Jorge Castano

Engineer in Training (EIT) | Mechanical Engineer | Pittsburgh, PA | 407-879-1203 | jcastano@andrew.cmu.edu

EDUCATION

CARNEGIE MELLON UNIVERSITY
Bachelor of Science in Mechanical Engineering

PROJECTS

SMART BENCH PRESS FORM ANALYZER | Computer Vision Lead & Testing Coordinator | February 2025

- Collaborated with a multidisciplinary team to design and implement a real-time bench press form monitoring system, aimed at ensuring proper flat bench press lifting technique and reducing risk of injury.
- Led the development of a Python script using OpenCV to analyze barbell position during flat bench press, determining the angle of the barbell and whether or not the barbell remained within a 5 degree tolerance range parallel to the ground.
- Integrated electromyography (EMG) sensors to collect muscle activation data during proper repetitions, creating a reference dataset for future analysis and live personalized feedback for the user through use of a speaker.
- Processed raw EMG signals using Arduino by implementing real-time filtering, rectification, and smoothing algorithms to extract meaningful muscle activation data during bench press repetitions.

CONVOLUTIONAL NEURAL NETWORK FOR ADDITIVE MANUFACTURING | August 2024

- Developed a convolutional neural network (CNN) using PyTorch to analyze single-track laser powder bed fusion (LPBF) deposits of Inconel 718.
- Utilized ImageJ for preprocessing, including noise reduction, segmentation, and feature extraction.
- Designed and trained the model to identify melt pool widths, improving the accuracy of process monitoring and quality assessment.
- Results contributed to enhanced understanding of LPBF process dynamics and Lack of Fusion defect prediction in metal additive manufacturing.

ADAPTIVE CRUISE CONTROL SYSTEM PROTOTYPE | Embedded Systems Engineer | March 2024

- Programmed an Arduino using C++ to integrate an Ultrasonic Sound Sensor and LED lights to inform the user when there are objects approaching the sensor at speeds dangerous for the user.
- Designed and implemented an adaptive cruise control (ACC) system using an ultrasonic sensor, LED indicators, and an Arduino microcontroller.
- Developed real-time distance measurement algorithms to detect incoming obstacles and provide visual feedback with LED signals on proximity thresholds.

ADDITIONAL EXPERIENCE

DEADWOOD CUSTOM | Solidworks Technical Drafter & CNC Operator | February 2025 - Present

- Led design and development of detailed 3D models, technical drawings, and fabrication schematics for custom retail displays and fixtures using SolidWorks, ensuring adherence to client branding and functional requirements.
- Operated and programmed a CNC router using VCarve Pro to cut DXF 2D projections of 3D models to ensure dimensional accuracy.
- Optimized design for ready-to-use and customer-assembled-configurations through modular components to fit shipping containers or other space-constrained logistics - reducing freight cost and simplifying on-site installation.

CENTRE-CRAIG DISTRIBUTING COMPANY | Delivery Driver | February 2022 - January 2025

- Coordinated and executed the loading, transport, and delivery of palletized beer orders to restaurants and event centers, optimizing efficiency and ensuring on-time fulfillment.
- Worked closely with a team to plan and execute deliveries, developing strong teamwork, communication, and workflow optimization skills.
- Communicated with restaurant manager and event coordinators to confirm order accuracy and resolve logistical challenges, honing interpersonal and problem-solving skills applicable to engineering project management.

TECHNICAL SKILLS & CERTIFICATIONS

Engineering Software: SolidWorks, MATLAB, QBlade, ImageJ, VCarve Pro, LightBurn, Microsoft Office
Programming: Python, MATLAB, C++, Arduino, OpenCV, PyTorch