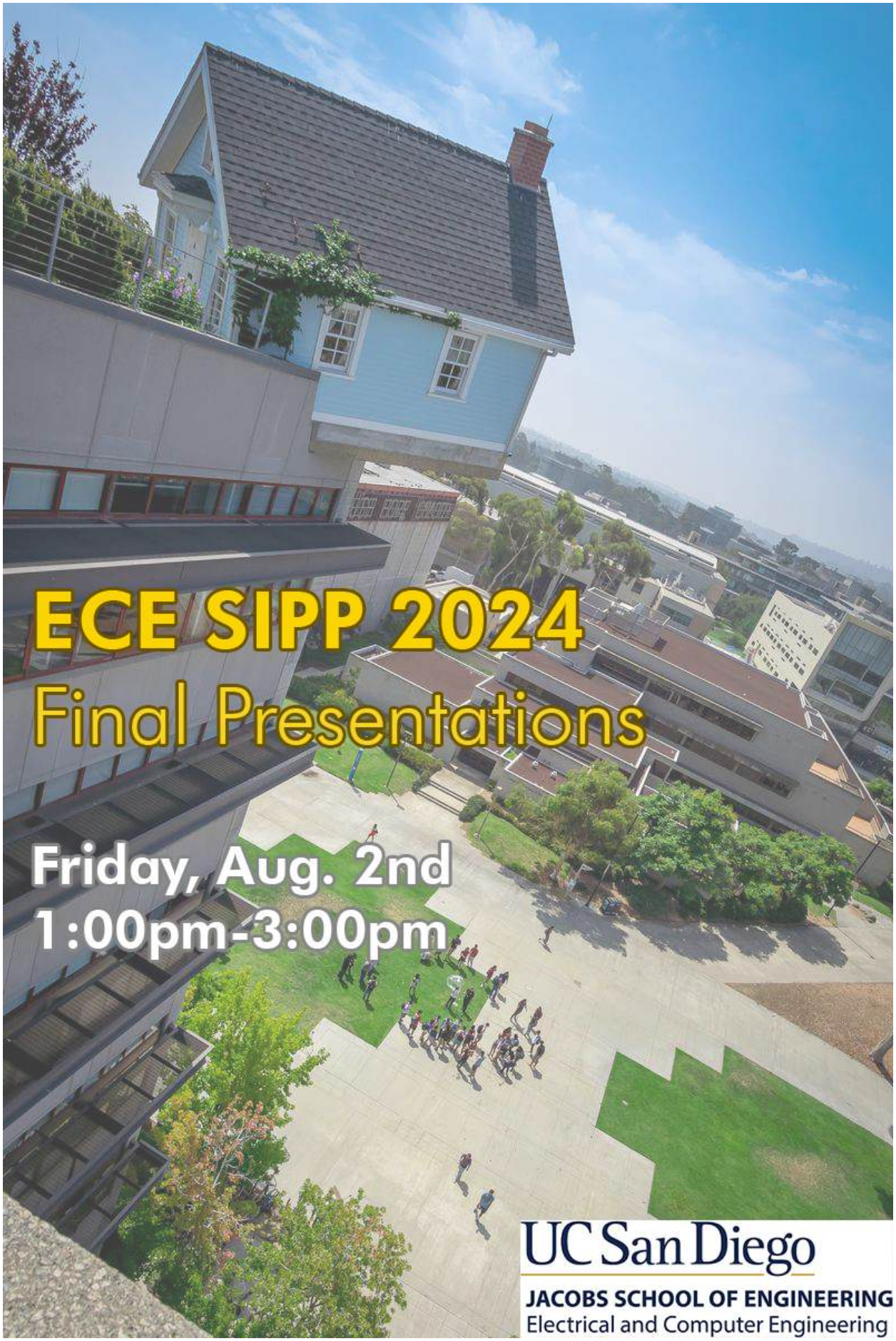

ECE SIPP 2024
Final Presentations
Friday, Aug. 2nd
1:00pm-3:00pm
UC San Diego
JACOBS SCHOOL OF ENGINEERING
Electrical and Computer Engineering

2024 ECE Summer Internship Prep Program

Welcome to the ECE Summer Internship Prep Program! While the past few years have been challenging, we believe students should not have to wait for their opportunity to learn, network, and build their engineering career.

This summer program has been designed by our team from the Department of Electrical and Computer Engineering to reach eager and energized students so that they may prepare for their future job interviews in both the technical and professional space.

With the help of our tutors, faculty, alumni, campus resources, career center, advising office, and student organizations, we've customized this summer program experience to best develop students' breadth in technical areas such as python, sensors and systems, and machine learning, as well as professional areas such as resume building, communication, academic planning, research opportunities and more to showcase and develop their skills.

Join us as our 2024 SIPP participants present their final projects.

UC San Diego
JACOBS SCHOOL OF ENGINEERING
Electrical and Computer Engineering

Meet the Program Coordinators and Tutors

Karcher Morris
ECE Teaching Professor

Nicholas “Nix” Stein
ECE Outreach Coordinator

Vibusha Vadivel
ECE Undergraduate
SIPP Alumni

Norah Zhou
ECE Undergraduate
SIPP Alumni

Final Presentations Agenda

1:00pm-1:30pm	**Opening Remarks And Highlights** Zoom Link Zoom ID: 98979278452
1:30am-3:00pm	**Student Presentations**
Track 1 Presentations	Zoom Link Zoom ID: 98979278452
Track 2 Presentations	Zoom Link Zoom ID: 95235650029
Track 3 Presentations	Zoom Link Zoom ID: 92576018874
3:00pm-4:00pm	**Break**
4:00pm-4:30pm	**Awards and Closing Remarks** Zoom Link Zoom ID: 98979278452

Track 1 Presentations

1:30 pm - 1:35 pm	**INTRO**
1:35 pm - 1:50 pm	**Smart Irrigation System** Erictuan Nong, Emily Peng and Ian Kim
1:50 pm - 2:05 pm	**Enhanced Light Alarm** Swaroop Kamble
2:05 pm - 2:20 pm	**Thermosensitive Fan** Danny Wu
2:20 pm - 2:35 pm	**GRePD-3 (Gesture Recog.)** Gordon Tin and Anton Crane
2:35 pm - 2:50 pm	**Memory Game** Ayush Shah
2:50 pm - 3:00 pm	**Smart DIY Fan** Bo Chulo

Zoom ID/Link
989 7927 8452

Track 2 Presentations

1:30 pm - 1:35 pm	**Intro**
1:35 pm - 1:50 pm	**Sensor Cane** Glara Palani, Nandita Kanumuri and Rohan Madan
1:50 pm - 2:05 pm	**The Apparationator-inator** Harrison Trinh and Korey Hu
2:05 pm - 2:20 pm	**Milk Run (Game)** Albert Olivas
2:20 pm - 2:35 pm	**The Wake Up 2000** Alexia Jones and Gabriela Jaramillo
2:35 pm - 2:50 pm	**Smart Plant Care System** Abdulrhman Alghamdi

Zoom ID/Link
952 3565 0029

Track 3 Presentations

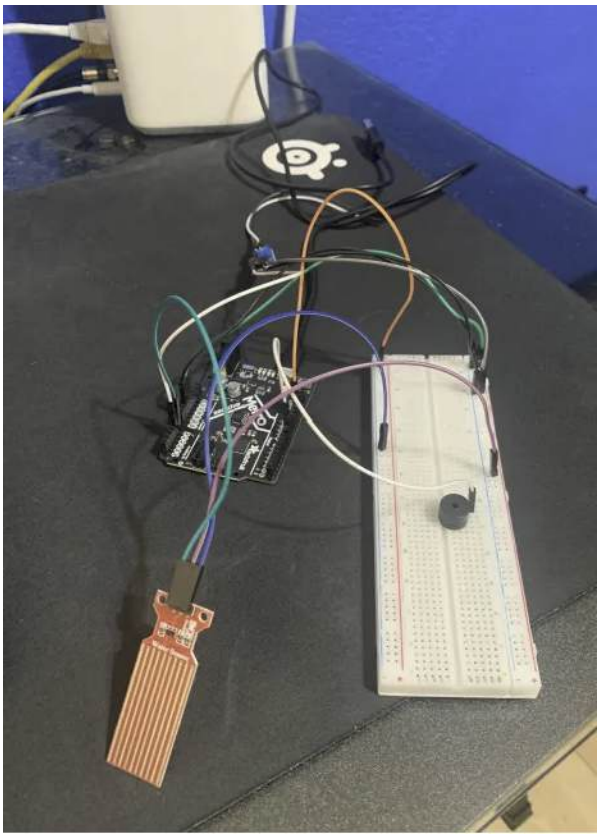
1:30 pm - 1:35 pm	**Intro**
1:35 pm - 1:50 pm	**Home Motion Detector** Alma Villegas
1:50 pm - 2:05 pm	**The Sizzle Sniffer** Narasinga Ujjini Havildar, Sara Zaya and Imaan Virk
2:05 pm - 2:20 pm	**Live Video Editor** Noah Snider
2:20 pm - 2:35 pm	**Parking Simulator 3000** Trenton Blom and Ilias Lahdab
2:35 pm - 2:50 pm	**Smart Plant Watering System** Aram Zarate, Manny San Jose and Gustavo Garcia

Zoom ID/Link
925 7601 8874

Smart Irrigation System

By Erictuan Nong, Emily Peng and Ian Kim

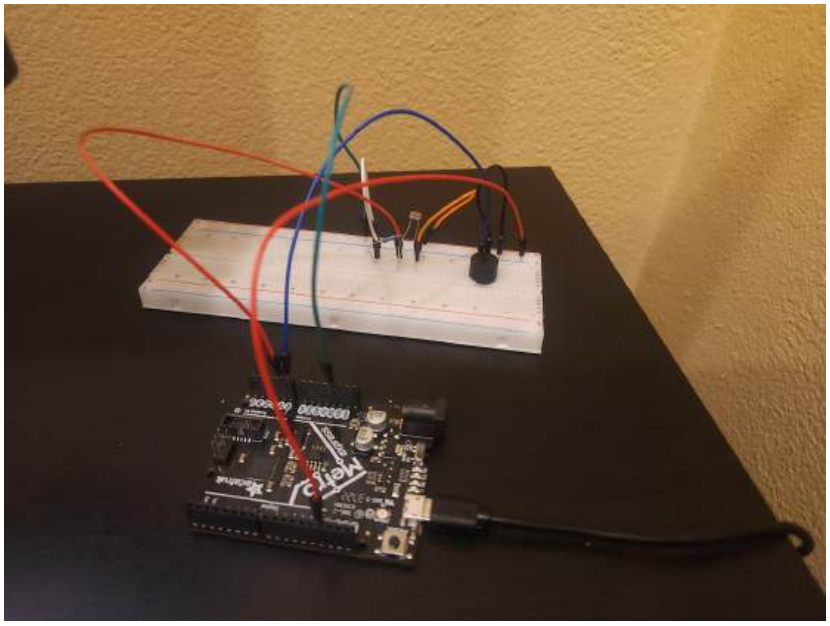
Our team worked to make a code that would allow us to use Python and sensors to determine when a plant needed to be watered. Our Metro M0 Express board utilized water level sensors and soil moisture sensors for this task. Additionally, we attempted to use OpenCV to determine if a plant was healthy which was determined by if the plant had any diseases.



Enhanced Light Alarm

By Swaroop Kamble

Many people often forget to turn off their lights, and don't realize that they do until hours later, when lots of electricity has already been wasted, as highlighted by Figure 1. My project, the Enhanced Light Alarm System, provides a solution for this common problem by having an alarm go off that creates a sound if you forget to turn off the lights. Furthermore, it can be incorporated into your smart home since it will also send a notification to your phone that reminds you that you left the lights on, letting you know that they're on no matter where you are. This system is also customizable, allowing you to adjust the light threshold with a knob and test the light level in a special setting mode, enabling you to use the device in rooms with any lighting conditions.



Thermosensitive Fan

By Danny Wu

My design will be a temperature-sensitive mechanic arm that can open the fan switch when the environment is hot enough. There is also an infrared sensor that detects the presence of humans to avoid waste of energy.

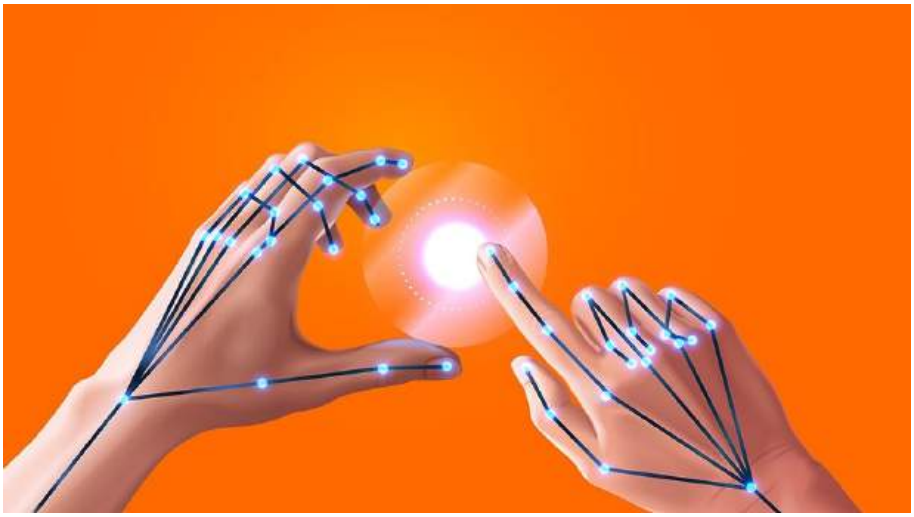
GRePD-3

By Gordon Tin and Anton Crane

The *Gesture Recognition Peripheral Device*, or **GRePD-3** for short, is a peripheral device that relies on Machine Learning and Neural Networks to identify hand gestures to use for a variety of tasks, including pausing, playing, and skipping music on Spotify, which we used for our Proof-of-Concept.

The GRePD-3 uses three different sensors; an infrared sensor to detect movement, a sonic sensor to detect the distance at which the movement occurred, and a webcam hooked up to the main computer running the program, which helps identify hand gestures better and improve accuracy.

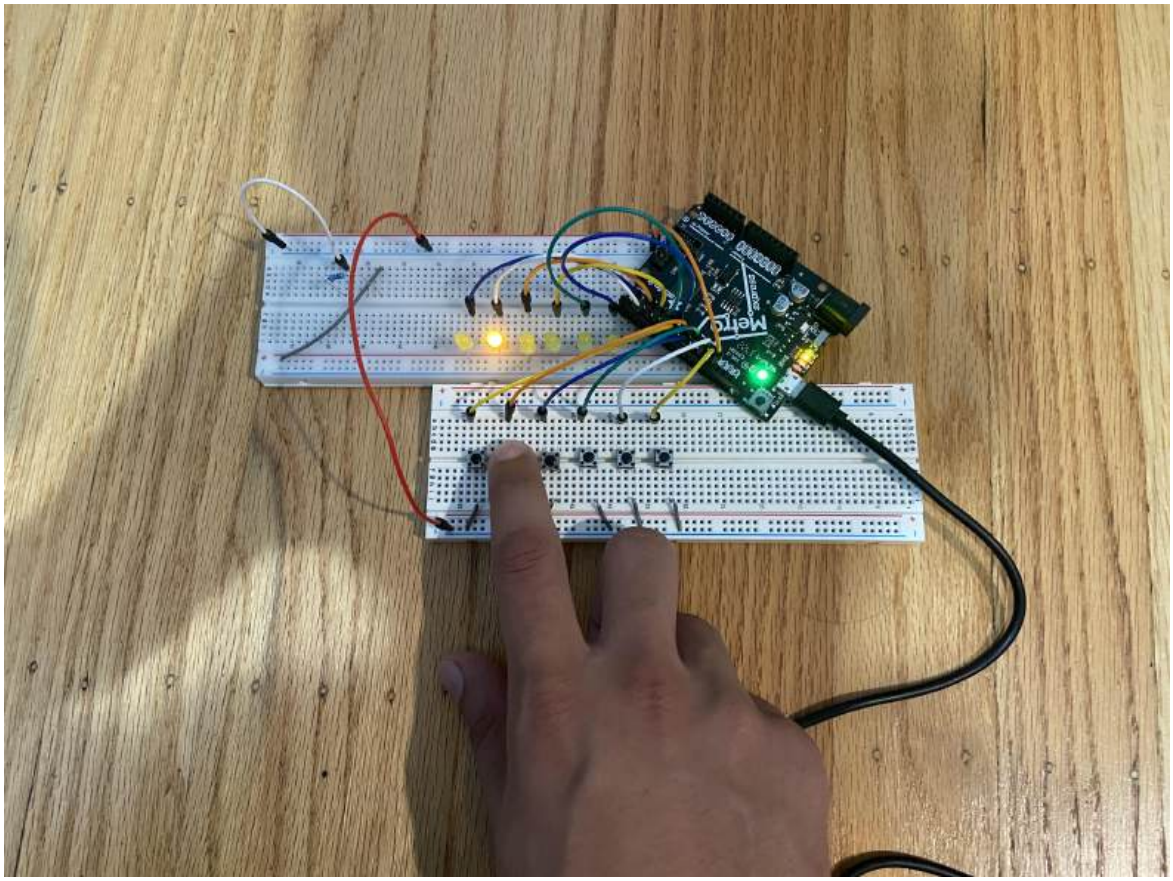
The machine learning model is multimodal: it uses an LSTM (Long Short Term Memory) for the sensor data and a CNN (Convolution Neural Network) for the webcam data, which is first put through MediaPipe's hand recognition software and then, after a series of image transformations, converted to tensors before being fed into the CNN.



Memory Game

By Ayush Shah

This memory game developed using Python employs six LEDs and corresponding buttons to enhance cognitive recall abilities. Players are challenged to memorize and replicate increasingly complex sequences of lights that are randomly generated. Each correct input allows progression to a more difficult sequence, while incorrect inputs end the game and result in a restart. This interactive project not only entertains but also stimulates memory and concentration skills, making it an engaging tool for cognitive development.



Smart DIY Fan

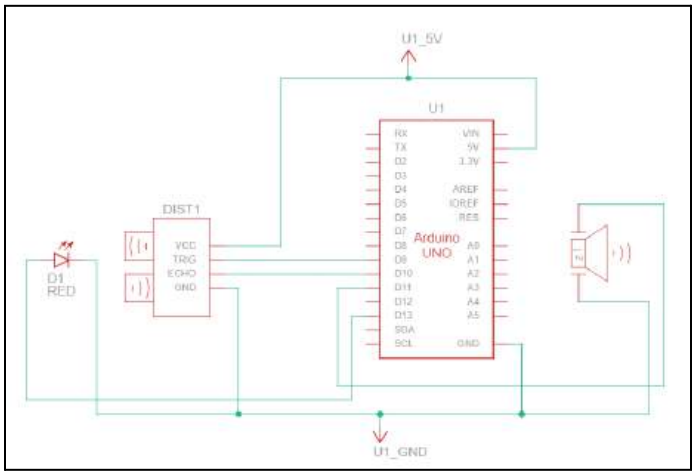
By Bo Chulo

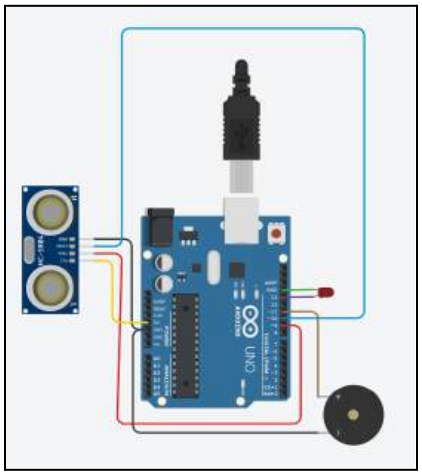
This project aims to design and develop a smart fan system using a combination of circuit design, microcontroller programming, and 3D modeling techniques. The circuit design and PCB layout are created using EagleCAD, ensuring precise and efficient electronic schematics. Microcontroller programming is accomplished with CircuitPython via Visual Studio Code, enabling the integration of various components and functionalities. The mechanical design, including the fan enclosure and custom parts, is modeled using Onshape. Key components include a potentiometer for adjusting fan intensity, a Metro M0 Express card, a breadboard, wires, a power supply delivering 5V current, a continuous servo motor, resistors, and an LED lamp to indicate the fan's operational status. Additionally, the system incorporates a thermo-sensor with a digital temperature display to monitor and respond to environmental temperature changes. The fan blades are crafted from an empty beer can, and assembly is facilitated using a glue gun. The design also incorporates an old small canister as the fan housing. This project exemplifies a multidisciplinary approach to creating an efficient and customizable smart fan system using recyclable materials commonly found in households.

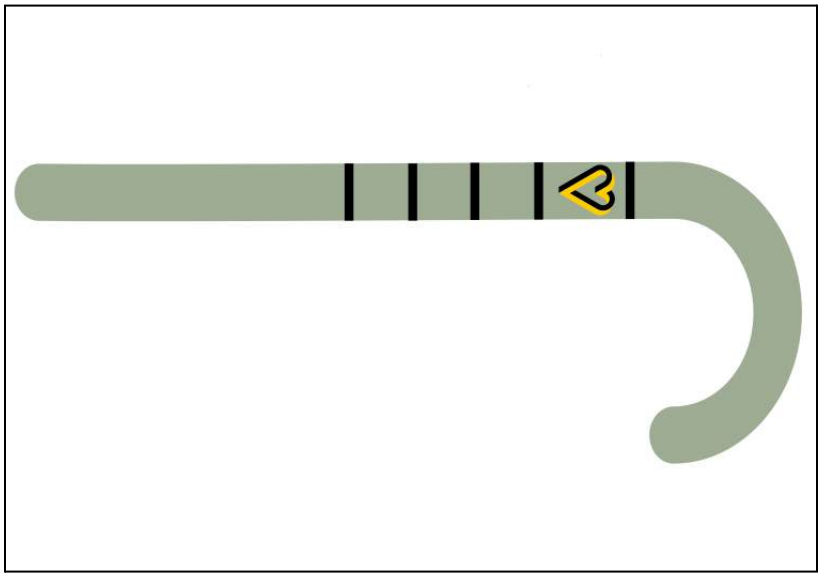
Sensor Cane

By Glara Palani, Nandita Kanumuri and Rohan Madan

A “Smart Cane” to help detect objects in the cane’s path. When an obstacle is detected within a certain range, the LED lights up and the buzzer emits a sound to alert the user.





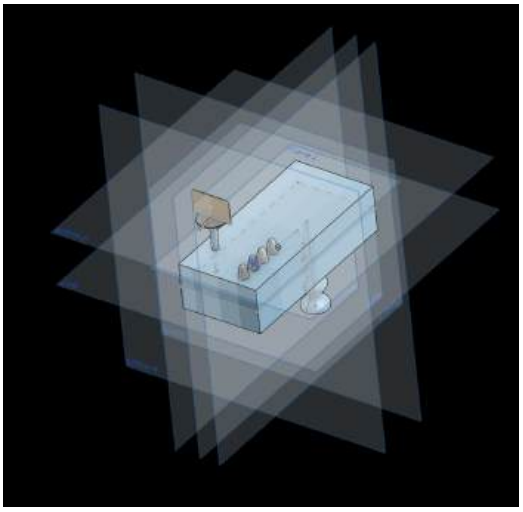


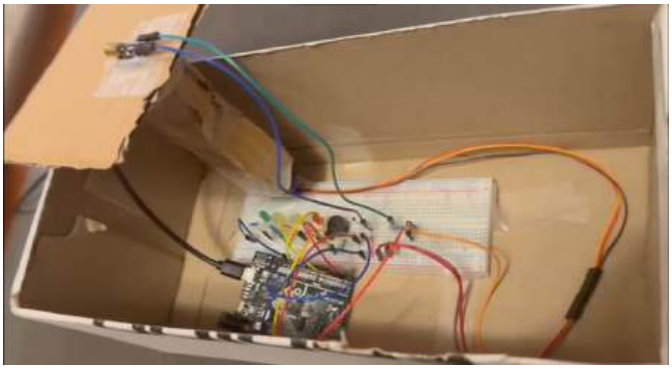
The Apparationator-inator

By Harrison Trinh and Korey Hu

The idea for this project was due to the lack of entertainment for children besides cellular devices.

The Apparitionator-inator will detect the temperature using a thermistor. As the temperature decreases, the more lights will turn on. This will happen alongside the passive buzzer's volume and pitch increasing as well. When the Apparitionator-inator is plugged in, the micro servo will sweep continuously the whole time. When the light reaches the fourth level, which is the red LED, the laser sensor attached to the micro servo will activate.





Milk Run

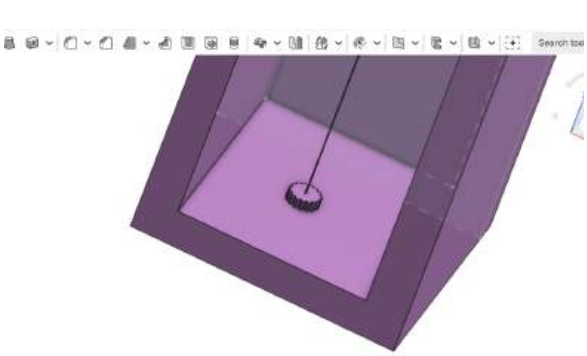
By Albert Olivas

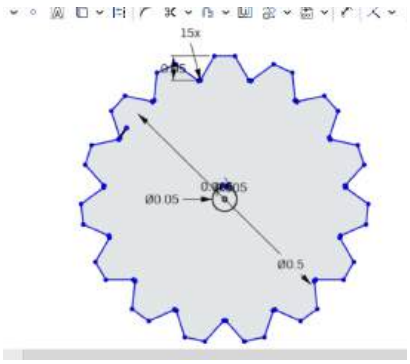
Milk Run is the game Snake reimagined, like the original the goal is to control a snake to move and collect food around the map. However now the snake is seeking to quench his thirst through the lushish and calcium rich drink known as milk. While on the run try to avoid the milk man's traps as falling for them would result in your demise.

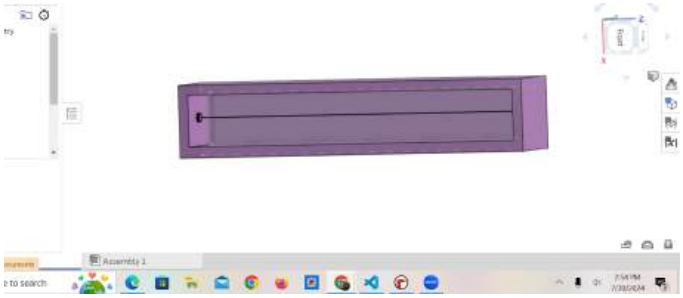
The Wake Up 2000

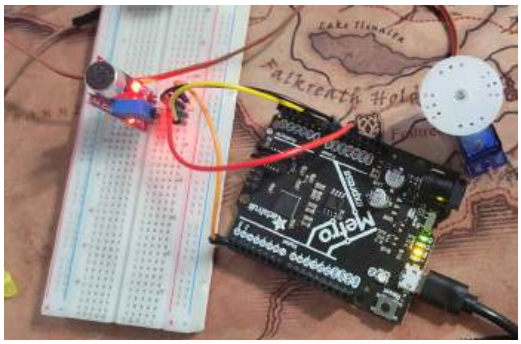
By Alexia Jones and Gabriela Jaramillo

The Wake Up 2000 is an easy and accessible way to open and close your blinds. The servo that moves the blinds is activated by a single clap. There will be two gears inside the device, one that is connected to the rod that moves the blinds, and the other is connected to the servo (we are still adding this one).





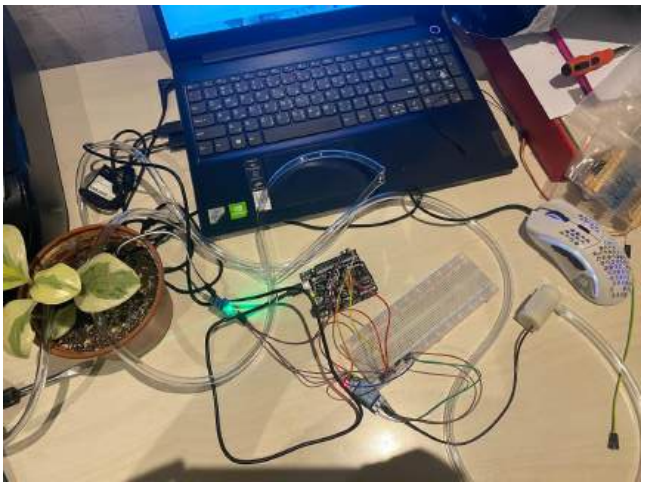




Smart Plant Care System

By Abdulrhman Alghamdi

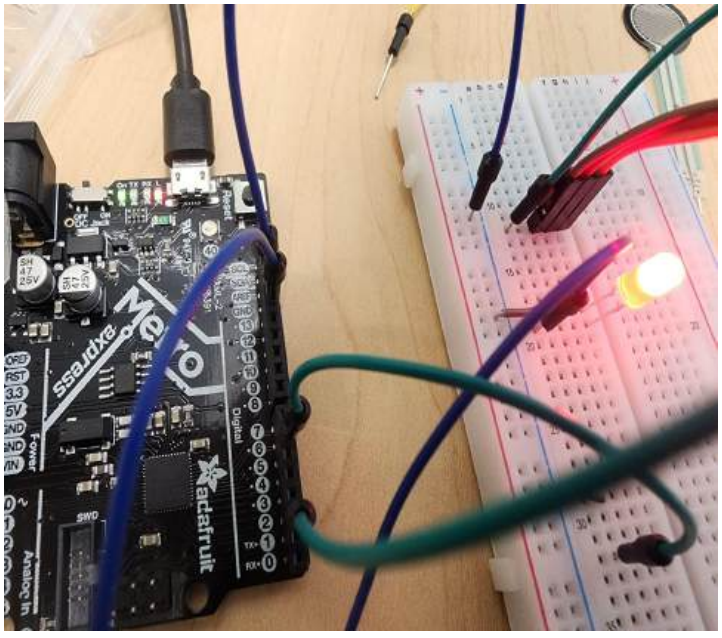
In arid environments, maintaining optimal soil moisture for plant health can be challenging, often leading to over- or under-watering. This project addresses the problem of inefficient plant watering by employing an automated system to manage soil moisture levels. Using an Adafruit Metro M0 Express Board, a soil moisture sensor, a relay module, and a water pump, the system continuously monitors soil conditions and adjusts watering schedules accordingly. The soil moisture sensor detects the moisture level and sends data to the Metro M0 Express Board, which processes this information and activates the relay module when watering is required. The relay module then controls the water pump to deliver precise amounts of water to the plant. This approach ensures that plants receive the right amount of water, optimizing their growth while conserving resources. The result is a simple yet effective solution to maintaining plant health with minimal manual intervention.



Home Motion Detector

By Alma Villegas

Managing the movement of both children and pets within a home can be challenging, especially when they frequently venture into restricted areas. As a parent of two toddler boys and an owner of an Alaskan Malamute/Siberian Husky mix, I understand the difficulty of constantly supervising them. My project addresses this issue by utilizing a motion sensor to trigger an LED and piezo buzzer, providing an effective solution for monitoring unauthorized entry into specific areas of the house. This system not only alerts me when my children or dog enter these areas but also serves as a reminder to them that they are not allowed there. This innovation eliminates the need for constant vigilance, allowing me to focus on other tasks such as cleaning or cooking without worrying about their whereabouts.

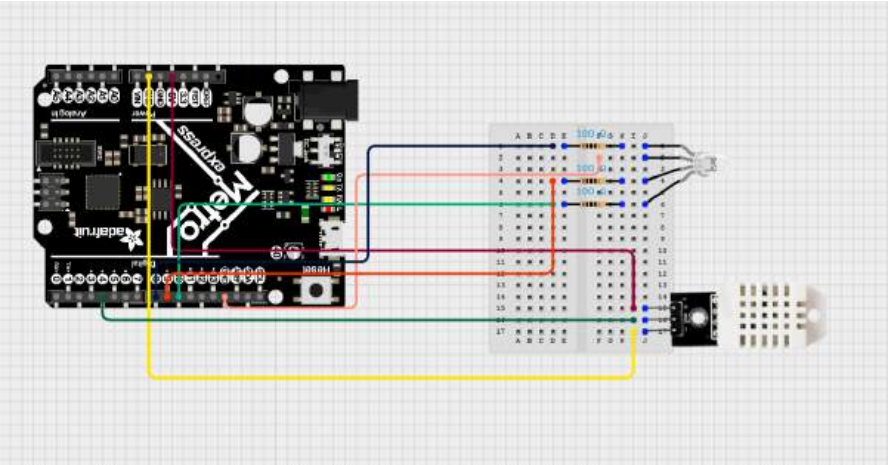


The Sizzle Sniffer

By Narasinga Ujjini Havildar, Sara Zaya and Imaan Virk

The Sizzle Sniffer is a device that runs on any inexpensive microcontroller interfaced with a DHT11 Temperature/Humidity sensor, any heat-conducting element, and a four-pin RGB LED. This device fits in a normal-sized glove. The aim of this device is to provide temperature indicators in order to keep the glove wearer safe in high temperature conditions, from baking in an oven to fighting fires. By providing a straightforward LED indicator, this device can quickly alert the user of potentially dangerous conditions, and allow them to get to safety if needed.

This project currently uses copper wire along with many plastic parts. In the future, we aim to improve upon this proof-of-concept by using faster-conducting, more robust material such as silver or teflon. We also aim to use smaller, more inexpensive microcontrollers to save on weight, space, and cost, such as the Espressif Systems ESP32 or STMicroelectronics STM8, as well as adapt this proof-of-concept into a single PCB.



Live Video Editor

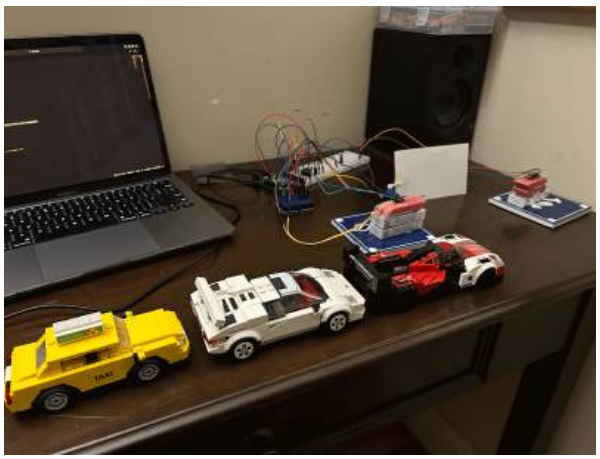
By Noah Snider

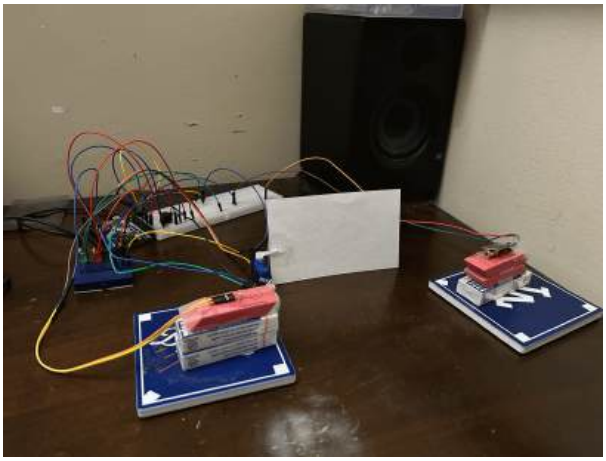
This will allow you to draw on live video in 12 different colors, change the size of the brush drawing, and be able to blur sections of the image.

Parking Simulator 3000

By Trenton Blom and Ilias Lahdab

The Parking Simulator 3000 is a miniature version of an entrance gate to a parking structure that uses a force sensor, motion sensor, and a laser to detect a car attempting to pass through the garage gate. The gate is designed to be highly secure and only specified for certain vehicles. We used an LED light to signal whether the car attempting to enter is allowed to enter. A servo was used to control the gate and an infrared sensor was used to activate the force sensor and the laser. In conclusion, a mix of hardware, software, and stuff found around our homes was used to make the high-security Parking Simulator 3000 come to life!

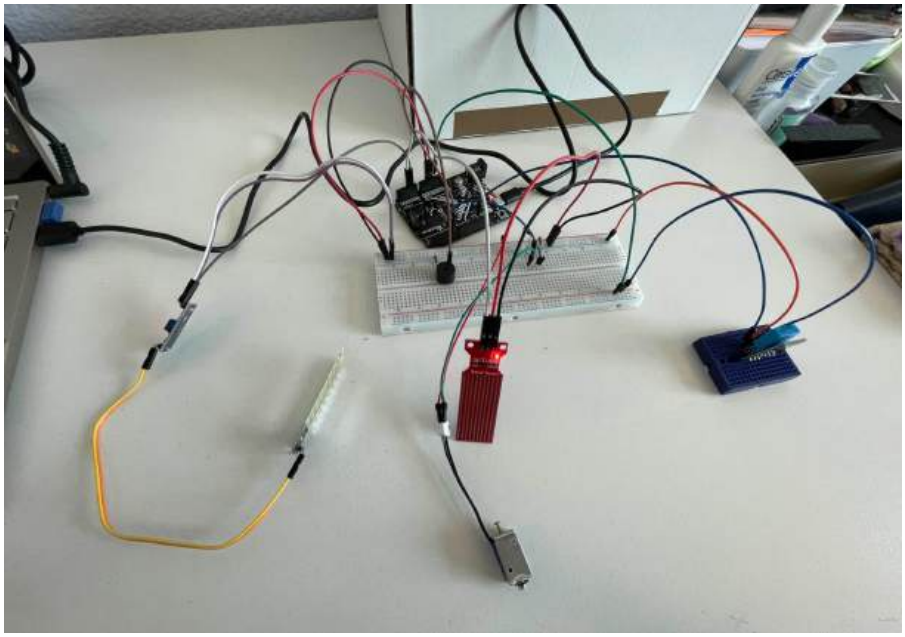




Smart Plant Watering System

By Aram Zarate, Manny San Jose and Gustavo Garcia

The Smart Plant Watering System is designed to automate and optimize the watering process for plants. Utilizing the Metro M0 Express Board, the system integrates a soil moisture sensor, water level sensor, mini solenoid valve, DHT11, 4 digit display and a buzzer. When the soil moisture falls below a set threshold, the solenoid activates to water the plant. Additionally, if the water level in the reservoir is low, the buzzer will play a tune to alert the user to refill the storage.The DHT11 is used to measure the temperature and humidity and displays it on the serial monitor. This system ensures consistent plant care, reduces manual intervention, and conserves water by only watering when necessary.



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Katheryn Cooper
Harrison Trinh
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Nandita Kanumuri
Sara Zaya
Purab Balani
Alexia Jones
Harvey Singleton
Stephen Marquez
Alma Villegas
Sean Maranan
Swaroop Kamble
Noah Snider
Ian Kim
Margaret Yao
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Albert Olivas
Seongmin Na
Imaan Virk
Amy Szymanowski
Nicholas Bilotto
Owen Liu
Narasinga Ujjini Havildar
Korey Huynh
Joseph Nguyen
Alayna Justus
Gordon Tin
John Gorges
Nandita Kanumuri
Glara Palani


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Congratulations to all the students!
Thank you to all of those who have supported us!