Jingyun Ning

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Education

University of Virginia — Charlottesville, VA
PhD. in Computer Engineering, GPA: 3.8/4.0 — Expected Dec. 2024

University of Virginia — Charlottesville, VA
M.Eng. in Computer Engineering, GPA: 3.5/4.0 — Jan.2016-Dec.2017

Shanghai University of Engineering Science — Shanghai, China
B.Eng. in Automation (Automobile Electronic Engineering) GPA 3.5/4.0 — Sep.2011-Jul.2015

Research Experience

Capstone research project, University of Virginia — Mar. 2018 - Aug. 2018

- Established an autonomous driving environment using Airsim and Unreal Engine.
- Generated hours of driving imagery for dataset collection and preprocessing.
- Constructed an end-to-end deep learning architecture utilizing AlexNet.

Member of team-dMIST, University of Virginia — Oct. 2018 - Aug. 2020

- Collaborated with two principal investigators on a stormwater management study.
- Built two stormwater systems using the SWMM (Storm Water Management Model) simulator.
- Designed four different rule-based control strategies.
- Implemented a data-driven Model Predictive Control (MPC) for real-time stormwater management.

Leader of team-Vehicle Dynamics & Control, Cavalier Autonomous Racing — Jun. 2020 - present

- Studied the vehicle dynamics for various types of vehicles and racecars
- Built and refined multiple vehicle models for a full-sized Indy racecar.
- Implemented a pure-pursuit control algorithm on the racecar.
- Implemented Model Predictive Control (MPC) on a bicycle model for real-time dynamic control of the racecar.
- Participated in multiple Indy Autonomous Challenge (IAC) events at racetracks across the United States.

Autonomous Racing Competitions

Indy Autonomous Challenge at Indianapolis Motor Speedway — Oct. 23, 2021

- Achieved the status of the fastest American team in the competition.
- Implemented a pure pursuit control algorithm on the AV-21 autonomous racecar.
- Achieved an average lap speed of 126 mph.

Indy Autonomous Challenge at CES 2024 — Jan. 6, 2024

- Won 2nd place in the CES 2024 competition.
- Qualified in 1st place and became the top-seeded contender.
- Applied a Model Predictive Control (MPC) algorithm based on a single-track vehicle model.
- Executed multiple high-speed autonomous overtakes at speeds up to 143 mph.

Indy Autonomous Challenge at Indianapolis Motor Speedway — Sept. 6, 2024

- Won the time trial competition with a lap time of 52.628 seconds.
- Achieved an average speed of 171.012 mph and experienced 2.25 lateral Gs.
- Set a new world record for autonomous racing speed on a racetrack with a top speed of 184 mph.

Publications and Presentations

- Ning, J., Bowes, B. D., Goodall, J. L., & Behl, M. (2022, June). Data-Driven Model Predictive Control For Real-Time Stormwater Management. In 2022 American Control Conference (ACC) (pp. 1438-1443). IEEE.
- Ning, J., & Behl, M. (2023). Vehicle Dynamics Modeling for Autonomous Racing Using Gaussian Processes. arXiv preprint arXiv:2306.03405.
- Ning, J., & Behl, M. (2023, August). Scalable Deep Kernel Gaussian Process for Vehicle Dynamics in Autonomous Racing. In 7th Annual Conference on Robot Learning.

- Chrosniak, T., & Ning, J., & Behl, M. (2024) Deep Dynamics: Vehicle Dynamics Modeling with a Physics-Constrained Neural Network for Autonomous Racing. IEEE Robotics and Automation Letters
- Ning, J., & Behl, M. (2024). Gaussian Processes for Vehicle Dynamics Learning in Autonomous Racing. SAE International Journal of Vehicle Dynamics, Stability, and NVH, 8(10-08-03-0019).
- Presented at American Control Conference (ACC), Atlanta, US, 2022.
- Presented at Conference on Robot Learning (CoRL), Atlanta, US, 2023.

Teaching Experience

Teaching Assistant, F1Tenth Autonomous Racing, University of Virginia 2021 & 2022

- Prepared ten F1Tenth racecars for student groups, ensuring readiness for practical learning experiences.
- Maintained and optimized the F1Tenth racecars throughout the semester, addressing both software and hardware aspects.
- Conducted office hours and managed grading responsibilities.
- Received the Outstanding Graduate Teaching Award.

Skills

Technical Skills: Python, ROS & ROS2, PyTorch, C++, MatLab, Docker
Soft Skills: Problem Solving, Communication, Leadership, Time Management, Team Collaboration.