Student Projects for an NSF Grant "Enabling Technologies Laboratory Student Design Program"

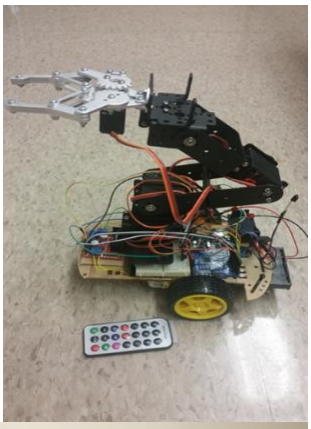
Wen Chen[1], Abhilash Pandya[2], Chenxi Ling[1], and Khaled Osman[1]
[1]Department of Engineering Technology
[2]Department of Electrical and Computer Engineering
Wayne State University
Detroit, MI, 48201-1111
Email: wchenc@wayne.edu

Abstract

The Enabling Technologies Laboratory (ETL) Student Design Program provides Wayne State University's undergraduate engineering students with the opportunity to design and create prototypes, custom designed devices, software and services to aid persons with disabilities. The student design projects are coordinated with ETL research on the impact and effectiveness of technologies that enhance human performance, both physically and cognitively, with an emphasis on the needs of individuals with disabilities. Accessible and universal design principles are key elements in these research and design activities. A fundamental design principle is to build intelligence into the environment, products or service so that "ambient intelligence" or "ubiquitous computing" can provide cognitive support if required.

Brief Description of Project 1: A Remotely Controlled Mobile Robot[1]

Disabled people frequently have some inconvenience when they want to fetch something. This design using an Arduino Uno could help disabled people to fetch what they need in a room. They can control the robot to move around, adjust a robot hand to catch things, and come back by using a wireless remote controller. In the design, an Arduino sends PMW signals to L298N Motor controller for driving a brushless motor on the cart. Speed and direction of the mobile cart can be adjusted such that the robot can move forward and turn left/right.



Brief Description of Project 2: A Motorized Elliptical Trainer for Physical Exercise of a Disabled Person's Legs[2]

The purpose of this project is to promote physical exercise for a disabled person's legs when he/she is sitting in a wheelchair. Driven by a speed-adjustable motor, this elliptical trainer will help in blood circulation, improve balance, and strengthen legs' muscles so that atrophy could be prevented.

Bibliography

1. Chenxi Ling, Project Report: remotely controlled robot, Dec. 2015.
2. Khaled Osman: Senior project report: motorized elliptical, Fall 2015.