Matthew Sivaprakasam

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Education

B.S. | Computer Engineering
University of Pittsburgh

- Expected graduation: April 2022
- Overall GPA: 3.76
- In-major GPA: 3.9
- Concentration: Autonomous Systems
- Minor: Biomedical Engineering

Skills

Programming Languages

Proficient

Python • Matlab • Java

Some Experience

C++ • HTML • MIPS Assembly

Development/Frameworks

PyTorch
OpenCV
Arduino
User-centered Design
ROS
Tensorflow
Agile/Scrum

Miscellaneous

Music Recording/Performance
Pro Tools
CPR certified

Coursework

Engineering

Computer Vision
Deep Learning & Machine Learning
Cyber-Physical Systems
Learning/Control of Movement
Signals and Systems Analysis
Linear Control Systems
Mechatronics
Art of Making (Design course)
Quant. Systems Neuroscience

Experience

AirLab, Carnegie Mellon University | Research Intern
Pittsburgh, PA | June 2020 - Present

- PI: Dr. Sebastian Scherer
- Improving standard path-planning and perception methods in off-road environments by incorporating learned models for tasks such as predicting obstacle-interactions, and semantic segmentation using multi-perspective features from fused lidar scans and rgb images
- Implementing autonomy software and algorithms for an all-terrain vehicle equipped with an extensive sensor payload, and testing them in off-road environments
- Designed planning framework on top of Hybrid A* and validated in simulation and on a physical platform
- Robotics Institute Summer Scholar 2021

M*Modal | Software Engineering Co-op
Pittsburgh, PA | May 2019 - December 2020

- Applied state-of-the-art NLP techniques towards enhancing clinical software
- Pre-trained a language model using a Reformer (more-efficient Transformer), and fine-tuned to predict diagnosis codes from large sets of clinical documents
- Developed a QA tool that generates text by incorporating various medical terms/concepts and checks that our service understands them in the right context

NSF-SHREC | Research Intern
Pittsburgh, PA | May 2020 - August 2020

- Worked on a project in Airsim that involves using reinforcement learning to teach a drone to locate and travel to specified objects in an unknown environment

Human Engineering Research Laboratories | Research Intern
Pittsburgh, PA | June 2018 - August 2020

- Processed and analyzed IMU data taken from wheelchair users to find new metrics for evaluating user performance

Projects

Indy Autonomous Challenge (ongoing)

- Motion Planning subteam co-lead - in charge of researching, implementing, and testing planning algorithms before integrating them into our stack
- Programming an autonomous racecar that will compete against other cars in a high-speed race on the Indianapolis Motor Speedway
- Competing as a member of the Pitt Robotics and Automation Society team, in collaboration with Massachusetts Institute of Technology

Person-tracking for Tello Drone

- Perception and high-level control system for drone to detect,track, and follow a person with onboard camera (demo visible at pitt.edu/~mjs299)
- Designed subject-visibility metrics based on keypoints on your body predicted using Google's Posenet
- Metrics are used in hand-designed error function, which is fed into PID controller to calculate motion commands along each axis

Publications/Presentations

TartanDrive: A Large-Scale Dataset for Learning Off-Road Dynamics Models

- Samuel Triest, **Matthew Sivaprakasam**, Sean Wang, Wenshan Wang, Aaron Johnson, Sebastian Scherer. *International Conference on Robotics and Automation, 2022*

Improving Off-road Planning Techniques with Learned Costs from Physical Interactions

- **Matthew Sivaprakasam**, Samuel Triest, Wenshan Wang, Peng Yin, Sebastian Scherer. *International Conference on Robotics and Automation, 2021*

Quantifying Electric Powered Wheelchair Users' Driving Skills Using An Inertial Measurement Unit

- **Matthew Sivaprakasam**, Deepan Kamaraj, Jorge Candiotti, Sandra Guzman, Brad Dicianno, Rory Cooper. *Biomedical Engineering Society Annual Conference Oct. 2019*