Weizhuo (Ken) Wang

600 Sharon Park Dr., Menlo Park, CA 94025 | 217-305-1720 | weizhuo2@stanford.edu

EDUCATION

Stanford University, *Stanford CA*   *GPA: **4.02**/4.00*
PhD Candidate, Robotics   *Sep. 2022 – Dec. 2025 (Expected)*
Co-advised by: C. Karen Liu (CS), Monroe Kennedy III (ME)
Master of Science, Aeronautics & Astronautics - Robotics and Autonomy Track   *Sep. 2020 – Jun. 2022*
Relevant Coursework: AA 274A/B Principles of Robot Autonomy, AA 228 Decision Making Under Uncertainty, CS 330 Deep Multi-task Meta Learning, AA 277 Multi-robot Control, CS 224N Natural Language Processing, ME 227 Vehicle Dynamics & Control, ENGR 105&205 Feedback Control, EE 256 Board Level Design

University of Illinois at Urbana-Champaign, *Urbana-Champaign*   *Aug. 2016 – May. 2020*
Bachelor of Science, Aerospace Engineering with minor in Computer Science   *GPA: **4.00**/4.00*
Bronze Tablet Award (Highest Honor), AIAA Scholastic Achievement Award, 1st place in AIAA Aircraft Design Competition, Edmund James Scholar, Harvey Jordan Award 2020 nominated, Tau Beta Pi Invited

SELECTED RESEARCH EXPERIENCE

Scaled Humanoid (Name TBD), *Stanford TML (CS)*   *Dec. 2023 – Present*
Isaac Gym, Reinforcement Learning, OnShape, Jetson Orin NX
-      Designing a 1:4 scaled open source humanoid robot to facilitate real world locomotion learning

Multi-Modal trajectory prediction, *Stanford ARMLab, TML (CS)*   *Apr. 2023 - Present*
Pytorch Lightning, Diffusion Model, DINOv2, Mask2Former, C++
-      Built a diffusion model to estimate modes of future trajectories based on multi-multimodal past.
-      Proposed a hybrid generation scheme to speed up diffusion generation to near real time.
-      Investigated if adding semantic segmentation (from DINOv2 + M2F) latent would improve variance and constraint enforcement in trajectory generation.
-      Lead a team in mobile deployment of real-time trajectory prediction and semantic segmentation aiming to benefit population with various disabilities.
-      Lead a team in extracting human pose from video-in-the-wild (e.g., YouTube) to validate sway covariance metric proposed in previous work.

Scaled Autonomous Vehicle Test Platform, *Stanford ARMLab*   *June. 2023 – Sep. 2023*
ROS, Jetson Orin Nano, VESC, ODrive, Motive Mocap, Pure Pursuit Controller, Foxglove Studio, Embedded System
-      Designed a versatile testing platform with capabilities including: onboard model inference, teleoperating, trajectory following, telemetry, low latency video streaming, and motion capture localization.
-      The platform will serve as a foundation for various projects in the lab such as: leveraging human intent for autonomous driving handover risk minimization and XR driving data collection.

SmartBelt Fall Prevention System, *Stanford ARMLab, TML (CS)*   *Apr. 2021 – Dec. 2022*
ROS, C++, Python, Javascript, CircuitPython, PyTorch, CVAE, LSTM, I2C, SLAM, VIO, IMU
-      Created ROS based solution to take in multiple IMU streams and depth perception, provide real time localization, and conduct trajectory and sway quantification with VAE-LSTM model.

SELECTED PROJECTS (Personal + Course)

Vehicle Controller VW Golf Tested, *Stanford*   *Mar. 2021 - May 2021*
    Implemented and compared the performance between LQR and lookahead controller in both simulation and real vehicle in the parking lot.

Multi-Agent Game Theoretic Planner, *Stanford*   *Jan. 2021 - Mar. 2021*
    Implemented and compared iterative-best response Nash equilibrium solver with ALGAMES trajectory optimization solver in multi-agent racing environment.

Meta Learning for Robust Out-of-domain Question Answering, *Stanford*   *Jan. 2021 - Mar. 2021*
    Investigated the effectiveness of various meta learning techniques on out-of-domain question answering task.

Autonomous Shopping Robot, *Stanford*   *Sep. 2020 - Nov. 2020*
    Used Turtlebot with LiDAR and camera to explore unknown environment and retrieve items on demand. Implemented various SLAM/localization and vision algorithms such as particle filter, EKF, UKF.

AlphaGomoku, Reinforcement Learning Based Gomoku AI, *Stanford*   *Oct. 2020 – Nov. 2020*
    Implemented and compared Actor-Critic, Monte Carlo Tree Search (MCTS), and AlphaZero on tackling the

Gomoku task. Was able to beat the baseline AI consistently after merely a few hours of self-play training.

Race Line Calculator, Stanford   *Aug. 2020 – Nov. 2021*

Gradient based optimizer that would find the fastest route around the racetrack based on vehicle dynamics simulation and track layout

Race Bike Onboard Electronics Kit, Urbana   *Oct. 2019 – Apr. 2020*

Developed embedded hardware package with dash that would display crucial performance metrics and log vehicle dynamics for pit analysis. Relied on IMU and GPS-RTK for accurate measurements.

SKILLS&PAST ENPERIENCES

Programming Languages: Python, C/C++, MATLAB, Simulink, LaTeX, Bash, CMake, Arduino, CircuitPython, URDF, Fortran, R, JavaScript, HTML

Tools & Professional Software:

CAD, Modeling: Siemens NX, Altium, KiCAD, Cura, 3D printing, Keyshot, Blender

Programming: GitHub, Visual Studio, Google Cloud/AWS/Azure, Linux

Robotics: ROS, Teleoperation, Gazebo, PyTorch, TensorFlow, OptiTrack Motive, OpenAI Gym, PointCloud Library (PCL), Custom PCB designing

Other: PETSc, PyGame, PyBullet, Tecplot, LabVIEW, Photoshop, After Effect, Premiere

Skills: Fabrication/machine-shop skills, 3D printing, Student private pilot, Advanced Track Rider, Mandarin

ML/AI/CV:

Models: Diffusion Model, Transformer, Foundation Models, CVAE,

Tools: Pytorch Lightning, SLURM, LibRealsense, OpenCV, Tensorboard, WandB

Experiences: Representation Learning, Distributed training, Model finetuning, Semantic segmentation, Panoramic scene reconstruction, Scene understanding, RGBD perception

HONORS

AIAA Aircraft Design Competition 2020 1ˢᵗ place (Team Mustang), Urbana	*Aug. 2020*
The Bronze Tablet (University Highest Honor), Urbana	*Apr. 2020*
AIAA Scholastic Achievement Award, Urbana	*May. 2020*
Edmund James Scholar Honors Program, Urbana	*2017 - 2020*
Dean's List, Urbana	*2016 – 2020*

PUBLICATION

Trajectory and sway prediction towards fall prevention   *ICRA 2023*

Weizhuo Wang, Michael Raitor, Steve Collins, C. Karen Liu, Monroe Kennedy III

TEACHING EXPERIENCE

ENGR 15 Dynamics   *Autumn 2023*