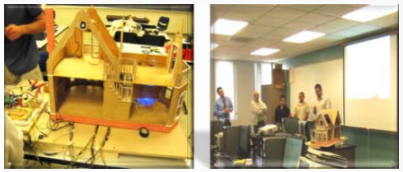
CALIFORNIA STATE UNIVERSITY
FULLERTON™

COMPUTER ENGINEERING SENIOR DESIGN PROJECTS

Glove Mouse Project (Fall 07, Spring 08)

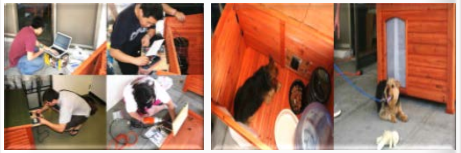
The goal of this project was to build a computer mouse in the form of a glove which translates various hand movements into cursor movements.

"Smart" Home Project (Fall 08, Spring 09)



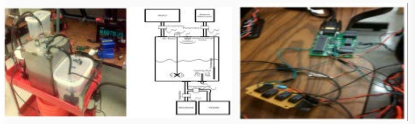
"Smart" home controls various aspects throughout the home such as the convenience of controlling the temperature, ability to turn on coffee makers in the morning and allowing blinds to open and close providing natural light to enter the home.

Solar Powered "Smart" Dog House (Fall 08, Spring 09)



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.

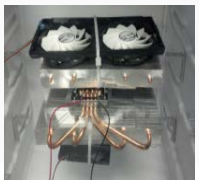
Fully Automated Solar-Powered Biodiesel Processor (Fall 09, Spring 10)



The objective of the proposed research was to design and implement a solar-powered fully automated processor that produces biodiesel from waste vegetable oil (WVO), readily available from fast-food restaurants on campus..

Solar Powered Dual Temperature Controlled Enclosure With Automated Solar Tracker (Fall 11, Spring 12)

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

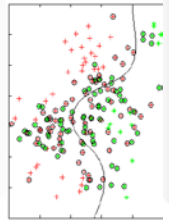


High-Performance Computing (HPC) for Accelerated and Secure Health Information Exchanges and Electronic Medical Record Collection (Fall 11, Spring 12)

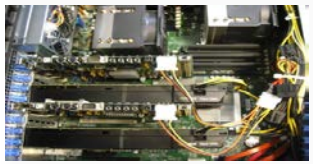
Accelerating data retrieval and operations using GPGPU Techniques on a CUDA framework.

Machine Learning Techniques for Digital Signal Processing Applications (Fall 11, Spring 12)

Implementation of a signal-processing receiver system, where supervised machine learning algorithms are utilized for improved weak signal detection in presence of noise.

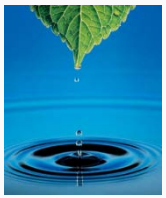


Hybrid, High-Performance Cluster Computer Setup (Fall 10, Spring 11)



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.

Fully Automated Solar-Powered Water Purification System (Fall 10, Spring 11)

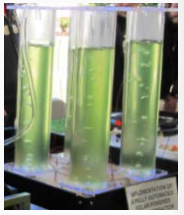


The objective of the project was to design and implement a solar-powered fully automated water purification system that is cost-effective, easy to use, and portable.

Air Quality and Surveillance (AQS) Copter (Fall 11, Spring 12)

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

Implementation of a Fully Automated Solar-Powered Photobioreactor for Algae Biodiesel Production (Fall 11, Spring 12)



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.

CALIFORNIA STATE UNIVERSITY
FULLERTON™

COMPUTER ENGINEERING SENIOR DESIGN PROJECTS

Multi-Functional Automated Turret (MAT) (Fall 12, Spring 13)

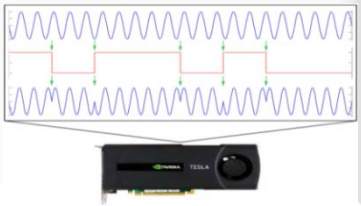
Stand alone turret using OpenCV libraries for image processing with real-time tracking utilizing Arduino microcontroller for motor Control was implemented (Collaborative project with Mechanical Engineering).

Robotic Arm Control Using Brain-Computer Interface (Fall12, Spring 13)

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

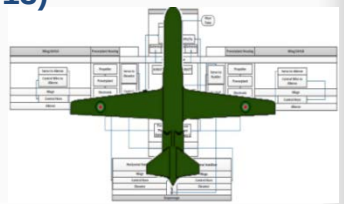
BPSK Receiver for Wideband Communications (Fall 12, Spring 13)

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 (Fall 12, Spring 13)

Design and implementation of an unmanned aerial vehicle (UAV) which is capable of autonomous control via a ground station with the ability to locate and recognize targets using real-time image Processing (Collaborative project with Mechanical Engineering).



Spot Check (Fall 13, Spring 14)

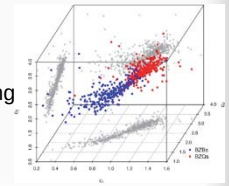
The system pin points the vacant spot in a parking structure using a mobile app. The system utilizes distance sensors that move on a suspended wire to scan for available spots.

Automated Bartender (Fall 13, Spring 14)

The systems allows the user to choose a drink from a list of pre-programmed selections, and creates/mixes the drink using available bottles of alcohol and other beverages. The system also has a wireless interface that lets the customers order drinks remotely from a smartphone.

Pulsed Radar Receiver (Fall 13, Spring 14)

The receiver is developed uses machine learning techniques and algorithms to extract key features from the received signals. These features are compared to a training set of data in order to achieve accurate signal modulation classification with an accuracy of up to 99%.



Robotic Reconnaissance System (Fall 13, Spring 14)

The reconnaissance system can be deployed into buildings during emergencies to study the interior layout of the building; the system takes photos at high frame rate to recreate the interior walls and then sends it back to the base station.

Intelligent Indoor Air Quality and Ventilation System (Fall 13, Spring 14)

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.

CALIFORNIA STATE UNIVERSITY FULLERTON™

COMPUTER ENGINEERING SENIOR DESIGN PROJECTS

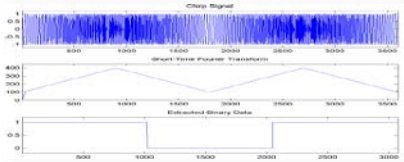
BCI Controlled Electric Wheelchair (Fall 14, Spring 15)

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

Automated Burger Machine (Fall 14, Spring 15)

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

BPSK and Chirp Receiver for Wideband Communications (Fall 14, Spring 15)



The receiver, implemented on a high performance computing (HPC) platform, extracts data from BPSK and Chirp signals with unknown carrier frequencies and phases. [Mercury Defense Sponsored Project]

Tuffy Cart – Self-Driving Golf-Cart (Fall 14, Spring 15)

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

Motorcycle Anti-Theft System (Fall 14, Spring 15)

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

Automating Weld Inspection Maintenance System (Fall 14, Spring 15)

System sits on the roller coaster track and moves between the track's metal cross ties, taking photos of the weld [Disney Sponsored Project]

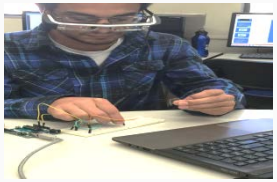
Air Screen with Gestural Interface (Fall 14, Spring 15)

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

BedyByte (Fall 15, Spring 16)

Smart bed that is designed to give the user an ideal sleeping experience and adjusts their sleeping conditions to maximize comfort and improve sleep quality.

Augmented Reality (AR) Circuit Labs (Fall 15, Spring 16)



The AR Circuit Labs application utilizes next generation smart glasses and provides a unique user experience for viewing lab instructions by overlaying 3D models and real time circuit data over Bluetooth.

Spotting Bench Press (SBS) System (Fall 15, Spring 16)

SBS system provides safety measures to individuals who bench press by themselves at home or at the gym.

Automated Vegetable Cutter (Fall 15, Spring 16)

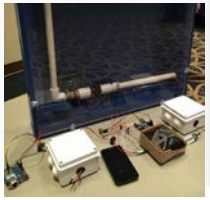
The Automated Vegetable Cutter seeks to streamline the cutting process. Device automatically detects the type of vegetable to cut, and then rotates the cutting board and alters sequence of operations until desired results are achieved.

CALIFORNIA STATE UNIVERSITY
FULLERTON™

COMPUTER ENGINEERING SENIOR DESIGN PROJECTS

Smart Water Information Monitoring (SWIM) System (Fall 15, Spring 16)

The SWIM System provides home owners with the ability to effortlessly monitor and control all water usage within their property, allowing for better water management practices and preventing unnecessary water usage.



Automated Clothes Folding Machine (Fall 15, Spring 16)

The project aims to help households speed up the laundry chores by automatically folding multiple types of clothing after being washed and dried.

Control System for CSUF Titan Rover (Fall 15, Spring 16)

A multidisciplinary project with the goal of constructing a mobile platform and competing in the University Rover Challenge (URC) held at the Mars Desert Research Station in Hanksville, Utah.