Emil Jermann

215-941-2136 | emiljj2@illinois.edu

Education

University of Illinois at Urbana Champaign GPA: 3.9/4

B.S. in Computer Science & Statistics

Relevant Coursework: AI, Algorithms and Models of Computation, Data Structures, Numerical Methods, Linear Algebra, Differential Calculus, Statistical Modelling, Organismal and Evolutionary Biology

Technical Experience

CatchenLab at the University of Illinois Urbana-Champaign November 2024 — Present

Research Assistant *Urbana, IL*

- Designed and implemented a transformer model using **Pytorch** to perform synteny analysis on homologous chromosomes.

Sanders' Sustainable Systems Group at USC May 2024 — August 2024

Research Assistant *Los Angeles, CA*

- Designed and trained a multilayer perceptron model using **Pytorch** to calculate marginal emissions factors (MEF) with five input features and one output float *to study the effect of demand side solutions on CO2 emissions for the California electricity grid.*
- Evaluated model using **Matplotlib** and Scikit-learn by comparing the model's outputs to another model using R2 and mean absolute error and binning according to different input features to help understand patterns in the model's calculation of emissions.
- Conducted sensitivity analysis on an input feature to evaluate the ability to differentiate the output feature with respect to the same input feature.

Projects

Illinois Medlaunch Vision Swim | *C++, CV Algorithms, Data Manipulation, STL* September 2023 — May 2024

- Designed and built a computer-vision assistive device to improve pool lane navigation for visually impaired swimmers, *promoting inclusivity and accessibility in recreational fitness.*
- Wrote lane detection algorithm using **OpenCV** supported edge detection algorithms. Applied Canny Edge Detection with Hough Line Transform on still-frames with Gaussian Blur applied.
- Designed an algorithm to divide ESP32-CAM images into rectangular regions and analyze localized luminance patterns, storing luminance values paired with coordinate locations in STL maps for efficient data manipulation, thus enabling lane detection capabilities for a swimming pool.
- Implemented core language components like classes, inheritance, templates, and exception handling. Utilized **STL data structures** like arrays, maps, and pairs for organized data storage and retrieval.

Illini VEX Robotics Drone Project | *C++, Control Systems, Arduino* September 2023 — May 2024

- Led a team of 5 in developing the control systems for a drone.
- Developed sensor fusion for drone using **Kalman** filtering for accurate position estimation.
- Implemented **PID** control algorithms to stabilize and control drone flight characteristics including pitch, roll, yaw, and altitude.
- Programmed **Arduino** microcontroller to interface with motors, sensors, and radio control receiver using C++.

Skills & Interests

Languages: Python, C++, R, Java
Tools: PyTorch, Conda, Arduino, Git, RStudio, VS Code, Visual Studio, Fusion 360, Onshape CAD, CNC Operation
Skills: embedded systems, MLP Models, computer vision, data structures, object-oriented programming