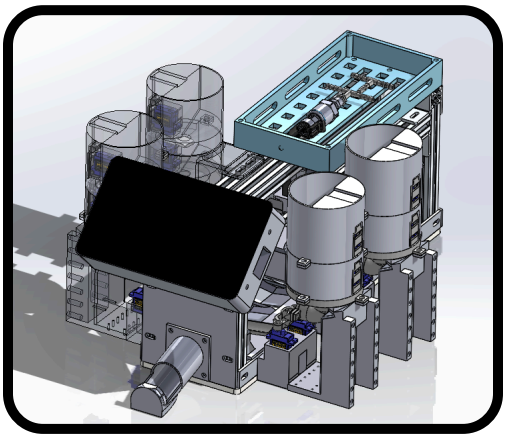
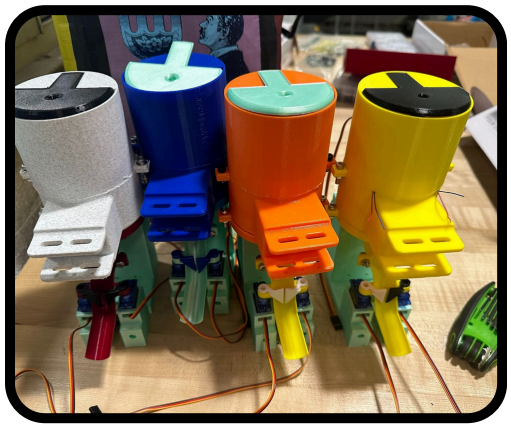
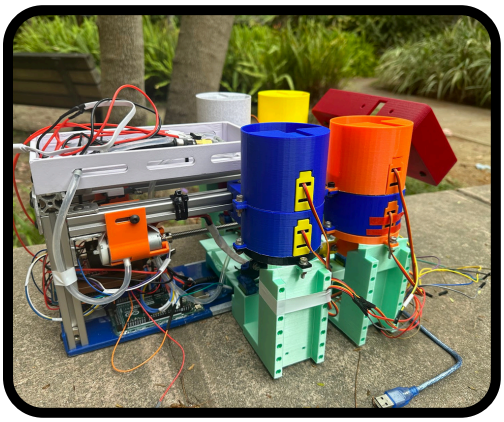
Onur Calisir Portfolio

M.S. in Mechanical Engineering at Columbia University ‘25 | onur.calisir@columbia.edu

Automated Pill Dispenser - UCLA Capstone







What I Built

Designed and prototyped a low-cost, user-friendly automated pill dispenser for elderly users to improve medication adherence.

Implemented a triple-latch redundant filtration system, including gates at the end of the slide, for precise single-pill dispensing.

How I Built It

Designed the hopper mechanism in **SolidWorks** and integrated vibration motors to improve pill flow.

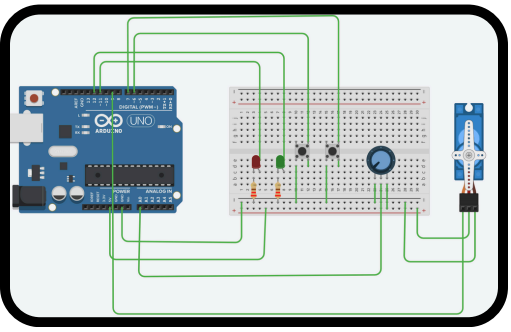
Programmed **Arduino Mega** to control 4 servos per hopper using PCA9685 boards, ensuring seamless integration with the main assembly.

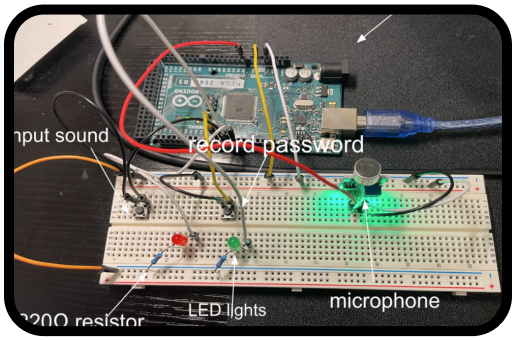
Results

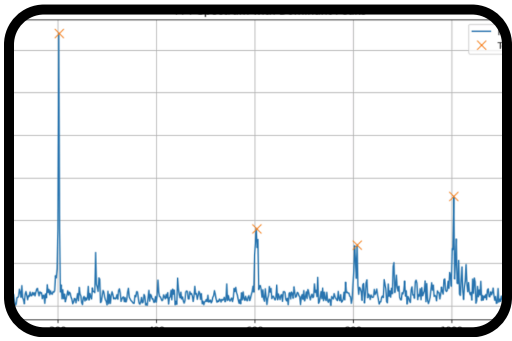
Achieved 95% pill dispensing reliability for varying pill sizes (1mm to 10mm).

Delivered a fully functional prototype under a $500 budget, incorporating a modular design with a user-friendly **Raspberry Pi** interface.

FFT Based Lock - UCLA







What I Built

Developed a sound-driven password lock using **Fast Fourier Transform (FFT)** technology to analyze and match dominant sound frequencies for access control.

Lead for system design and **Arduino** implementation, ensuring functional FFT analysis and sound signal matching.

How I Built It

Designed and implemented an FFT-based system using **Arduino Mega** and a microphone module.

Calibrated the system to identify and store the five most dominant sound frequencies as a password array, incorporating a ±5 Hz tolerance range

Developed and tested **Arduino** code to perform FFT analysis and compare input frequencies with the stored password.

Results

Achieved reliable password matching for continuous sound signals with a success rate of 90%.

Managed limitations in sampling frequency and memory constraints, adjusting tolerances to improve recognition of harmonic and human voice inputs.

SAF Printing Demo Keychain - +90 3D Digital Factory

What I Built

Designed and manufactured a custom keychain to demonstrate skills in **CAD** modeling, additive manufacturing, and post-processing techniques.

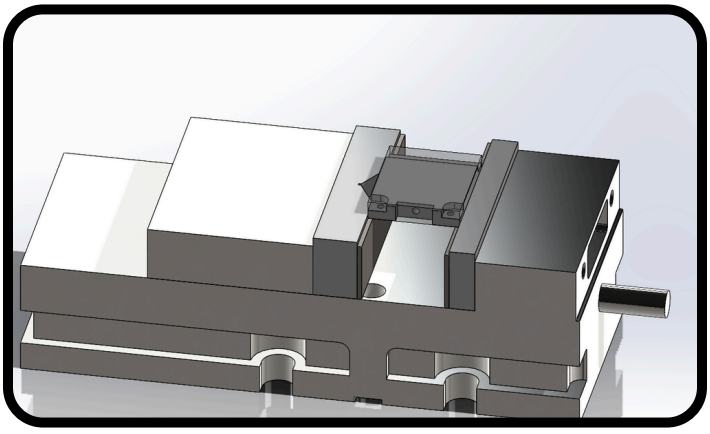
The keychain was created to showcase intricate design capabilities and effective use of **3D printing** technology.

How I Built It

Modeled the keychain in **SolidWorks**, incorporating detailed features such as custom text and geometric design for aesthetic appeal.

Printed using the Stratasys H350 **SAF** printer, ensuring precise layer adhesion and structural integrity. Performed smoothing, sanding, and polishing to ensure a high-quality finish.

Mini Aluminum Chair - UCLA



What I Built

Designed and fabricated a mini aluminum chair to demonstrate machining skills and proficiency in using various tools and equipment.

The project aimed to create a functional and aesthetically pleasing chair, showcasing attention to detail and precision

How I Built It

Chair Legs: Machined using a **lathe** from cylindrical aluminum stock to create smooth and precise cylindrical shapes.

Chair Base: Milled with a **3-axis mill**, which included drilling, tapping holes, and creating connection points for the legs.

Chair Back: Designed in **SolidWorks CAM** and machined with a **CNC router** to carve a custom pattern, achieving a professional finish.

The components were aligned and assembled using screws, ensuring structural integrity and a polished appearance.