Jason Pettinato

jasondpett@gmail.com | github.com/jasonp02 | linkedin.com/in/jason-pettinato24/

University of Massachusetts Amherst | MS Mechanical Engineering, **GPA: 3.8**   **Expected February 2025**

Graduate Courses Feedback Control Systems, Numerical Methods, Intelligent Manufacturing, Industrial Automation, Predictive Analysis, Nonlinear Dynamics, Machine Learning, Robotic Control, Technical Project Management

Skills: MATLAB, Python, C++, Linux, PLC, SolidWorks, Microcontrollers, ROS, Machine Learning, Serial, CAN, Git, 3D Printing, Design, GD&T

Work Experience

Robotics Intern, rStream**,** Somerville MA   **June 2024 – August 2024**
- Collaborated on the design and assembly of a Mini-MRF trash sorting system, an autonomous mobile trash sorter.
- Engineered and fabricated a 95-gallon autonomous trash bin tipper using pulleys, winches, and hydraulics; conducted material strength analysis to support a load-bearing capacity of 175 lbs. at a height of 7', achieving a 15% reduction in material costs through optimized design.
- Designed rotation stabilization mechanisms and integrated counterbalance weights for the bin tipper in fusion 360, reducing tipping force requirements by 30% while improving operational stability
- Performed CNC milling, electrical wiring, power analysis, support fixture 3D printing, PLC programming, and server rack assembly, contributing to both mechanical and electrical aspects of the system.

Undergraduate Research, Intelligent Sensing Lab, UMass Amherst   **January 2023 – September 2024**
- Utilized ROS MoveIt with an RGB camera and robotic arm to perform manipulation on a set of objects.
- Integrated ORB3 with IMU for real-time robotic mapping and localization, for research in activity monitoring.
- Designed a graph-based attention neural network, achieving 85% accuracy in anomaly detection for childcare environments by integrating rgb, pose, and object data.

HVAC & PFP Intern, Jaros Baum & Bolles   **June 2023 - August 2023**
- Addressed piping and electrical conflicts using Revit, resolving major conflicts and optimizing layouts.
- Reduced piping usage by over 100 feet, saving several thousand dollars on a major project.
- Performed system sizing and contributed to gas regulator selection for a billion-dollar resort project.

Projects

Software Lead, NASA Lunabotics Competition   **November 2023 - May 2024**
- Led a team of engineering students to develop skills in Linux and using ROS for actuation and sensor communication within the robot.
- Collaborated on design and part selection of a lunar rock unloading system for transporting 10 lb. loads.
- Implemented A* pathfinding algorithm for motion planning in the competition.

Analysis Lead, Corn Monitoring Robot, Senior Capstone   **September 2023 – May 2024**
- Led the development of an autonomous corn monitoring system which collects video data for plant phenotyping.
- Designed control system in Python and C++; system used YOLO object detection for visual feedback
- Created a rotating base which provides a 360° view of the plant, adding robustness to data collection processes.
- Identified potential resonance behavior using FEA simulation in ANSYS, informing design decisions.

Design: Safety Braking Mechanism & Geartrain   **May 2023**
- Designed a shoe brake, with solenoids balancing springs during normal operation and triggering a near-instantaneous stop upon power failure; generated BOM and final report highlighting part selection.
- Designed a 12:1 spur geartrain using McMaster Carr parts, reducing the design space with a MATLAB script based on geometric constraints.

Jason Pettinato

jasondpett@gmail.com | github.com/jasonp02 | linkedin.com/in/jason-pettinato24/

ASTM Bone Screw   **November 2022**
- Used engineering design principles to create a pediatric bone screw based on existing standards & dimensions.
- Used static structural simulation in Ansys to determine deflection and stress for ramped loading condition.
- Tested the 3D printed part on an Instron machine to compare FEA results with real values, ensuring that the designed load-bearing capabilities were met.

Industrial Automation, Allen Bradley PLC, HMI Programming, P&ID   **October 2024 -November 2024**
- Lead a team in the automation of a concrete panel creation process, increasing production throughput by streamlining control logic and improving reliability.
- Programmed Allen Bradley PLCs with HMI to automate control of the panel creation process, using real-time data inputs to refine system performance. This included troubleshooting control logic and refining feedback loops.

SLAM: Traditional & Deep Network, Independent Project   **August 2024 – November 2024**
- Designed a hybrid SLAM system, integrating traditional algorithms with a neural network for loop closure detection, achieving performance comparable to ORB-SLAM3 using the *mav0* dataset.
- Enhanced trajectory estimation by implementing late fusion of IMU and RGB streams in PyTorch, improving robustness in low-texture and high-dynamics environments.

Intelligent Manufacturing, Anomaly Detection Projects   **February 2024**
- Analyzed a real-world manufacturing dataset of semiconductor etching processes using data cleaning, PCA dimensionality reduction, and statistical modeling in MATLAB to detect anomalies based on process information.
- Used KNN, GMM, and MLP NN to compare accuracy and time on anomaly detection in faulty drill bit data.

Manufacturing, Double-insulated wrenches, Group Project   **September 2022 – November 2022**
- Evaluated the materials, processes, throughput, quality, and cost of manufacturing double-insulated wrenches.
- Analyzed manufacturing challenges and recommended solutions in the form of different plastics, processes, and finishing techniques to improve product quality.
- Created executive summary to be presented with concise and clear goals of our process, including all potential changes or recommendations from the investigation.
-

Autonomous RC Car   **November 2022**
- Utilized Arduino microcontroller with electrical engineering design principles to create an autonomous car that detects objects in front of it, and avoids it by controlling the polarity of the RC motors for turning and driving.
- Created wiring diagram and logical functions of the circuit using H-bridges, TIP120 transistors, Arduino, and an existing RC car chassis.