Research and Professional Experience

Ju Lin, December 2024

Academic Background

> Education

- **The Hong Kong Polytechnic University**
  - BEng (Hons) Aviation Engineering / Minor in Electronics & Information Engineering
  - Current GPA: 3.34 / 4 (Ranking: top 17%)
  - IELTS: Band 8
  - Selected Courses:
    - Computer Programming – A
    - Mathematics II (including advanced vector calculus, Taylor's expansion, Fourier series expansion, PDE) – A-
    - Fundamentals of Electrical and Electronic Engineering – A-
    - Fundamentals of Materials Science and Engineering – A
    - Guidance and Navigation – A-
    - Safety, Reliability and Compliance – A
    - Dynamic System and Control – B+
    - Flight Mechanics and Control System – B+

> Language: Fully proficient in English, Mandarin Chinese, Cantonese, and Teochew

Academic Background

> Research Experience

- **Research and Development of AI-aided GNSS Software Receiver**
  - Supervisor: Dr. Li-ta Hsu, and Dr. Guohao Zhang
  - Time: Sept. 2022 – Sept. 2023
  - Affiliation: Intelligent Positioning and Navigation Laboratory, PolyU
  - Description: An individual research project that integrated Machine Learning to regress the raw GNSS data obtained from software defined receiver, in order to detect, predict, and mitigate the multipath effect
  - Skills: Matlab, Signal Processing, Machine Learning, Guidance and Navigation
  - Grant: HK$ 30,000

Academic Background

> Research Experience

- **Computer Vision-based Search & Rescue Platform Development**
  - Affiliation: LifeSparrow Solutions Limited
  - Time: Mar. 2024 – Aug. 2024
  - Description: I helped train the YOLO and Transformer model, revamped the SparAI UI, and realized the live detection function using Nvidia DeepStream SDK. I am currently helping them doing some POC projects, including HKIA cargo operation safety detection.
  - Skills: Python, Computer Vision, Transformer, UI/UX, and Telegram API
  - **Output:** SparAI platfrom, and realization of livestreaming feature

Academic Background

> Research Experience

- **Automated Data Standardization for Seamless Positioning using Large Language Models**
  - Supervisor: Dr. Li-ta Hsu
  - Time: Mar. 2024 – Present
  - Affiliation: Intelligent Positioning and Navigation Laboratory, PolyU
  - Duties: I came up with the idea of this innovative integration of LLMs and positioning, and crafted most of the logic, experiments, algorithm, fusion, training dataset, model training, and testing. The funding came from another PhD candidate so I can't be the first author:(
  - Skills: Python, Matlab, Sensor Fusion, Computer Vision, Feature Matching, LLMs, NLP, and ROS
  - **Output:**
    - IPIN 2024 (2nd author, presenter)
    - IEEE IoT-J (2nd author, under review)
    - Patent (2nd inventor, to be filed by PolyU)

Academic Background

> Research Experience

- **Study of Pressure Drops and Discharge Coefficients in Horticultural Crops**
  - Supervisor: Prof. Michel De Paepe, and Dr. Wito Plas
  - Time: Jul. 2024 – Aug. 2024
  - Affiliation: Research Group Applied Thermodynamics & Heat Transfer, Ghent University
  - Skills: Thermodynamics, Flow Analysis,
  - Description: This is a more thermodynamics-related project, in which I performed multiple experiments on a two-phase injection compressor test bench, collected and analyzed data with different crops to validate the accuracy of a CFD model in Ansys Fluent.

Academic Background

> Research Experience

- **Sensor Fusion Platform Building and Dynamic Sensor Weighting with Multimodal LLMs**
  - Supervisor: Dr. Li-ta Hsu
  - Time: Sept. 2024 – Present
  - Affiliation: Intelligent Positioning and Navigation Laboratory, PolyU
  - Duties: This is a capstone project partnered with other two UG students. We are attempting to manipulate the multimodality of LLMs to aid fusion algorithms. Our baseline are EKF and FGO. I am leading the whole project and in charge of everything.
  - Languages: Python, Matlab
  - **Output:**
    - IEEE/ION PLANS 2025 (1st author, accepted)

Academic Background

> Research Experience

- **Low-Cost Indoor Smartphone Camera Localization Using Spherical Panorama and BIM**
  - Supervisor: Dr. Li-ta Hsu
  - Affiliation: Intelligent Positioning and Navigation Laboratory, PolyU
  - Time: Sept. 2024 – Present
  - Description: This is a pretty innovative research where we implemented novel computational science tools, including Depth Everything from CVPR 2024 for panorama segmentation and other feature matching tools from CV, to boost positioning accuracy.
  - Languages: Python
  - **Output:**
    - IEEE Sensors Journal (2nd author, under review)

Academic Background

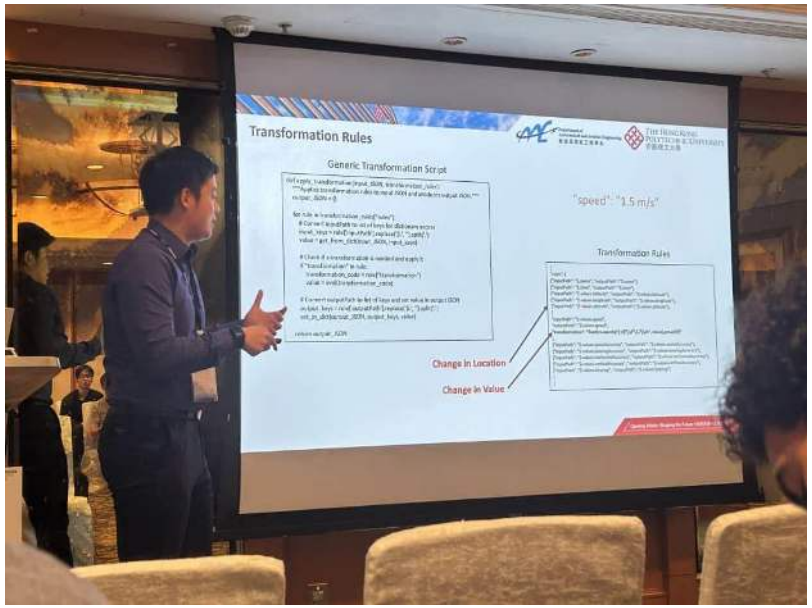
> Research Experience

- **Drone and Sensor Data Integration with Machine Learning Models for Enhanced Positioning Analysis**
  - Supervisor: Dr. Li-ta Hsu
  - Affiliation: Intelligent Positioning and Navigation Laboratory, PolyU
  - Time: Dec. 2024 – Present
  - Description: This is a research internship where I collected and pre-processed raw data from various positioning sensors and drones, ensuring data quality for analysis and modeling. I worked closely with the research team to develop and train machine learning models, leveraging data to identify meaningful patterns, trends, and insights.
  - Skills: Python, ROS, Robotics, Machine Learning, and Sensor Fusion

Academic Background

> Research Experience

- There are also some other projects in UAV modeling and simulation, visual odometry, LiDAR, SLAM, path planning, auto car development (C, ROS), android development (JAVA)
- I am also working on some POC / Entrepreneurship ideas, which requires working on stereo cam, rosbag, raspberry pi…



> **Testimonial**

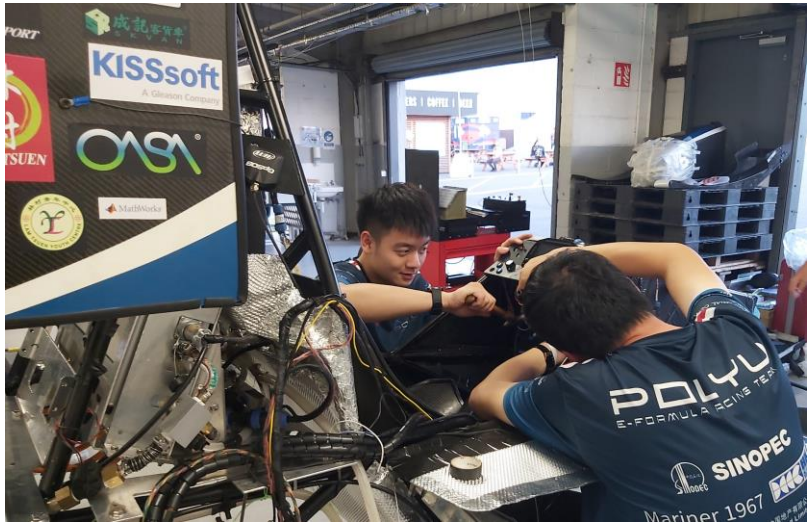
- I am a super passionate and ambitious person. And I am really into integrating novel computational science into the solutions of engineering problems. I believe my background in guidance and navigation, visual-based navigation, drones, robotics, and control system can be helpful in your group!

Extracurricular Activities

> **Formula Student Racing**
  - Deputy Director, Powertrain Lead, and Driver of PolyU E-Formula Racing Team
  - PIC of powertrain system
  - Participated in the Formula Student 2023 (Silverstone, UK), and Formula Student Electric China 2023 (Hefei, China)
  - Skills: Mechanical Design & Modeling (SolidWorks, AutoCAD, ANSYS), Drivetrain Design (Optimum Lap, KISSsoft…)

> **Volunteering**
  - Service in Hong Kong, Hainan (China), and Tanga (Tanzania)
  - Gender equality studies during pandemic

> **Athletic Background**
  - Tennis youth athlete since 11 (retired before college)
  - University's basketball team (small forward, only for 2 months)



Professional Exposure

> **Low Altitude Economy**
- Co-founded **EVTOLASIA**, the first Asian eVTOL newsletter
- Media invitation to UAS EXPO 2024, Shenzhen eVTOL Expo 2024

> **World Artificial Intelligence Conference 2024**
- Attended as exhibitor
- Showcased our AI S&R product

> **ETTE Symposium 2025**
- Nominated as Student Panelist