Terry Tao

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terrytao19.github.io/portfolio 🌐

Objective

Looking to continue my career by applying experience from Ford, MRacing and other projects. Seeking to further develop my practical knowledge with strong technical mentorship at an autonomy, controls, or AI focused internship opportunity during spring-summer 2024.

Experience

Ford Motor Company | ALLEN PARK, MI   MAY 2023 – AUGUST 2023
ADAS L3 Self Driving Summer Intern
- Developed a kinematics-based model to flag Duty of Care (safety envelope) violation events during L3 test drives – safety metric used to compare different driving policies
- Using MATLAB, Vector tools, and python, automated testing of ECU interface on HIL bench and in-vehicle, fixed issues related to CAN message packing, transmitting, gatewaying and receiving
- Automated data acquisition and post processing to compare CAN logs with RTK position and velocity on mule F150 and other vehicles with MATLAB, python scripts and OxTS software
- Learned about how large companies manage project timelines – agile, scrum

Education

University of Michigan | ANN ARBOR, MI   AUG 2022 – APRIL 2025
B.S. Robotics Engineering
AV - Controls with Disturbances, Applied SLAM, Human-Robot Systems, Pursuing sequential M.S. 2026

Projects and Activities

PORTFOLIO

YOUTUBE

GITHUB

Formula Electric Racing (MRacing) | Autonomous Director   SEPT 2022 - PRESENT
- Currently leading the development of the first ever autonomous car at MRacing, responsible for e-brakes, power steering, safety electronics / radio, controls, onboard perception + reasoning
- Coordinated with other subteams to ensure consistent or improved levels of functionality, serviceability, mass, and speed, while meeting design requirements specified by rules
- Using ROS, C++ and python, applied a RTK INS based mapping pipeline that fuses NMEA data with 3D cone position from stereo camera then estimates the midline from the track map
- Trained a custom YOLO object model for traffic cone detection and perspective mapping
- Managed sponsorships from autonomy focused companies for hardware components
- Oversaw acquisition of over $30,000 worth of sensor / computer hardware from sponsors

Ground Effect Plane Controls | Class Project   2023-PRESENT
- Used MATLAB and Simulink to create a 6DOF EOM solver with additional ground effect dynamics
- Designed decoupled altitude, airspeed, and heading controllers, tuned nested PID controllers
- Applied waypoint following, result is a plane capable of navigating any set of waypoints in order, at a setpoint altitude of 5m above water under reasonable wave and wind disturbances

SLAM Robot| Class Project   2023-PRESENT
- Tuned wheel velocity PID and trajectory following PID, applied differential drive wheel odometry
- Applied action model state estimator, LiDAR occupancy grid mapping, particle filter for fusing
- Applied A* path planning and frontier exploration to automatically map new environments

Stewart Platform | Personal Project   2021
- Developed kinematics and dynamics control model on microcontroller – embedded C
- Applied IMU lateral acceleration dampening and angular setpoint following on end effector

FIRST Robotics (FTC) | Team President   2018-2022
- Used Java to program a triple dead-wheel odometry localizer to perform manipulation tasks fully autonomously and optimized pose trajectories, state machine-based proprioception
- Iteratively Designed mechanisms in Fusion and Solidworks to manipulate small plastic objects

Skills

Programming:
Java | Python | C++ | OpenCV | ROS | Julia | Git | MATLAB | Pytorch | R | Simulink | LaTeX | Eigen
Software:
Solidworks | Siemens NX | Fusion 360 | Kernel | YOLO | Jetson OS | Canalyzer | Ubuntu
Communication:
CAN | I^{2}C | SPI | UART | RTK GNSS (RTCM) | UDP | SSH
Fabrication / Other:
Fiber laser |CO2 laser | Waterjet | GTAW | FDM | Wire harnessing | Camera-Lidar extrinsic calibration