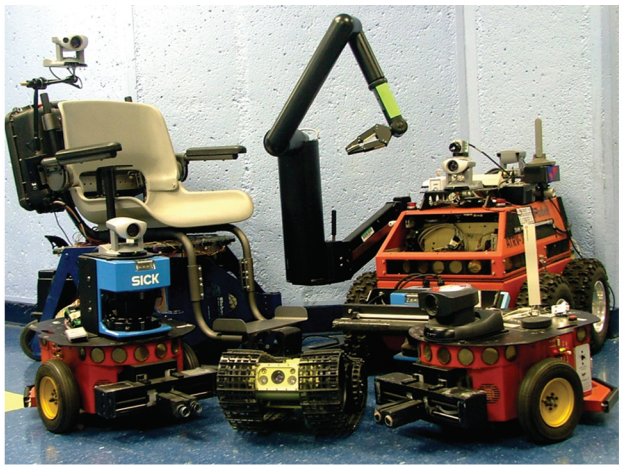
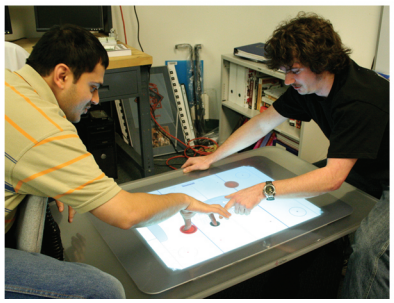
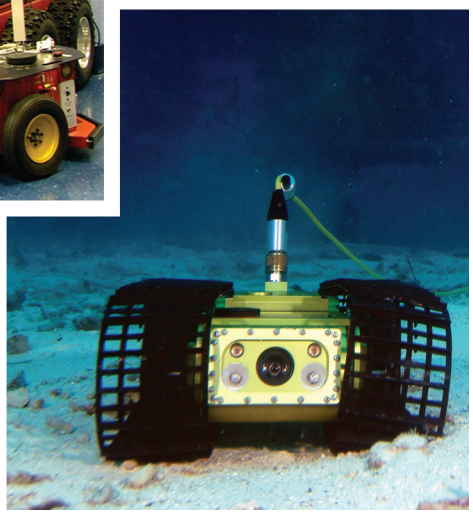
Robotics Lab @ UMass Lowell

UMass Lowell Robotics Lab
Department of Computer Science
http://robotics.cs.uml.edu







UMass Lowell Robotics Lab

Dr. Holly Yanco founded the UMass Lowell Robotics Lab in 2001. Research focuses on human-robot interaction (HRI), which includes multi-touch computing, interface design, robot autonomy, trust, and evaluation methods. Application domains include assistive technology and urban search and rescue (USAR). The Robotics Lab also has an active K-12 community partnerships program.

Urban Search and Rescue

Obtaining and maintaining situation awareness (SA) is critical to the successful operation of unmanned vehicles. We have worked to develop effective HRI techniques, design guidelines, and evaluation techniques for making human operators aware of the robot and its environment. We have also studied the impact of camera location and multi-camera fusion.

We have implemented a video-centric interface for an ATRV-JR robot. Our interface features a large video panel of the forward facing camera, a "rear-view mirror," a distance panel, a dynamically generated map, and a range of autonomy modes. Automatic Direction Reversal mode flips the front and rear camera views and remaps the drive commands to allow the user to back out of tight spaces as if driving forward. The robot can be operated with a joystick or a multi-touch device using gestures.

In addition to robot control, the multi-touch device can also be used in a command and control disaster response. For example, we have overlaid aerial photography of Biloxi, MS, after Hurricane Katrina on pre-disaster satellite imagery, providing interactive damage assessment. Multiple users can zoom and annotate the map using gestures.

Robots offer a unique view for damage assessment when structures are too unstable for human or canine personnel to safely search. Our VGTV-Extreme robot successfully cleared two buildings in Biloxi, MS, after Hurricane Katrina by providing Florida Task Force Three responder with a first-person view.