Showcase

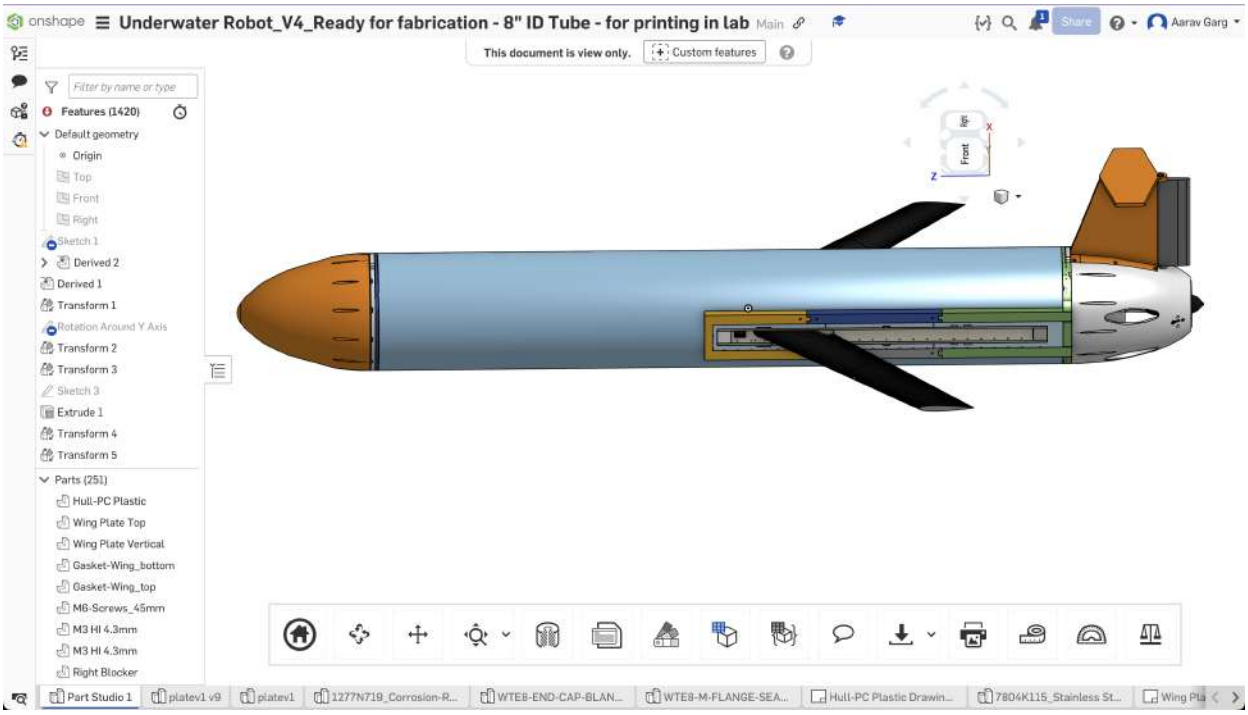
PROJECTS

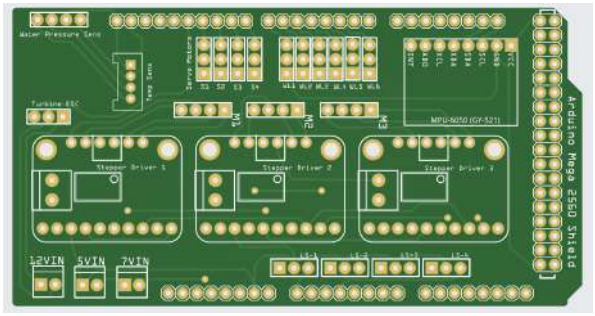
Aarav Garg

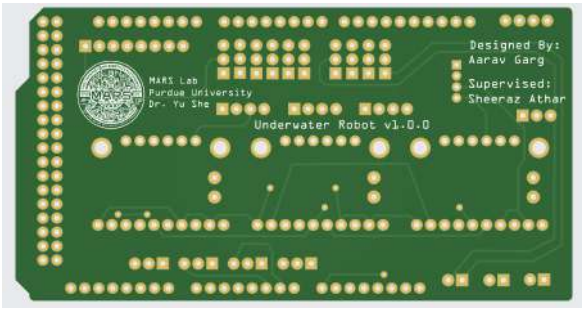
UPDATED: 2024

Underwater Robot

Description	An autonomous underwater gliding robot designed to explore cavities in icebergs. Engineered using Siemens NX for mechanical design, with an Arduino Mega controlling actuators and sensors. Features a custom PCB for compact electrical integration and streamlined assembly.
Publications	Upcoming
Hardware	Arduino Mega, IMU, Pressure Sensor, Servo Motors
Highlights	Mechanical CAD/CAM, PCB Design
Coding	Arduino, C++
Challenges	Problems: • Designing a robot capable of navigating complex iceberg cavities • Ensuring waterproof integrity in extreme conditions • Miniaturizing electrical systems for a compact design Solutions: • Utilized Siemens NX for precise mechanical design • Developed a custom PCB to integrate electrical components compactly • Engineered a waterproof enclosure suitable for underwater exploration
URL	https://engineering.purdue.edu/IE/news/2023/she-nsf-ore-state-collab
Year	2024
Awards	$1.5M Grant - U.S. National Science Foundation's Office of Polar Programs

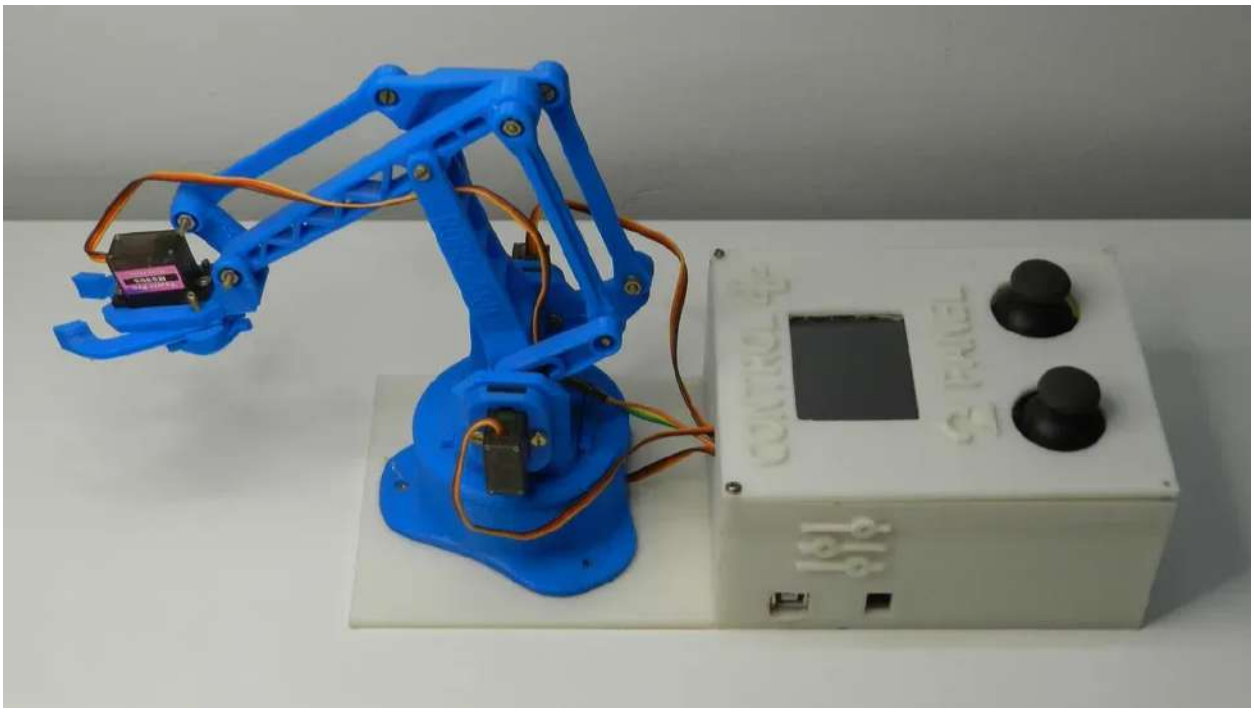

onshape
Underwater Robot_V4_Ready for fabrication - 8" ID Tube - for printing in lab
Main
Share
Aarav Garg
This document is view only.
Custom features
Filter by name or type
Features (1420)
Default geometry
Origin
Top
Front
Right
Sketch 1
Derived 2
Derived 1
Transform 1
Rotation Around Y Axis
Transform 2
Transform 3
Sketch 3
Extrude 1
Transform 4
Transform 5
Parts (251)
Hull-PC Plastic
Wing Plate Top
Wing Plate Vertical
Gasket-Wing_bottom
Gasket-Wing_top
M6-Screws_45mm
M3 HI 4.3mm
M3 HI 4.3mm
Right Blocker
Part Studio 1
platev1 v9
platev1
1277N719_Corrosion-R...
WTE8-END-CAP-BLAN...
WTE8-M-FLANGE-SEA...
Hull-PC Plastic Drawin...
7804K115_Stainless St...
Front

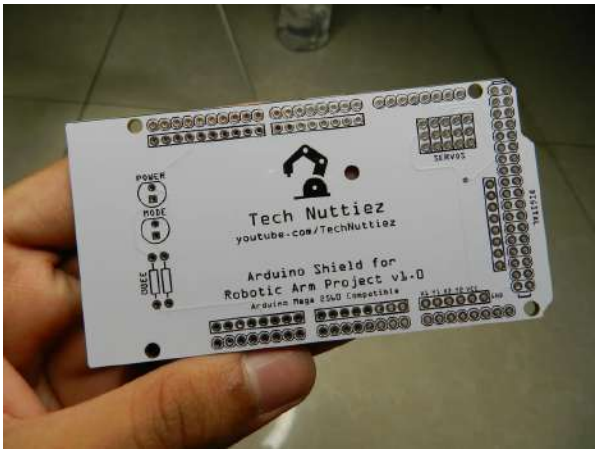

Arduino Mega 2560 Shield
12VIN
5VIN
7VIN

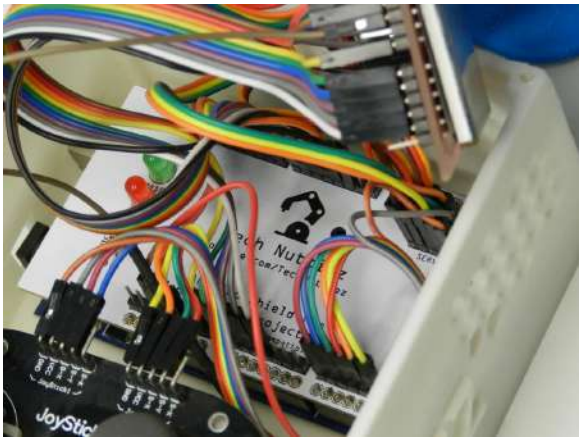

MARS Lab
Purdue University
Dr. Yu She
Designed By:
Aarav Garg
Supervised:
Sheeraz Athar
Underwater Robot v1.0.0

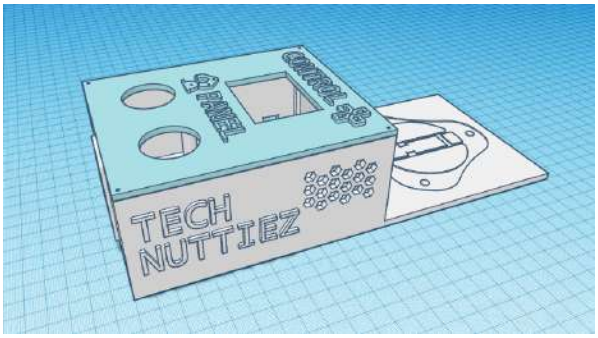
Robotic Arm That Learns

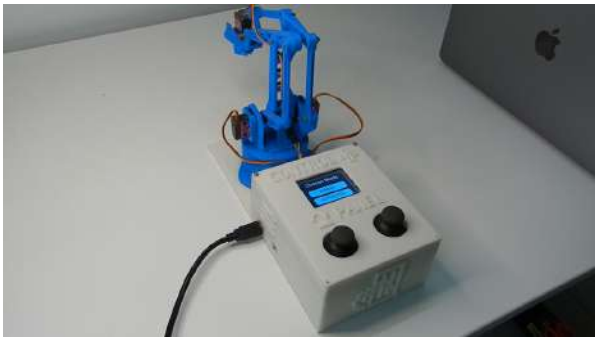
Description	Robotic Arm that can learn and perform tasks autonomously or be manually controlled using joysticks, featuring a TFT touchscreen display for control and visualization, with three degrees of freedom and a gripper powered by metal gear servo motors.
Publications	DIYODE Magazine, Instructables, Silicon Chip Magazine
Hardware	Arduino Mega, Potentiometers, Servo Motors, Touch Display
Highlights	Feedback Control System, Mechanical CAD/CAM, PCB Design
Coding	C++
Challenges	- Problems: Plastic servos jittery, makeshift control panel very buggy, short circuit due to perfboard/breadboard - Solutions: Migrated to V2 (metal gear servos, touch display for control, custom Printed Circuit Board)
URL	https://bit.ly/Robotic-Arm-That-Learns
Year	2023
Awards	#1 Prize - Autodesk Contest




Tech Nuttiez
youtube.com/TechNuttiez
Arduino Shield for
Robotic Arm Project v1.0
POWER
MODE
SERVOS



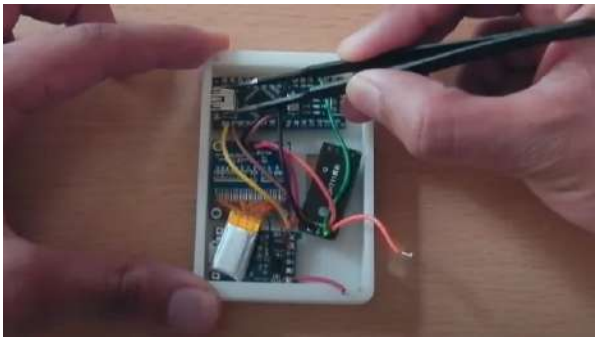

TECH
NUTTIEZ

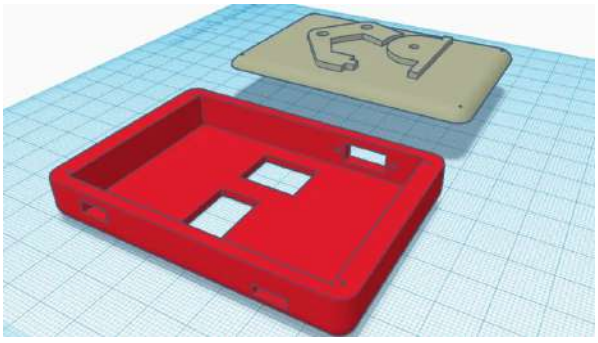


Pocket Weather Station

Description	A compact, portable weather station that displays real-time temperature and humidity on an OLED screen. It features a rechargeable battery for on-the-go use and can be easily carried in a pocket.
Publications	DIYODE Magazine, Elektor, HackSpace Magazine, Instructables, Silicon Chip Magazine
Hardware	Arduino Nano, DHT11 Temperature Sensor, LiPo Battery, OLED Display
Highlights	Battery Management, Mechanical CAD/CAM, PCB Design
Coding	Arduino, C++
Challenges	Problems: • Fitting components in a compact enclosure • Ensuring accurate temperature and humidity readings • Optimizing battery life Solutions: • Designed custom 3D printed enclosure • Carefully placed components to minimize interference • Implemented power-saving techniques in the code
URL	https://www.instructables.com/Pocket-Weather-Station-Your-Self-Care-Weather-Assi/
Year	2021
Awards	Homepage Feature - Instructables

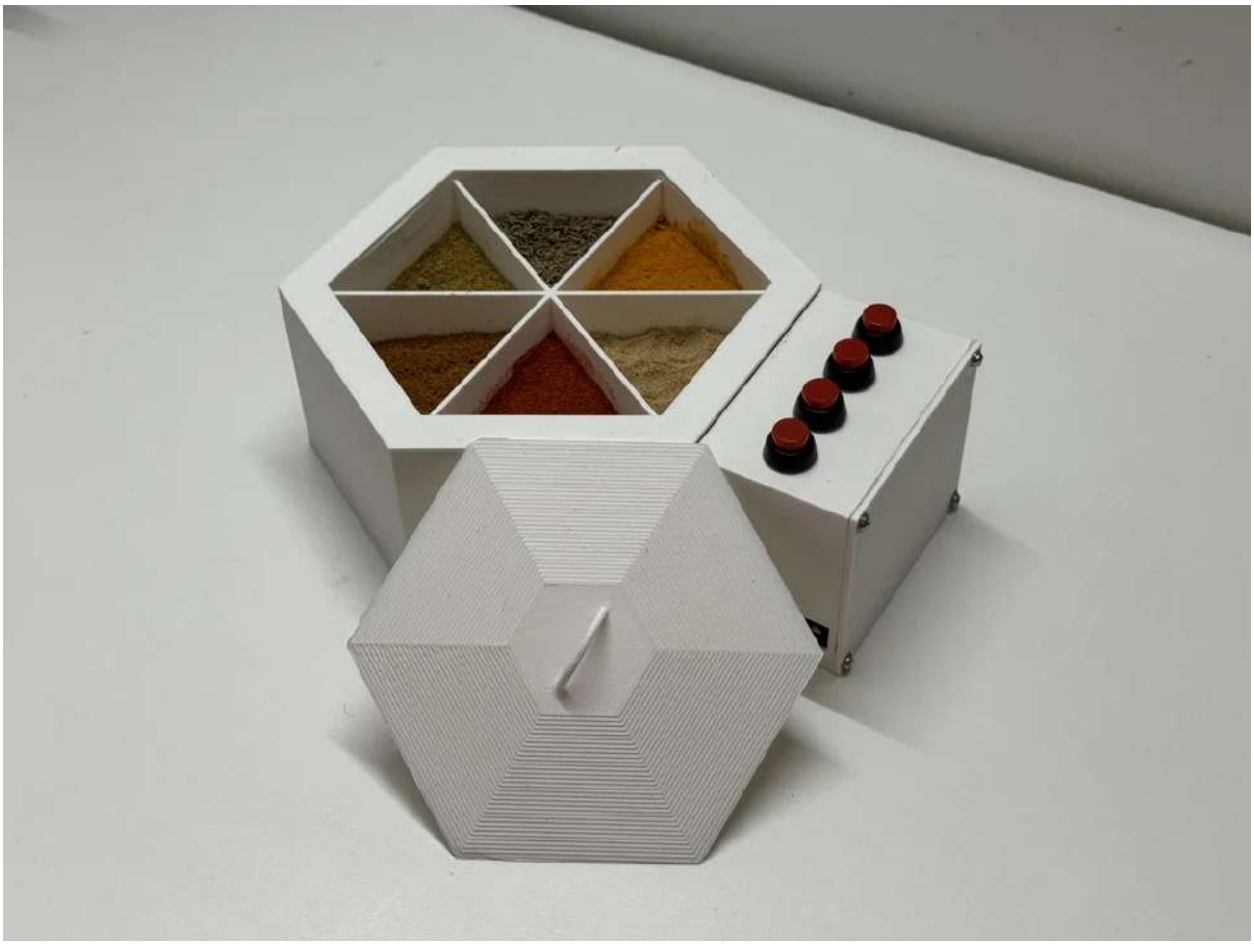

Temp: 29.70°C
Humid: 54.00%
Feels: 31.23°C

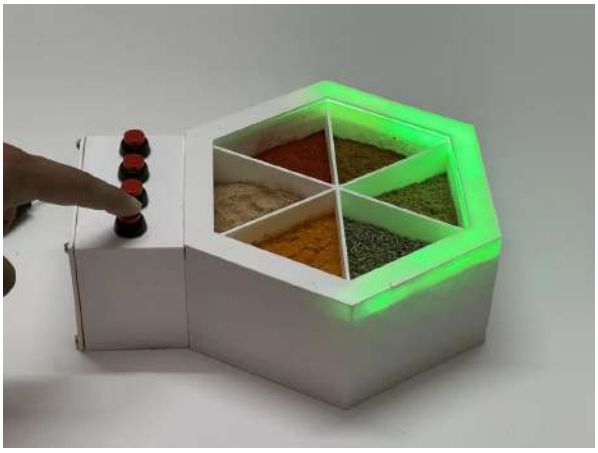




Smart Spice Box

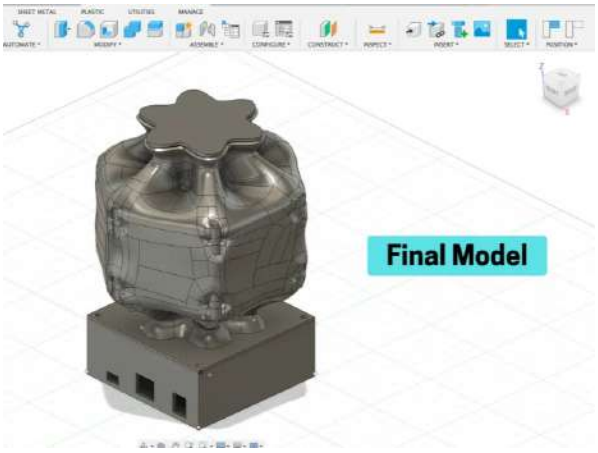
Description	A smart spice box that streamlines Indian cooking by guiding users on spice selection for specific recipes using LED lights and a simple button interface utilizing a state-machine algorithm with an Arduino Uno to manage 999 unique states allowing for easy recipe storage and navigation.
Publications	Instructables
Hardware	Arduino Uno, LED Strip, Tactile Button
Highlights	PCB Design, State-Machine Algorithm
Coding	Arduino, C++
Challenges	Problems: • Designing an efficient spice organization system. • Implementing an intuitive recipe selection interface for 999 recipes. Solutions: • Created a fixed hexagonal design with six compartments. • Developed a state-machine algorithm to navigate 999 recipes with just 3 buttons.
URL	https://www.instructables.com/Spice-Box-That-Helps-You-Cook-Faster/
Year	2024
Awards	#1 Prize - Autodesk Contest





AI-Based Night Lamp

Description	A smart night lamp designed to provide optimal lighting for one person working or reading while minimizing disturbance to a sleeping partner. Utilizes AI-generated topology optimization for its design, incorporates automatic activation via an LDR sensor, and uses specific light colors and intensities based on sleep research.
Publications	Instructables
Hardware	Arduino Uno, LDR Sensor, LED Strip
Highlights	AI-Generated Topology Optimization, Mechanical CAD/CAM
Coding	Arduino, C++
Challenges	Problems: • Designing a lamp that doesn't disturb a sleeping person while providing sufficient light for work • Optimizing light diffusion and direction • Integrating smart features for convenience Solutions: • Used AI-generated topology optimization for efficient light • Implemented sleep findings in light color and intensity choices • Developed an LDR-based automatic activation system
URL	https://www.instructables.com/AI-Designed-Night-Lamp/
Year	2024
Awards	#3 Prize - Autodesk Contest


Final Model