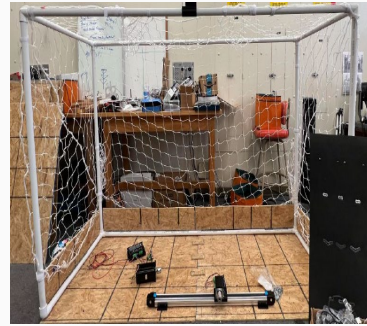


Spring 2023 Computer Engineering Capstone Senior Design Project Presentations & Demo

May 19, 2023 (10 am); E302

Auto Goalie - Realtime Soccer Training System (10.00 am)

The automated training system can detect soccer balls, predict its path and location, and block incoming shots in real time.



Titan AUV (11:40 am)

AUV works by interfacing various hardware components as well as several machine learning models to perform mission tasks underwater.

Supported by  **RJE INTERNATIONAL**
SPECIALIZING IN MISSION CRITICAL PRODUCTS



Automatic Waste Sorter (10:25 am)

The smart system automatically sorts household waste into recycling, organic and trash.

Supported by

 **Sustainability Decathlon**
ORANGE COUNTY



Plant Keeper (12:15 pm)

This autonomous garden system helps garden enthusiasts maintain their house plants from watering to shading.

Supported by

 **Sustainability Decathlon**
ORANGE COUNTY



Sink N' Save Smart Faucet (10:50 am)

The smart system utilizes motion sensors and cameras to determine the object under the faucet and optimizes water dispensation.

Supported by

 **PME Services, Inc.**
Precision Measurement Equipment

 **Sustainability Decathlon**
ORANGE COUNTY



Smart Home Leak Detection System (12:40 pm)

The smart monitoring system shuts off water valve when it detects leaks and sends alerts to users' phone.

Supported by

 **Sustainability Decathlon**
ORANGE COUNTY

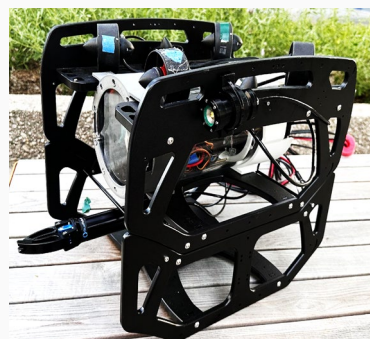


Titan ROV (11:15 am)

A tethered Underwater vehicle, designed with intuitive controls and real-time video capture, assists in underwater research and marine exploration.

Supported by

 **RJE INTERNATIONAL**
SPECIALIZING IN MISSION CRITICAL PRODUCTS



Assistive Glasses (1:15 pm)

This smart glass, designed to assist individuals with visual impairments, detects and identifies common objects in front and estimates the distance from the user.

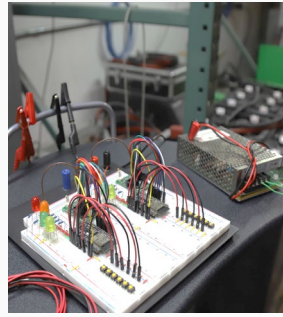


Fall 2022 Computer Engineering Capstone Senior Design Project Presentations & Demo

December 16, 2022 (10 am); E302

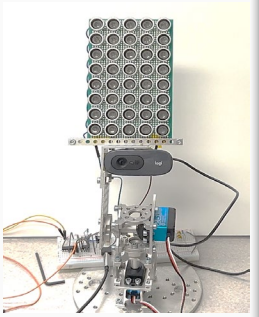
Power-line Communication to Monitor Forklift Batteries (10:00 am)

In this industry-funded project, power-line communication between devices that monitor forklift batteries are studied to diagnose packet loss.
(supported by Advanced Charging Technologies)



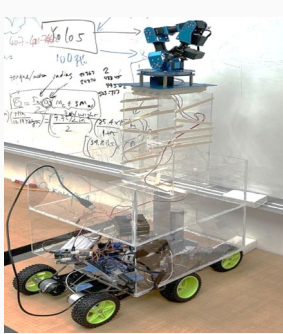
Artificial Intelligence-Powered Directional Speakers (11:15 am)

An innovative approach to deliver directional audio that follows you! Face recognition software detects the user and rotates the speaker towards the user as he/she moves.



Self-Driving Mail Delivery Robot (10:25 am)

A self-driving robot powered by Artificial Intelligence that delivers mail on campus efficiently by utilizing a machine learning based vision algorithm.



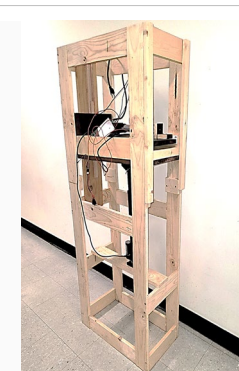
Remote Controlled Robotic Arm for Hazardous Environments (11:40 am)

Remotely controlled 3-D printed robotic technology for deployment in hazardous environments such as chemical plants, mines and oil rigs.



Easy-Access Drive-through ATM (10:50 am)

A drive-thru ATM machine that utilizes facial recognition and distance sensors to measure and adjust itself according to the user's position for ease-of-access.



Spring 2022 Computer Engineering Capstone Senior Design Project Presentations & Demo

May 20, 2022 (10 am); E201

Automated Golf Ball Retriever (10:00 am)

System seeks out and moves towards golf balls, retrieves them using a picking-up mechanism, and then deposits them into the storage container.



Automated First Base Umpire (11:40 am)

A smart umpire that will help eliminate bad calls and alleviate stress from fans and players.



Drone Security System (10:25 am)

The drone is capable of autonomously patrolling and facial recognition to notify the end-user of authorized or unauthorized visitor(s).



Neural Network Based Smart Door (12:05 pm)

A smart door that utilizes facial recognition and voice recognition to identify and provide access only to registered users.



Autonomous Trash Disposal System (10:50 am)

A self-driving trash bin follows a user-defined path through an automatic door to empty the bin into a dumping station.



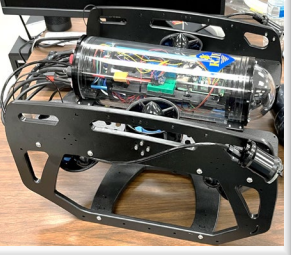
Automobile Monitoring System (12:30 pm)

A smart alternative to car security mainly targeted for individuals with older models; system includes both security and quality of life features.



Autonomous Underwater Vehicle (AUV) (11:15 am)

AUV works by interfacing hardware and software using BlueRobotics components as well as several machine learning models to perform mission tasks underwater.



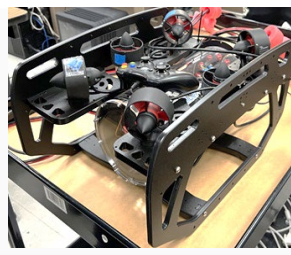
Project Eden [CpE-ME Project] (12:55 pm)

A customizable smart irrigation infrastructure that can handle diverse watering needs and monitor output via sensors.



Remotely Operated Underwater Vehicle (1:20 pm)

A tethered Underwater vehicle, designed with intuitive controls and real-time video, along with color detection, to assist in underwater research and marine exploration.



2021 Computer Engineering Capstone Senior Design Project Presentations & Demo [May 21, 2021, 11 am]

Zoom Link: <https://fullerton.zoom.us/j/81154576387?pwd=ek14aFJLN0EyYmQ4TFNQc0oyOTZHQT09>

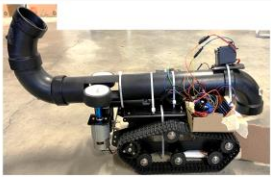
Auto Tracking Security & Surveillance Spotlight (11:00 am)

Thermal and night vision paired wall-mounted security spotlight, that livestreams and autonomously tracks an intruder while shining a bright deterring light at them.



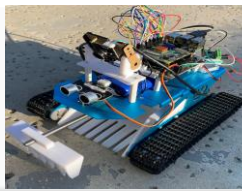
FetchBot (11:20 am)

A completely autonomous interactive robot that can play fetch with your dog.



Scoop-A-Tron (11:40 am)

An automated system similar to a "Roomba," that will roam around the yard and scoop up your dog's waste, so you don't have to!



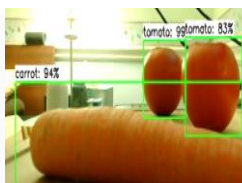
Autonomous Life Board (12:00 pm)

The bodyboard will identify individuals struggling to stay afloat in water, and autonomously navigate to them.



Automated Smart Vegetable Chopper (12:20 pm)

System recognizes different types of vegetables, picks it up and chops it based on automated process.



Arboretum Security System (12:40 pm)

The security system for Fullerton Arboretum is discrete, solar powered and will alert the user with photos when intruders enter the premises.



Tu force Targa (1:00 pm)

The robotic system on wheels autonomously checks the license plates on the parked cars and confirm if they are valid or not.



Autonomous Underwater Vehicle (1:20 pm)

The underwater vehicle consists of a surveillance camera, an AI computing device, and a single-board computer for the autonomous aspect of this vehicle.



Remotely operated underwater vehicle (1:40 pm)

The underwater vehicle can travel up to 25 feet underwater with easy precision while relaying live image feedback to aid in underwater research, marine vehicle inspection, and to move underwater objects.



2016 Computer Engineering Senior Design Project Demonstrations

May 19, 2016 - CS301 (12 pm – 2 pm)

BedyByte

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.

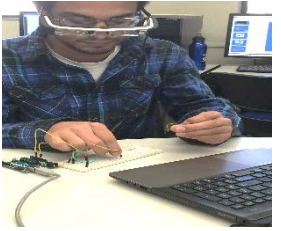
Team Members: Nico Ramirez, Adam Card, Rayton Espiritu, Adam Morton & Justin McCarty



Augmented Reality (AR) Circuit Labs

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.

Team Members: Bryce O' Bard, Andrew Bertran & Luis Corona



Spotting Bench Press (SBS) System

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

Team Members: Alexis Tapia, Bryan Luco & Raymundo Zaragoza



Automated Vegetable Cutter

The Automated Vegetable Cutter seeks to streamline the vegetable 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.

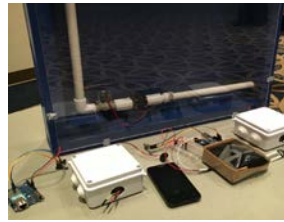
Team Members: Graciela Cortez, Krystle Ilisastigui, Kyle Meezan, Chris Nguyen



Smart Water Information Monitoring (SWIM) System

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.

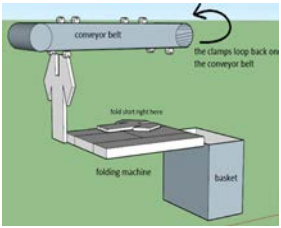
Team Members: George Ayoub, Tyler Rodas, Vipul Lakhani



Automated Clothes Folding Machine

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

Team Members: Nick LeBlanc, David Melton, Lampson Nguyen & Maria Pangan



Control System for CSUF Titan Rover

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.

Team Members: Brandon Dang (CpE)



Fall 2021 Computer Engineering Capstone Senior Design Project Presentations & Demo

December 17, 2021 (9 am - 12 pm); E201

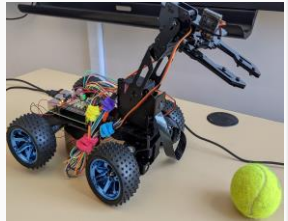
Extinguishing Flame Audio Resonator (9:00 am)

An innovative approach to extinguish fire with low frequency sound waves on detecting and tracking fires using object detection.



Toy Bots (10:40 am)

A team of co-bots autonomously find, navigate to, and pick up different types of toys, utilizing object detection and machine learning.



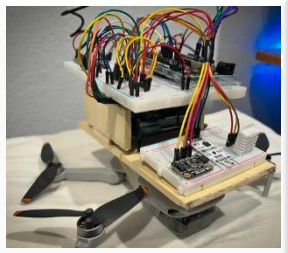
Smart BBQ Grill (9:25 am)

An autonomous kitchen companion capable of seasoning meat, cooking it to desired doneness, and lastly transferring it onto a serving plate!!



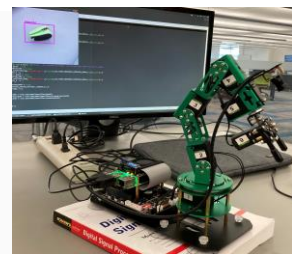
Titan Fire Drone [CpE-ME Project] (11:05 am)

A drone that is capable of patrolling and gathering real-time environmental data such as temperature, humidity, etc. to analyze and predict the threat of fires.



Smart Robotic Helper (9:50 am)

This voice command based robotic helper lends you a hand to fetch tools while you work on something you can't take your eyes off!!



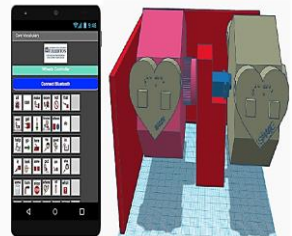
Smart Pet Monitoring System (11:30 am)

Alleviates stress of pet parents by enabling them to remotely monitor their pet and dispense both food and water as needed.



Smart 3D Tactual Symbol Wheel (10:15 am)

The smart rotary wheel with 3D tactual symbols helps children with developmental disabilities to communicate with their teachers and caretakers.



Titan CubeSat [CpE-ME Project] (11:55 am)

Explores the implementation of cube-shaped miniature satellites as a possible solution to the increasingly frequent and intense California wildfires.



Computer Engineering Program - Senior Design Presentation & Demo

May 15, 2019 (Session I: 9 am - 12 pm; Session II: 1 pm - 4 pm); CS 301

Projects to be presented in Session I



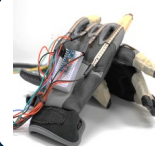
Smart Showerhead: The custom showerhead, designed for a local ALS patient, can be controlled using voice commands



Solar Shrub: Design that mimics the leaf-like structure of standard household plants captures solar energy and stores in a power bank.



Service Robot: Robot that performs the basic duties of a service dog while being cost-effective.



Sign Language Glove: Effectively translate American Sign Language into English text which will then be displayed on a mobile device.



Learn to Play Drums! System with an interactive mobile app that teaches the user to play the drums.



MiniDex: An omnidirectional 6-legged symbiotic robot designed for applications in assisting in anti-fatigue, strenuous, and repetitive activities.



Smart Window Blinds: Blinds with environmental sensors (temperature, light, vibration, etc.) adjusts itself based on user's preferences set using a mobile app.



TuffyGo: Autonomous Golf Cart: Provides stress-free on-campus transportation without human drivers to operate the cart.



DRONELIVERY: Express campus mail delivery using drones.

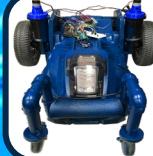
Computer Engineering Program - Senior Design Presentation & Demo

May 15, 2019 (Session I: 9 am - 12 pm; Session II: 1 pm - 4 pm); CS 301

Projects to be presented in Session II



Autonomous Submarine: Underwater vehicle capable of following paths and avoiding obstacles (being developed to enter into the RoboSub Competition).



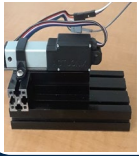
Autonomous Lawnmower: Electric powered lawn mower provides optimal cutting results while reducing the time and labor it takes to mow the yard.



Predicting Vehicle Signatures: Machine learning based classification and prediction of vehicles using their electronic signatures. (Cal/Amp Project)



Solar-Tracking & Self-Cleaning System for Solar Panels: System with dual-axis motion solar tracker and self-cleaning mechanism improves the amount of harvested energy.



Automating Battery Welding: A semi autonomous system that can weld several battery encasings in one process. (ProDex Project)



Smart Refrigerator: Refrigerator with an interactive display keeps track of the quantity and expiry dates of items in the fridge and notifies the user.



Disney Torque Stripe AI Project: Machine learning based image detection to identify the condition of the bolt through the torque seal. (Disney Project)



Equipment Vending Machine: Storage unit that would store and dispense the equipment and boards (FPGA and microcontrollers) used in computer engineering classes.



Automated Construction Site Excavation: Autonomously clears and removes dirt from a construction zone using a toy RC backhoe and bulldozer (Project with Civil Engineering).



Secure Package Box: System designed to prevent package thefts includes features such as voice and face recognition, surveillance cameras and smartphone application.

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)



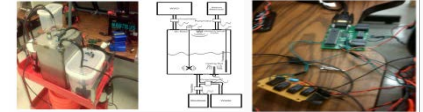
“Smart” home controls various aspects throughout the home such as the convenience of controlling the temperature, ability to turn on coffee makers in the morning and allowing blinds to open and close providing natural light to enter the home.

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.



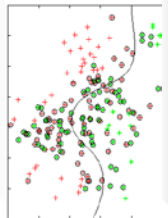
High-Performance Computing (HPC) for Accelerated and Secure Health Information Exchanges and Electronic Medical Record Collection (Fall 11, Spring 12)

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)



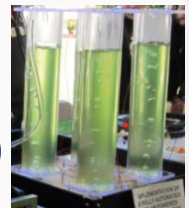
The objective of the project was to design and implement a solar-powered fully automated water purification system that is cost-effective, easy to use, and portable.

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.

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).



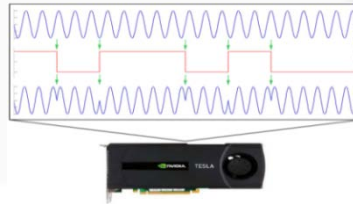
Robotic Arm Control Using Brain-Computer Interface (Fall 12, Spring 13)

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



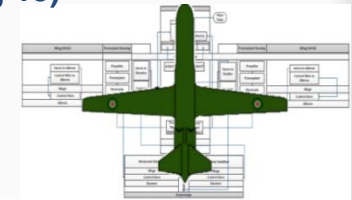
BPSK Receiver for Wideband Communications (Fall 12, Spring 13)

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 Convassing 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.



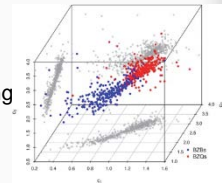
Automated Bartender (Fall 13, Spring 14)

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.



COMPUTER ENGINEERING SENIOR DESIGN PROJECTS

BCI Controlled Electric Wheelchair (Fall 14, Spring 15)



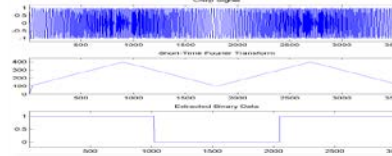
Brain-computer interface (BCI) based system to control an electric wheelchair thoughts and facial expressions.

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.

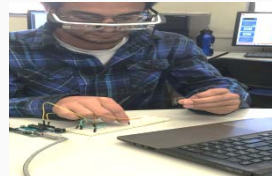


BodyByte (Fall 15, Spring 16)



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)

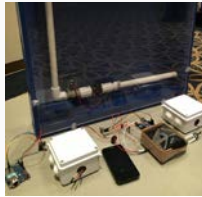
The Automated Vegetable Cutter seeks to streamline the cutting process. Device automatically detects the type of vegetable to cut, and then rotates the cutting board and alters sequence of operations until desired results are achieved.



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.



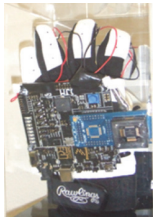
Control System for CSUF Titan Rover (Fall 15, Spring 16)

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.



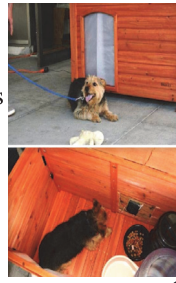
Glove Mouse Project

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.



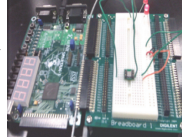
Fully Automated Solar-Powered Biodiesel Processor

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



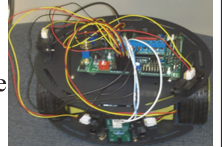
SmartSleep Alarm System Project

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.



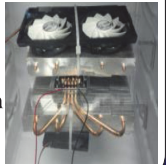
Hybrid, High-performance Cluster Computer Setup

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.



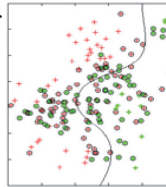
High-Performance Computing (HPC) for Accelerated and Secure Health Information Exchanges and Electronic Medical Record Collection

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.



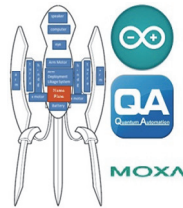
Implementation of a Fully Automated Solar-Powered Photobioreactor for Algae Biodiesel Production

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.



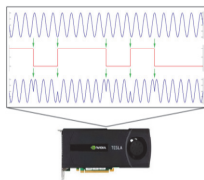
Robotic Arm Control using Brain-Computer Interface

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.

