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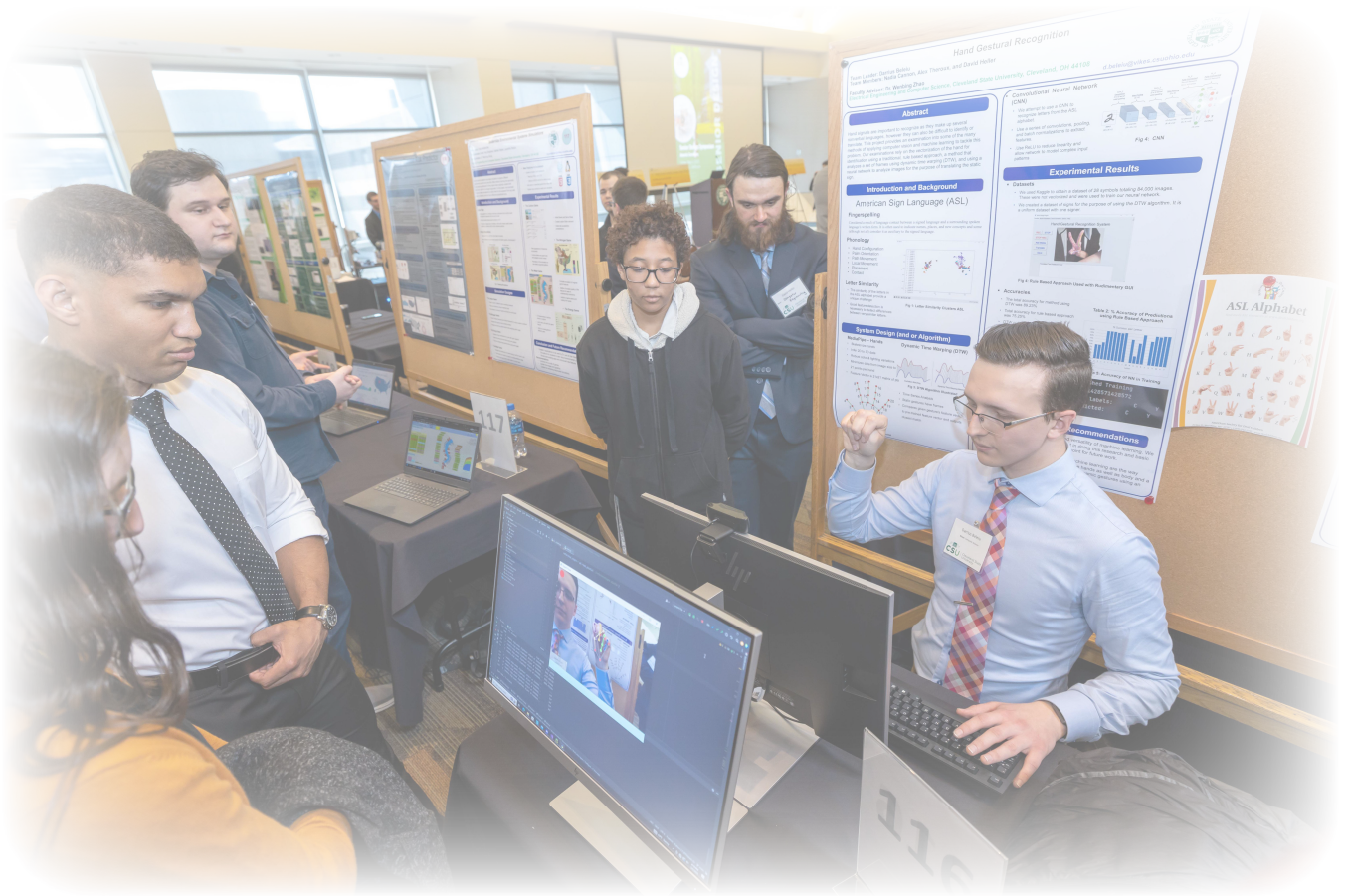
# Senior Design Symposium Awards Ceremony

Friday, May 3, 2024

4:30 p.m. - 7:30 p.m.

Wolstein Center Arena

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### Hand Gestural Recognition

David L. D'Angelo, Scott D. Cook, and Michael J. Griffin, Ohio State University, Columbus, OH 43210

**Abstract**

Hand gestures are a natural and expressive form of communication. This paper presents a novel approach to hand gesture recognition that leverages the power of deep learning. The proposed system is designed to be robust to variations in gesture speed, scale, and background. The system is evaluated on a dataset of 1000 hand gestures, and achieves a recognition accuracy of 95.2%.

**Introduction and Background**

American Sign Language (ASL) is a natural language used by the deaf and hard of hearing community. ASL is a visual language, and is expressed through hand gestures, facial expressions, and body movements. ASL is a rich and expressive language, and is an important mode of communication for many people. However, ASL is not widely understood by the general population, and this can lead to communication barriers. This paper presents a novel approach to ASL recognition that leverages the power of deep learning.

**Methodology**

The proposed system is designed to be robust to variations in gesture speed, scale, and background. The system is evaluated on a dataset of 1000 hand gestures, and achieves a recognition accuracy of 95.2%.

**Results**

The proposed system achieves a recognition accuracy of 95.2% on a dataset of 1000 hand gestures. This is a significant improvement over previous methods, which typically achieve accuracies of 80-90%.

**Recommendations**

The proposed system is a promising approach to ASL recognition. It is robust to variations in gesture speed, scale, and background, and achieves a high recognition accuracy. This system could be used to improve communication for the deaf and hard of hearing community.



# Engineering Senior Design Symposium

Friday, May 3, 2024

Wolstein Center Arena

## Program of Events

4:30 p.m..... Poster Session & Judging

6:00 p.m..... Reception

6:45 p.m..... Award Announcements

**Dr. Michael Adams, Chair**  
Department of engineering Technology  
Senior Design Symposium Director

**Dr. Richard Schoephoerster, Dean**  
Washkewicz College of Engineering



## DESIGN TEAMS

### Project Title: 2Swift Skateboard

Team Members: Matt Keyerleber, Austin Lackritz, Derek Crow

Advisor: Andrew Dorman, Instructor: Bogdan Kozul

Department: Mechanical Engineering

Industry Sponsor: 2Swift Boards

### Project Title: Industrialization of VAWTS in Lower Income Communities

Team Members: Case Zilch, Youssef Mostafa, Adnan Sopariwala, Sam Bamberger, Nate Webster, Mamidou Traore

Advisor: Bud Kinney, Instructor: Michael Gallagher

Department: Mechanical Engineering

Industry Sponsor: ABEDA

### Project Title: Guide Ohio

Team Members: Nick Grega, Jade Widener, Paul Oluduyile

Advisor: Jenna Thomas, Instructor: Kelly Marton

Department: Civil & Environmental Engineering

Industry Sponsor: Bike Cleveland

### Project Title: Farmbot to the MAX

Team Members: Justin Balmert, Devin White, Christianna Brewer, Faith Mancuso, Dillion Foster, Brodee Bocek, Saud Alazemi

Advisor: Katie Blodorn, Instructor: Sanchita Mal-Sarkar

Department: Computer Science

Industry Sponsor: CSU University Recreation and Wellbeing

### Project Title: Rocky River Shoreline Restoration with Steel By-Products

Team Members: Mohammed Dari, Yaarab Alshanfari, Ronnakorn Cheinvicha

Advisor: Isabel Culkar, Instructor: Kelly Marton

Department: Civil & Environmental Engineering

Industry Sponsor: CTI

### Project Title: Morton Park Improvement Plan

Team Members: Benjamin Parker, Michael Shearer, Joseph Gragg

Advisor: Andy Mahall, Instructor: Kelly Marton

Department: Civil & Environmental Engineering

Industry Sponsor: Fabrizi Trucking & Paving Co., Inc.

### Project Title: NASA Virtual Reality Space Game

Team Members: Chileshe Besa, Roula Jamal, Zorah Feely, William Leavitt

Advisor: Cassie Bowman, Instructor: Sanchita Mal-Sarkar

Department: Computer Science

Industry Sponsor: Arizona State University

### Project Title: Krebs Sanitary Sewer & Water Project

Team Members: Mitchell Hager, Myah Bozak, Marie Johnson

Advisor: Jarod Larson, Instructor: Kelly Marton

Department: Civil & Environmental Engineering

Industry Sponsor: Avon Lake Regional Water

### Project Title: N. Market St. Storm Sewer

Team Members: Sebrine Abu-Hamdeh, Tamer Assi, Patrick Schlund

Advisor: John Rice, Instructor: Kelly Marton

Department: Civil & Environmental Engineering

Industry Sponsor: City of Wooster

### Project Title: Design Case Study of a Two-Story Headquarters Building

Team Members: Emersen Liauw, Thomas Walden, Matthew Lobosky, Alfadel Alkharusi

Advisor: Brad Fronek, Instructor: Kelly Marton

Department: Civil & Environmental Engineering

Industry Sponsor: CT Consultants

### Project Title: 3D Scanning and Integration into VR

Team Members: John Parker, Andrea Llapa, Jay Leiden, Jerome Nelson, Jovan Djordjevic

Advisor: Matthew Duplin, Instructor: Sanchita Mal-Sarkar

Department: Computer Science

Industry Sponsor: EMDiS

### Project Title: ABC Dry Chemical Transfer

Team Members: Jackson Zsigray, Matthew Bucar, Erin Leydig, Neythan Poling

Advisor: Brad Bell, Instructor: Michael Gallagher

Department: Mechanical Engineering

Industry Sponsor: First Energy Beta Laboratory

### Project Title: Automating Automation

Team Members: Andre Billups, Turner Kall, Robert Preston

Advisor: Frank Morris, Instructor: Toufik Aidja

Department: Engineering Technology

Industry Sponsor: Integrated Mill Systems



## DESIGN TEAMS

### **Project Title: Energy Recovery, CO<sub>2</sub> and Particulate Reduction, Through a New Patented Process**

Team Members: Madelyne Dunn, Hannah Modlin, Jay Patel, Charbel Noun

Advisor: Joesph Spagnuolo, Instructor: Jorge Gatica

Department: Chemical & Biomedical Engineering

Industry Sponsor: Holistic Engineering

### **Project Title: Psyche Asteroid VR**

Team Members: Mayur Patel, Felicia Wenner, Jason Rasum, Amritraj Singh Dhillon

Advisor: Cassie Bowman, Instructor: Sanchita Mal-Sarkar

Department: Computer Science

Industry Sponsor: NASA

### **Project Title: Closed Four-Stage True Zero Emissions Strayton Engine**

Team Members: Radhika Patel, Austin Staiger, Alyssa Vandecaveye, Jon Sokolowski

Advisor: Roger Dyson, Instructor: Michael Gallagher

Department: Mechanical Engineering

Industry Sponsor: NASA GRC

### **Project Title: Automated Hydroponic System**

Team Members: Karan Patel, Trinity Robinson, Cody Dannels, Nick Hopper, Christopher Zollos, Ziad Alharbi

Advisor: Marzelle Brown, Instructor: Toufik Aidja

Department: Engineering Technology

Industry Sponsor: Rockwell Automation

### **Project Title: Automatic BLock Cleaner**

Team Members: Kevin Schutte, Schutte Becks, Andrew White, Becky Hurosky

Advisor: David Castillo, Instructor: Bogdan Kozul

Department: Mechanical Engineering

Industry Sponsor: National Safety Apparel

### **Project Title: EcoCycle**

Team Members: Matt Oravets, Indy Dhillon, Nathan Baker, Mohammad Alrashidi

Advisor: Iain Mcvey, Instructor: Michael Gallagher

Department: Mechanical Engineering

Industry Sponsor: M2DCON

### **Project Title: Food Delivery Robot**

Team Members: Carissa Templeton, Luke Palos, Ramandeep Arora, Connor Robertson, Alexis Marrero

Advisor: Shawn Payne, Instructor: Ihab Wattar

Department: Electrical & Computer Engineering

Industry Sponsor: McDonald's - Tri-Arch 8, Inc.

### **Project Title: Optimizing Psyche 3D Printable Files**

Team Members: Nicholas Ribic

Advisor: Cassie Bowman, Instructor: Bogdan Kozul

Department: Mechanical Engineering

Industry Sponsor: NASA / Arizona State University

### **Project Title: NASA Web-based Game for Psyche**

Team Members: Joshua Wiess, Andrew Weitzel,

David Kalman, James Rusnak

Advisor: Cassie Bowman, Instructor: Sanchita Mal-Sarkar

Department: Computer Science

Industry Sponsor: NASA Psyche Mission

### **Project Title: Parker Hannifin Alignment of Fitting Bodies**

Team Members: Izabell McGreevy, Alex Osowski, Alex Lake, Adam Price, Collin Parete

Advisor: Zach Morehead, Instructor: Bogdan Kozul

Department: Mechanical Engineering

Industry Sponsor: Parker Hannifin

### **Project Title: Plastic Design for Automated Assembly**

Team Members: Jordan Schultz, Brady Stanton, Dhak Poudel,

Advisor: Therin Orlando, Instructor: Bogdan Kozul

Department: Mechanical Engineering

Industry Sponsor: Rockwell Automation

### **Project Title: The Mead Team**

Team Members: Daniel Bucknavich, Ryan Molina, Ryan Granger, Jonathon Oritz, Patrick Vargo

Instructor: William Atherton

Department: Engineering Technology

### **Project Title: The Plastics**

Team Members: Ellen Ingle, Samantha Racic, Richard Lekan, Andrew Kovesdi, Vannessa Runewicz, Kyle Glover

Instructor: Chelsea Monty-Bromer

Department: Chemical & Biomedical Engineering





## DESIGN TEAMS

### Project Title: Adhesion Traverse System

Team Members: Izabell McGreevy, Alex Osowski, Alex Lake, Adam Price, Collin Parete  
Advisor: Matt Snider, Instructor: Bogdan Kozul  
Department: Mechanical Engineering  
Industry Sponsor: Parker Hannifin

### Project Title: Lab & Pilot Scale Latex Reactor Correlation

Team Members: Mia DiSalvo, Kierstin Clark, Daniel Patten, Lyndsey Lacey, Marybeth Duke  
Advisor: Kim Koglin, Instructor: Chelsea Monty-Bromer  
Department: Chemical & Biomedical Engineering  
Industry Sponsor: The Sherwin Williams Company

### Project Title: Welser Profile High Bay Project

Team Members: John Dunn, Joshua Harris, Michael Bender, Don-niel McKenzie  
Advisor: Cary Frame, Instructor: William Atherton  
Department: Engineering Technology  
Industry Sponsor: Welser Profile

### Project Title: Social Learning App for Cybersecurity

Team Members: Malik Carpenter, Alexis Payton-Williams, Paul Rebello, Hamza Srhiri  
Advisor: Wenbing Zhao, Instructor: Sanchita Mal-Sarkar  
Department: Computer Science

### Project Title: Field Avenue Gravity Sewer

Team Members: Megan Stroescu, Andrew Mucklo, Brandon McEwen  
Instructor: Kelly Marton  
Department: Civil & Environmental Engineering

### Project Title: Wearable Gas Detector

Team Members: Carlton Powell, Joseph Kensicki, Jonathan Holt, Tarryn Williams  
Instructor: Toufik Aidja  
Department: Engineering Technology

### Project Title: ASCE Timber-Strong Design Build

Team Members: Hunter Finkel, Zach Cleveland, Mike Francek, Trey Moody  
Instructor: Kelly Marton  
Department: Civil & Environmental Engineering

### Project Title: Rotor Temperature Measurement Sensor

Team Members: Jenna Watts, Alfonso Santana, Izasak Wallace, Brandon Baughman, Ahmed Alsukhayri, Avionne Weaver  
Advisor: Sachin Aggarwal, Instructor: Toufik Aidja  
Department: Engineering Technology  
Industry Sponsor: Safran

### Project Title: Collector Stand Project

Team Members: Zachary Forristal, Aflah Albaimani, Emmanuel Borisade  
Advisor: Frank Armstrong, Instructor: Kelly Marton  
Department: Civil & Environmental Engineering  
Industry Sponsor: TTR Engineers

### Project Title: Baja Data Acquisition System

Team Members: William McCartney, Connor Buccieri, Skye Thornsberry, Logan McClain, Ryan Davenport, Jake Tackett  
Instructor: Michael Gallagher  
Department: Mechanical Engineering

### Project Title: ChemE Car

Team Members: Sophia Vozar, Julia Lewins, Vuk Bojovic, Alijoharah Alhobayshi, Benjamin Mollel  
Instructor: Chelsea Monty-Bromer  
Department: Chemical & Biomedical Engineering

### Project Title: 3-Band Overdrive Pedal

Team Members: Henry LoConti, Michael LoConti, Ahmad Jundi  
Instructor: Ihab Wattar  
Department: Electrical & Computer Engineering

### Project Title: Sign Language Translating Glove

Team Members: Carmen Villalobos García, Salvador Murillo, Fabio Hinojosa, Leonid Negomedzyanov  
Instructor: Sanchita Mal-Sarkar  
Department: Computer Science

### Project Title: FIERF Forging Competition: Halligan Bar

Team Members: Zachary Wheeler, Stefan Blagojevic  
Instructor: Michael Gallagher  
Department: Mechanical Engineering



## DESIGN TEAMS

### Project Title: Thunderbolt

Team Members: Dakota Rumford, Hasna Rachid, Lindsey Kotz, Peter Sankovic, Nouray Sfeir, Nessa Regal  
Instructor: Chelsea Monty-Bromer  
Department: Chemical & Biomedical Engineering

### Project Title: 24 Hours of Lemons

Team Members: Markus Simičak, Brian Elliott, Joshua Langin  
Instructor: Michael Gallagher  
Department: Mechanical Engineering

### Project Title: ExploreIT

Team Members: Lukas Miciunas, Cameron Flack, Corey Malloy, Riyan Mustafa  
Advisor: Yongjian Fu, Instructor: Sanchita Mal-Sarkar  
Department: Computer Science

### Project Title: SHOPPER BUDDY

Team Members: Hassan Shaer, Saurav Bhambra, Sheeka Shee, Philip Baker  
Advisor: Aditi Singh Instructor: Sanchita Mal-Sarkar  
Department: Computer Science

### Project Title: Code Break Lockdown: An Educational Computer Science Game

Team Members: Sidney Zweifel, Gretta Foxx, Yaxin Gu, Sarah Ogorzaly  
Instructor: Sanchita Mal-Sarkar  
Department: Computer Science

### Project Title: Supptronics Dispenser

Team Members: Kevin Joyce, Anthony Pietrolungo  
Instructor: William Atherton  
Department: Mechanical Engineering

### Project Title: ASCE Student Steel Bridge Design Competition

Team Members: Michael Roach, Dalton Evans, Elijah Haller, Bradley Koblin  
Instructor: Kelly Marton  
Department: Civil & Environmental Engineering

### Project Title: Classroom Tablet

Team Members: Amy Hizlan  
Instructor: Ihab Wattar  
Department: Electrical & Computer Engineering

### Project Title: D-Ice

Team Members: Zachary Klimcak, Zachary Shell, Andrew Vokic  
Instructor: William Atherton  
Department: Engineering Technology

### Project Title: Eye Controlled Drone Flight

Team Members: Domenic Ticchione, Sean Mendicino, Harsh Patel, FNU Manish  
Advisor: Ye Zhu Instructor: Sanchita Mal-Sarkar  
Department: Computer Science

### Project Title: Passive Exoskeleton Fatigue Tester

Team Members: Connor Foster, Adam Mastropieri, Ivan Kalnoki-Kis  
Advisor & Instructor: Michael Gallagher  
Department: Mechanical Engineering

### Project Title: Automated Gardening System

Team Members: Justin Jicha, Tori Pettry, John Rodney, Danijel Knezevic  
Instructor: Ihab Wattar  
Department: Electrical & Computer Engineering

### Project Title: Solar District Cup 2024: University of Washington

Team Members: Ali Almusalli, Charles Contizano, Ornela Doris,  
Instructor: Bogdan Kozul  
Department: Mechanical Engineering

### Project Title: Parker-Hannifin Integrated Motion System

Team Members: Brandon Tsirlin, Erik Olree, Alexander Barron  
Advisor & Instructor: Bogdan Kozul  
Department: Mechanical Engineering

### Project Title: Raisin' Cranes

Team Members: Brandon Tsirlin, Erik Olree, Alexander Barron  
Instructor: William Atherton  
Department: Engineering Technology



## DESIGN TEAMS

### Project Title: 2024 AICHE Project - Methanation

#### Process Overview

Team Members: Seth Ayotte

Instructor: Chelsea Monty-Bromer

Department: Chemical & Biomedical Engineering

### Project Title: Fluid Power Vehicle Challenge

Team Members: Andrew Cook, Kaylee Baker, McKenzie Buttrey, Charles Farrington, Petar Golemovic, Sara Guerreiro

Instructor: Bogdan Kozul

Department: Mechanical Engineering

### Project Title: CSU Lab RFID Inventory

Team Members: Mohamed Masoud, Bryce Lanese, Joeseeph Kidd, Mohammed Alrasheedi, Carter Zeedyk

Advisor & Instructor: Ihab Wattar

Department: Electrical & Computer Engineering

### Project Title: IntelliGrow

Team Members: Divija Rajaraman, Karan Patel, Ryan Miles, Abyan Irfan

Advisor & Instructor: Toufik Aidja

Department: Engineering Technology

### Project Title: Interactive LED Museum Display

Team Members: Lillian Chan, Tyler Carr, Logan Kendall, Zachary Mosley

Instructor: Ihab Wattar

Department: Electrical & Computer Engineering

### Project Title: Construction Services Unlimited

Team Members: Michael Lung, Jared Day, Logan Sasse, Zach Hoover

Instructor: Kelly Marton

Department: Civil & Environmental Engineering

### Project Title: Airbag Jacket

Team Members: Mikhail Shulga, Mukhtar Shamea, Fadale Alhamdani, Joshua Heney

Instructor: William Atherton

Department: Engineering Technology

### Project Title: Weather Station

Team Members: Thomas Terry, Jonathon Andrus, Jacob Dorsey, Charles Reitz, Andrew Schelb

Instructor: Ihab Wattar

Department: Electrical & Computer Engineering

### Project Title: CSU Roommate Matching App - Roomer

Team Members: Aaditya Narayan, Tru Apicella, Nicholas Bun, Andrew Zetts

Instructor: Ihab Wattar

Department: Electrical & Computer Engineering

### Project Title: Flight Control of Quadcopter UAV

Team Members: Evan Hubbard, Luke Anderson, Aidan Cunningham, Jose Pacheco

Instructor: Ihab Wattar

Department: Electrical & Computer Engineering

### Project Title: City of Wooster North Street Parking Lot

Team Members: John Kushner, Ritcher Sia, Luis Balmori

Instructor: Kelly Marton

Department: Civil & Environmental Engineering

### Project Title: Mechanical Hand

Team Members: Jihan Taye, David Jasin, Joseph Costarella, Andrew Waldrop, Nathan DePaul

Instructor: William Atherton

Department: Engineering Technology

### Project Title: NASA Lunar Excavation Robot

Team Members: Eric McCallum, Ryan Nelson, Noah Stovall

Instructor: Toufik Aidja

Department: Engineering Technology

### Project Title: Spicer

Team Members: Rawan Almowallad, Jacob Kollar, Eric Matras

Advisor & Instructor: Toufik Aidja

Department: Engineering Technology

### Project Title: MOTOGO

Team Members: Matthew Cleary, Matthew Toldy, Sam Aina, Aaron Retych, Sarah Wile

Industry Advisor: Mike Sturdevant, Instructor: Toufik Aidja

Department: Engineering Technology

Industry Sponsor: Virtec Enterprises





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## Competitions

AICHE ChemE Car Competition  
ASCE Eastern Great Lakes Symposium  
ASCE Timber-Strong Design Build Competition  
BAJA ACEz  
ChemE Car  
FIERF FORGING COMPETITION  
Fluid Power Vehicle Challenge  
Ohio Contractors Association  
Solar District Cup 2024

## SENIOR DESIGN INSTRUCTORS

Toufik Aidja  
William Atherton  
Michael Gallagher  
Jorge Gatica  
Matthew Johnson  
Sanchita Mal-Sarkar  
Kelly Marton  
Chelsea Monty-Bromer  
Ihab Wattar

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Simon Richards  
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Abhi Siri  
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# SENIOR DESIGN



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