# ZHEKAI (ZACK) JIN

(929) · 354 · 6799 ⊙ zhekai.jin24@gmail.com ⊙ zhekaijin.github.io ⊙ New York, NY

## EMPLOYMENT EXPERIENCE

**Motional AD, Inc** Pittsburgh, PA

Software Engineer II - Localization & Mapping July. 2021 - Present

- Rescued the localization system from critical edge case failures by devising and implementing a state-of-the-art feature-based downsampling algorithm. Effectively tackled noise and outliers that were previously causing localization failures in challenging scenarios. The successful integration of the algorithm resulted in a remarkable 20% latency improvement for scan matching efficiency.
- Led a dynamic two-person team in the design and development of an offline pose optimization pipeline using GTSAM, enabling comprehensive accuracy verification for localization. This automated pipeline facilitated daily drivelog analysis, enabling precise performance benchmarking and ensuring the quality of code submissions without compromising performance.
- Crafted a robust non-linear step solver for the Iterative Closest Point (ICP) algorithm, significantly enhancing online task execution. This strategic implementation contributed directly to the system's ability to tackle real-time localization challenges effectively.
- Enriched the localization process by seamlessly integrating both online and offline metrics and delivering interactive visualizations. The unique combination of metrics, including pioneering industry-firsts, empowered the team with exceptional localization health monitoring and facilitated continuous performance benchmarking to allow data-driven decision-making.

## INTERNSHIPS

**Uber Advanced Technologies Group(ATG)** Pittsburgh, PA

Localization Software Engineering Intern - Mapping Jun. - Aug. 2020

- Worked at the Localization team on evaluating the output of ATG's offline pose estimation system
- Pioneered the industry's first objective metric for evaluating localized pose estimates independently of an HD map or ground truth, which sets a new standard for localization evaluation in the field.
- Composed a lightweight SLAM verification pipeline which achieved a 98% classifying accuracy on a customized dataset and could easily accommodate other objective metrics for performance feedback

**Ridecell, Inc.** Pittsburgh, PA

Capstone Project Lead - Learning To Drive with Reinforcement Learning Sept. 2019 - Sept. 2021

- Developed a comprehensive simulation pipeline using CARLA, integrating robust self-driving agents with high-fidelity modules for complex scenarios such as lane changing and intersection negotiation.
- Utilized DDQN, a reinforcement learning algorithm to model and fine-tune autonomous agent behaviors across various driving scenarios, demonstrating a high performance to 83% success rate

**Biorobotics Lab, Carnegie Mellon University** Pittsburgh, PA

Research Assistant - 3D Perception Team May - Sept. 2019

- Spearheaded the development of a robust Lidar inertial SLAM framework, specifically the industry's first to tackle Lidar with non-repetitive scanning patterns.

**Momenta.ai** Beijing, China

Research & Development Intern - Lidar Perception May - Aug. 2018

- Devised efficient Ground Detection & Semantic Road Segmentation algorithms with 98% precision
- Refactored Object Segmentation Modules with 20% memory usage drop by specialized data structures
- Designed and implemented a robust Real-Time Object Tracking pipeline which is able to track even sparse point clouds based on 3D Interpolation, now deployed at Momenta's L4 self-driving solution

## EDUCATION

**Carnegie Mellon University - School of Computer Science** Pittsburgh, PA

M.S. in Robotic Systems Development | GPA: 4.00/4.33 May 2021

**The Cooper Union for the Advancement of Science and Art** New York, NY

B.Eng, Major in Electrical Engineering, Minor in Computer Science | GPA: 3.69/4.00 May 2019

**Courses related** Geometry for Vision, Computer Vision, Robot Autonomy, Intro to Deep Learning

## SKILLS

**Languages** *Proficient in* : C++, Java, Python *Familiar with* : C, SQL, Matlab, Shell Scripting

**Technology** OpenGL, OpenCV, GTSAM, Ceres, PyTorch, PCL, ROS, AWS RDS/Lambda/EC2/S3