

# KHIEM VUONG

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<https://www.khiemvuong.com>

## EDUCATION

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### The Robotics Institute, Carnegie Mellon University

M.S. in Robotics (research-based)

Advisor: Srinivasa Narasimhan

September 2021 - Present

GPA: 4.17/4.3

### University of Minnesota, Twin Cities

B.S. in Computer Science (with high distinction)

Advisors: Stergios I. Roumeliotis & Hyun Soo Park

August 2017 - May 2021

GPA (within major): 4.0/4.0

## WORK EXPERIENCE

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### CMU Illumination and Imaging Laboratory

Research Assistant - Advisor: Srinivasa Narasimhan

October 2021 - Present

Pittsburgh, PA

- Currently working on discovering and resolving anomalies in smart cities using data from intersection-installed cameras. Smart Cities project: <http://platformpgh.cs.cmu.edu>
- Developing a novel generic framework for joint 2D/3D detection and tracking of rigid objects (e.g., vehicles) to reconstruct 3D dynamic activities from longitudinal (long-term) repetitious data.

### UMN Multiple Autonomous Robotic Systems Lab

Research Assistant - Advisors: Stergios I. Roumeliotis and Hyun Soo Park

September 2019 - May 2021

Minneapolis, MN

- Robust Surface Normal Estimation: Developed a novel technique (spatial rectifier) to improve surface normal estimation for *out-of-distribution* body/robot-mounted testing images and its extension to a more general model (multimodal spatial rectifier). Publications: [C1], [C4].
- 3D Scene Reconstruction: Developed a robust end-to-end visual-inertial perception system that performs localization and mapping with novel dense depth and surface normal estimation modules accompanied by uncertainties estimation from RGB image sequences. Publications: [C2], [C3].
- Egocentric scene understanding: Developed a pipeline to collect large-scale egocentric IMU-RGB-D data and build a novel egocentric 3D object dataset with estimated camera poses, scene layouts, and objects' shapes and poses. Project website: <https://z.umn.edu/ideadc>. Publications: [C4], [C5].

### Enfusion Systems

Software Development Intern

June 2019 - August 2019

Chicago, IL

- Developed a JUnit dynamic regression testing framework for Portfolio Management System that massively increased testing coverage for trade compliance rules and position rebalancing calculator through unit and integration tests.
- Optimized and maintained a data pipeline which facilitates data transfer between local database and Google BigQuery that allows Visual Analytics System to provide real-time, instant access to on-demand portfolio analysis reports.

## PUBLICATIONS (REFEREED CONFERENCE PUBLICATIONS)

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- [C5]. Tien Do, Lance Lemke, Jingfan Guo, **Khiem Vuong**, Minh Vo, and Hyun Soo Park, "IDEO: Large Scale Egocentric 3D Object Dataset and Benchmark Challenges". Neural Information Processing Systems Track on Datasets and Benchmarks (NeurIPS), 2022. (In submission)
- [C4]. Tien Do, **Khiem Vuong**, and Hyun Soo Park, "Egocentric Scene Understanding via Multimodal Spatial Rectifier". IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR), 2022, [Oral Presentation].
- [C3]. Tong Ke, Tien Do, **Khiem Vuong**, Kourosh Sartipi, and Stergios I. Roumeliotis, "Deep Multi-view Depth Estimation with Predicted Uncertainty". International Conference on Robotics and Automation (ICRA), 2021.
- [C2]. Kourosh Sartipi, Tien Do, Tong Ke, **Khiem Vuong**, and Stergios I. Roumeliotis, "Deep Depth Estimation from Visual-Inertial SLAM". International Conference on Intelligent Robots and Systems (IROS), 2020.

- [C1]. Tien Do, **Khiem Vuong**, Stergios I. Roumeliotis, and Hyun Soo Park, “Surface Normal Estimation of Tilted Images via Spatial Rectifier”. European Conference on Computer Vision (ECCV), 2020, [**Spotlight Presentation**].

## SELECTED COURSEWORK

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- Carnegie Mellon University: Computer Vision, Geometry-based vision, Machine Learning, Convex Optimization, Robot Localization and Mapping.
- University of Minnesota: Machine Learning/Deep Learning, Linear Optimization, Linear Algebra, Data Structures and Algorithms, Operating Systems.

## PROFESSIONAL ACTIVITY

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Reviewer: NeurIPS 2022 (Datasets and Benchmarks track)

## TECHNICAL SKILLS

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<b>Languages</b>	Python, Java, C/C++, MATLAB, JavaScript (elementary)
<b>Libraries</b>	PyTorch, NumPy, OpenCV, Open3D
<b>Others</b>	Git, Docker, Travis-CI, Python Flask