Kevin Ta

Software Developer · Robotics · Mechatronics

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Skills

Programming Python, Rust, C, C++, C#, MATLAB, ROS

Robotics computer vision, calibration, SLAM, probabilistic robotics, dynamic programming, machine learning, NeRFs

Mechatronics lidar, radar, event cameras, RGB cameras, IR cameras, systems modelling, thermal modelling, mechanical design, CAD

Experience

Waabi
Toronto, Canada

Intermediate Software Developer — *Jan. 2023 - Present*

- Enabled end-to-end calibration of an automotive sensor suite in unstructured environments using multi-modality unified `NeRFs`.
- Automated workflows using `AWS`-managed `Airflow` for in-field sensor geometric calibration validation and regression benchmarking.
- Implemented fine-grained lidar firing filtering in `Rust` to reduce the incidence of multi-path and self-intersecting points, improving localization and perception performance.

ETH Zürich Computer Vision Lab
Zürich, Switzerland

Master Thesis — *May 2022 - Nov. 2022*

- Researched the modelling of aleatoric uncertainty with shallow `MLPs` to aid localization and reconstruction performance of a `NeRF`-based pipeline built in `pytorch`, improving performance on challenging benchmarks.
- Fully calibrated a perception sensor stack featuring a state-of-the-art event-based camera, a traditional frame-based camera, a MEMS LiDAR, and a spinning RADAR using `OpenCV`, `Open3D`, `Scipy-Optimize`, and custom-built algorithms, enabling data collection in adverse conditions.

Cruise
San Francisco, California

Sensor Calibration Intern — *Sep. 2021 - Feb. 2022*

- Investigated the impact of calibration target quality on camera intrinsic calibration using `OpenCV` and a programmable robotics manipulator for repeatable performance studies showcasing a 50% reduced noise in reprojection metrics with metrology-grade targets.
- Communicated calibration station hardware recommendations (RGB cameras, LWIR cameras, and time-of-flight cameras) with clear evidence-based figures generated using `Matplotlib` to internal sales, manufacturing, and hardware teams, as well as external international vendors.

ETH Zürich Neural Control of Movement Lab
Zürich, Switzerland

Research Assistant — *Oct. 2020 - Jul. 2021*

- Implemented a real-time computer vision pipeline to estimate pupil size from RGB and infrared images using `RANSAC`-based feature extraction and ellipse fitting, achieving pupil size fits within one pixel standard deviation.

UBC Collaborative Advanced Robotics and Intelligent Systems Lab
Vancouver, Canada

Mechatronics Research Assistant — *May 2019 - Aug. 2019*

- Wrote custom client-server `TCP/IP` communication framework in `C++` and `Python` to stream kinematic IMU data at a fixed frequency and to continuous process wheelchair states for collaborative co-control.

Schneider Electric Solar
Burnaby, Canada

Solar Predictive Analytics and Modelling Intern — *Jan. 2018 - Aug. 2018*

- Created more realistic climate and temperature models by integrating a higher resolution geospatial map hosted in an on-premise `PostgreSQL` database, enabling more accurate reliability forecasting on coastal and mountainous installation sites.
- Ported `MATLAB` reliability simulation code to `Python`, leveraging `Numpy` and `Scipy` for fast matrix and array-based operations.

Publications

Kevin Ta*, Erik Sandström*, Luc Van Gool, and Martin R. Oswald, "UncLe-SLAM: Uncertainty Learning for Dense Neural SLAM," IEEE/CVF International Conference on Computer Vision Workshops (ICCVW), 2023.

Kevin Ta, David Brueggemann, Tim Brödermann, Christos Sakaridis, and Luc Van Gool, "L2E: Lasers to Events for 6-DoF Extrinsic Calibration of Lidars and Event Cameras," IEEE International Conference on Robotics and Automation (ICRA), 2023.

Education

ETH Zürich (Swiss Federal Institute of Technology)
Zürich, Switzerland

M.Sc. in Robotics, Systems, and Control — *Sep. 2020 - Dec. 2022*

UBC (University of British Columbia)
Vancouver, Canada

B.A.Sc. in Mechanical Engineering, Mechatronics Specialization — *Sep. 2014 - May 2020*