Huang, Hejun

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Education

M.Sc. in Aerospace, University of Michigan (Aerospace Department Fellowship) 08/2022 - 12/2023

M.Sc. in Mechanical, The Chinese University of Hong Kong 08/2019 - 12/2020

B.E. in Mechatronics, North China Electric Power University 08/2015 - 06/2019

Work Experience

Machine Learning Engineer at **Baidu USA** 05/2024 - current

Multimodal Agent Collaborations for Video Generation **Demo** Sunnyvale, California

- Developed a text2video generation pipeline that uses LLM for computer graphics software (CGS) call (e.g., Blender) with vision-based LLM feedback correction, using Open AI APIs and open-source LLMs (e.g., Llama3).
- Employed multimodal prompts to direct the LLM in extracting context from CGS documentation to enhance content.
- Fine-tuned Llama3 with Retrieval-Augmented Generation (RAG) to enhance video generation intelligence, achieving a Fréchet Video Distance (FVD) of **1.3** relative to the demo in PixelDance.

Research Software Engineer at **Robotics and Autonomous Driving Lab, Baidu USA** 01/2024 - 04/2024

Autonomous Cement Truck Development and Performance Optimization Sunnyvale, California

- Developed planning, control and calibration modules for both open and closed-loop deployments using **92GB** data.
- Increased simulation fidelity by **42%** in the Waymax simulator using Jax and reinforcement learning (e.g., SAC).
- Improved cement truck's control model accuracy to **97%**, leveraged it for lateral (LQR) and longitudinal (Double-PID) controllers testing during lane keeping, turning and parking maneuvers.
- Reduced vehicle control calibration time by **80%** by optimizing DNN, leading to the drafting of **2** patents.

Research Assistant at **University of Michigan** 08/2022 - 07/2023

Advancing Human-Robot Interaction: From Stationary to Humanoid Robots Ann Arbor, Michigan

- Designed a **healthcare robot** with cable-driven manipulators and a **restaurant robot** for assembling hot dogs, using Autodesk Inventor to do 3D modeling and stress analysis on critical joints.
- Implemented an end-to-end planning module for humanoid robots, integrating sophisticated trajectory planning algorithms and footstep optimization to efficiently address gait locomotion challenges under non-convex constraints.

Research Associate at **The Chinese University of Hong Kong** 09/2020 - 06/2022

Educational Platform Development Hong Kong SAR

- Built an E-learning platform, recognized with **2** rewards at **Expo 2021**, supporting **30** faculty and **120** teaching assistants annually, utilizing GCP, Maven, Spring Boot and MyBatis in an MVC framework.
- Conducted **over 60** SQL tests and **10** unit tests using Spring Data JPA to enhance database reliability and security.
- Finished UI/UX design and testing for web interfaces using HTML5, CSS3, and JavaScript with the FreeMarker template engine to enhance user interaction and accessibility.

Skillset

Development Languages: Java, C++, Python, SQL, MATLAB, Javascript, HTML5, CSS3

Software and Tools: Linux, Git, Docker, Conda, Kubernetes, Kafka, Slurm, Protobuf, Jax, Tensorflow, Pytorch, HuggingFace, TensorRT, Gurobi, Mosek, Latex, Blender, Autodesk Inventor, CI/CD

Frameworks: SprintBoot, MyBatis, Maven, React, Apollo, ROS2, Waymax, GCP, CUDA, YOLOv8

Publication

[1] **Huang, H.**, et al.. (2023) Remote Identification Trajectory Coverage in Urban Air Mobility Applications. in *Proceedings of Air Traffic Management R&D Seminar*.

[2] **Huang, H.**, et al.. (2022) Barrier Certified Safety Learning Control: When Sum-of-Squares Programming Meets Reinforcement Learning. in *Proceedings of Conference on Control Technology and Applications*.

[3] Han, D. & **Huang, H.**. (2022) Sum-of-Squares Program and Safe Learning On Maximizing the Region of Attraction of Partially Unknown Systems. in *Proceedings of Asian Control Conference*.