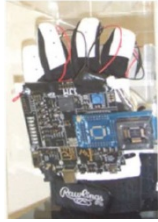### Glove Mouse Project

The goal of this project is to build a computer mouse in the form of a glove which translates various hand movements into cursor movements.

Solar powered "Smart" Dog House

The house incorporates several automated features in order to provide the pet means to have a healthy life. The main premise for the house is to care for the pet when the owner is unavailable or away.

"Smart" Home Project

"Smart" home controls various aspects throughout the home such as the convenience of controlling the temperature, ability to turn on coffee makers in the morning and allowing blinds to open and close providing natural light to enter the home.
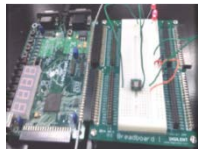
Fully Automated Solar-Powered Biodiesel Processor

The objective of the proposed research is to design and implement a solar-powered fully automated processor that produces biodiesel from Waste Vegetable Oil (WYO), readily available from fast-food restaurants on campus.
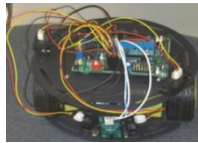
SmartSleep Alarm System Project

Smart alarm clock measures the sleep cycle, and waits for one to be in the lightest phase of sleep before rousing.

Fire Fighting Robot

An algorithm for a fire fighting robot that can traverse through a maze towards the fire source was developed and the prototype was implemented on a microcontroller board.

Fully Automated Solar-Powered Water Purification System - A Sustainable Water Solution

The objective of the project is to design and implement a solar-powered fully automated water purification system that is cost-effective, easy to use, and portable.

Hybrid, High-performance Cluster Computer Setup

The objective of the project is to build a supercomputing system comprising of 8 computing nodes, each with GPUs and FPGAs with Infiniband fabric as the communication backplane.

Solar Powered Dual Temperature Controlled Enclosure With Automated Solar Tracker

Design and implementation of a solar powered enclosure which utilizes the Peltier effect to provide refrigeration and heating methods.

High-Performance Computing (HPC) for Accelerated and Secure Health Information Exchanges and Electronic Medical Record Collection

Accelerating data retrieval and operations using GPGPU Techniques on a CUDA framework.

Machine Learning Techniques for Digital Signal Processing Applications

Implementation of a signal-processing receiver system, where supervised machine learning algorithms are utilized for improved weak signal detection in presence of noise.
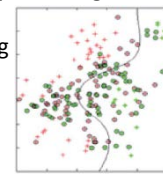
Air Quality and Surveillance (AQS) Copter

Implementation of a multi-sensor air quality and surveillance copter with real-time video feedback.

Implementation of a Fully Automated Solar-Powered Photo-bioreactor for Algae Biodiesel Production

Design and implementation of an automated system which cultivates algae and then utilizes it to create a viable fuel for use in a diesel engine.

Multi-Functional Automated Turret

Stand alone turret using OpenCV libraries for image processing with real-time tracking utilizing Arduino microcontroller for motor control was implemented.

Robotic Arm Control using Brain-Computer Interface

A brain control system that will manipulate a 5-axis robotic arm through a wireless EEG headset was implemented.

BPSK Receiver for Wideband Communications

Digital BPSK receiver for wideband communications was designed and implemented. The wideband receiver implemented on a High Performance Computing (HPC) platform, was designed to extract data from BPSK signals with unknown carrier frequencies and phases.
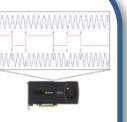
Operational Reconnaissance and Canvassing Aircraft

Design and implementation of an unmanned aerial vehicle which is capable of autonomous control via a ground station with the ability to locate and recognize targets using real-time image processing.
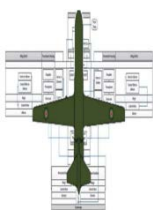
Spot Check

The system pin points the vacant spot in a parking structure using a mobile app. The system utilizes distance sensors that move on a suspended wire to scan for available spots.

Intelligent Indoor Air Quality and Ventilation System

The system automatically detects and ventilates out hazardous indoor chemicals by constantly monitoring and controlling indoor and outdoor levels of predetermined chemicals to ensure safe indoor air quality.

Robotic Reconnaissance System

The reconnaissance system can be deployed into buildings during emergencies to study the interior layout of the building. The system has the capability of obtaining and transmitting high-definition images of the interior walls.

Automated Bartender

The system allows users to choose a drink from a list of pre-programmed selections. The system also has a wireless interface that lets customers order drinks remotely from a smartphone.

Pulsed Radar Receiver

A receiver is developed that uses machine learning techniques and algorithms to extract key features from the received signals. The receiver achieved a classification accuracy of 99%.
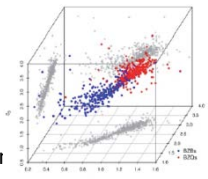
BCI Controlled Electric Wheelchair

Brain-computer interface (BCI) based system to control an electric wheelchair thoughts and facial expressions.

BPSK and Chirp Receiver for Wideband Communications

The receiver, implemented on a high performance computing (HPC) platform, extracts data from BPSK and Chirp signals with unknown carrier frequencies and phases.
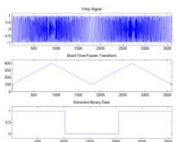
Motorcycle Anti-Theft System

The anti-theft system for motorcycles notifies a user via cellphone of any suspicious movement of their vehicle.

Automated Burger Machine

Machine prepares customized gourmet burgers via an app on a smartphone.

Tuffy Cart – Self-Driving Golf-Cart

Tuffy Cart follows specified routes using GPS and Mission Planner Software to assist anyone in need of easier transportation around campus.

Automating Weld Inspection Maintenance System

System sits on the roller coaster track and moves between the track's metal crossties, taking pictures of the weld spots.

Air Screen with Gestural Interface

Projection technology interfaced with gestures and pinpoint Touchscreen interactivity that allows for images and video to be projected onto a screen of dry fog.