PhD Proposal MAP-I

IntellWheels – Multimedia Interface with an Intelligent Wheelchair

Supervisor

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Abstract

Physical disabilities occur widely. They may be caused by accidents resulting in spinal injury (paraplegia or quadriplegia), amputation, brain injury affecting motor skills and limb control. They may also be caused by medical conditions such as cerebral palsy, spina bifida, multiple sclerosis, circulatory or respiratory diseases, inherited conditions passed on genetically, exposure to drugs or chemicals during pregnancy, etc. Generally, physical disabilities imply limited control of some or all voluntary muscles (arms, legs, trunk, face and throat). It is very difficult to generalize physical disabilities and each person will have different causes, symptoms and management strategies.
To help people with severe physical disabilities, a new generation of Intelligent Wheelchairs (IW) started being developed in several research projects with more than 30 IEEE publications each year. IntelWheels Project is a project being developed at LIACC, intended to develop exactly a wheelchair prototype that may help people with physical disabilities to live a more normal life. The project developed a new concept of intelligent wheelchair with navigation and planning capabilities, controlled at a very high-level (commands like "go-to-room") using a simple multimodal interface (voice, facial expressions, head movements, joystick, among other input devices). IntelWheels first prototype is now functional and the next step is to improve the simple multimodal interface to enable a high-level of interaction and adaptability to the user. This research project will research new methodologies for developing multimodal interfaces and apply the results in IntellWheels prototype.

Objectives

This research project will research new methodologies for developing multimodal interfaces and apply the results in IntellWheels prototype. The expected result is a framework for developing interfaces for Intelligent Wheelchairs that enables users to configure in a very flexible way all the interaction with the Intelligent Wheelchair.

Additional Information

Complete description available upon request. More Information: Http://www.fe.up.pt/~lpreis

Other Proposals

Several other possible PhD Proposals concerning the following subjects are available upon student request (email: lpreis@fe.up.pt):

- Autonomous Agents, Multi-Agent Systems (MAS) and Coordination in MAS;
- Intelligent Robotics, Cooperative Robotics and Robotic Soccer (RoboCup);
- Intelligent Simulation, Agent Based Simulation;
- Soccer, Game Analysis, Strategical Reasoning and Tactical Modeling;
- (Constraint) Logic Programming, Optimization, Scheduling and Timetabling.