

Tien Do

Email: doxxx104 at umn dot edu
Website: <https://tien-d.github.io>

EDUCATION

University of Minnesota, Twin Cities <i>Ph.D. in Computer Science</i>	Minneapolis, MN <i>Expected July, 2022</i>
University of Minnesota, Twin Cities <i>Bachelor in Electrical Engineering, with distinction</i>	Minneapolis, MN <i>June 2015</i>

PROFESSIONAL EXPERIENCE

MARS lab, University of Minnesota, Twin Cities <i>Research Assistant</i>	Minneapolis, MN <i>Sep. 2015 - Present</i>
Microsoft Hololens <i>Research Internship</i>	Redmond, WA <i>Jun. 2021 - Sep. 2021</i>
Google Daydream <i>Adecco Visual Inertial Navigation System Engineer (Contractor)</i>	Mountain View, CA <i>Jul. 2018 - Sep. 2018</i>
MARS lab, University of Minnesota, Twin Cities <i>Undergraduate Research Assistant</i>	Minneapolis, MN <i>Feb. 2014 - Aug. 2015</i>

RESEARCH EXPERIENCE

Objects reconstruction from unscripted Inertial-RGB-D egocentric data <ul style="list-style-type: none">Created a device to collect a large scale egocentric IMU-RGB-D data.Reconstructed camera poses, scene layouts, and objects' shapes and poses from large scale IMU-RGB-D data.Project website: z.umn.edu/ideaDC	<i>May. 2021 - Present</i>
Learning to Detect Scene Landmarks for Camera Localization <ul style="list-style-type: none">Designed a novel training pipeline for camera localization by detecting semantic scene landmarks (both visible and non-visible) with sub-pixel accuracy.Achieved the state-of-the-art results for learned camera localization on the proposed Indoor-6 dataset.Publication: [C8]	<i>Jun. 2021 - Nov. 2021</i>
Egocentric Scene Understanding via Multimodal Spatial Rectifier <ul style="list-style-type: none">An simple extension of the spatial rectifier [C4].Publication: [C7]	<i>Nov. 2020 - May. 2021</i>
Depth Estimation from Optical Flow with Uncertainty Prediction <ul style="list-style-type: none">Designed an iterative neural network to refine a dense depth and its uncertainty of an indoor scene from a dense optical flow and triangulation.Publication: [C6].	<i>May. 2020 - Nov. 2020</i>
Depth Completion (Indoor Structures) from Visual-Inertial SLAM <ul style="list-style-type: none">Designed a deep neural network to predict a dense depth from a VI-SLAM point cloud, which is noisy and sparse, by leveraging constrains between depth and surface normal on indoor planar surfaces.Publication: [C5].	<i>Sep. 2019 - Apr. 2020</i>
Surface Normal Estimation for Tilted Images using Spatial Rectifier <ul style="list-style-type: none">Designed a spatial rectifier to improve a surface normal estimation network's performance under extreme viewpoint discrepancies, between a hand-held (training) and body/robot-mounted (testing) images.Designed a robust loss function and an efficient network architecture that are suitable for estimating directional (surface normal) data.Publication: [C4].	<i>Jan. 2019 - Mar. 2020</i>
Gyro-less 3DOF Tracking for Mobile device <ul style="list-style-type: none">Designed a resources aware algorithm that can track 3DOF using camera and accelerometer for low-end commercial Android devices that are not equipped with gyroscope.Analyzed the camera-accelerometer system's observability.Publication: [C3].	<i>Apr. 2018 - Dec. 2018</i>

Dynamically Feasible Motion Planning for Quadrotors

Sep. 2016 - Apr. 2018

- Developed and analyzed the closed-form solution for a boundary value problem capturing the quadrotor's kinematics using differential flatness.
- Integrated the closed-form motion primitives to an efficient sampling-based motion planning for quadrotor in simulated environments.

Optimal Visual Information Selection

Sep. 2016 - Apr. 2018

- Designed a convex relaxation algorithm to select a suboptimal set of visual measurements for precise 6DOF pose estimation and proved its suboptimal bounds.
- Designed simulations to illustrate the algorithm's performance against greedy-based algorithms.

Dual Cameras Quadrotor Navigation

Sep. 2015 - Aug. 2016

- Designed an algorithm for fusing inertial information and measurements from 2 decoupled forward- and downward-pointing cameras.
- Designed a resources-allocation for visual measurements between 2 cameras with different pointing directions.
- Integrated the above algorithms into a commercial-grade quadrotor Bebop.
- Publication: [C2].

Autonomous Navigation through Image-defined Paths

Aug. 2014 - Aug. 2015

- Designed a topological-map-based autonomous navigation system for a quadrotor.
- Achieved real-time navigations through many challenging environments on a commercial-grade quadrotor Bebop with its own sensors (camera, IMU, ultrasonic).
- Publications: [J1], [C1].

PUBLICATIONS

Journal Articles

- [J1]. [Tien Do](#), Luis C. Carrillo-Arce, and Stergios I. Roumeliotis, "High-Speed Autonomous Quadrotor Navigation through Visual and Inertial Paths". International Journal of Robotics Research (IJRR), 2019.

Conference Papers

- [C8]. [Tien Do](#), Ondrej Miksik, Joseph DeGol, Hyun Soo Park, and Sudepta N. Sinha, "Learning to Detect Scene Landmarks for Camera Localization". IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR), 2022, [**Oral Presentation**]
- [C7]. [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**]
- [C6]. Tong Ke, [Tien Do](#), Khiem Vuong, Kouros Sartipi, and Stergios I. Roumeliotis, "Deep Multi-view Depth Estimation with Predicted Uncertainty". International Conference on Robotics and Automation (ICRA), 2021.
- [C5]. Kouros 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.
- [C4]. [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**].
- [C3]. [Tien Do](#), Leo Neira, Yang Yang, and Stergios I. Roumeliotis, "Attitude Tracking from a Camera and an Accelerometer on Gyro-less Devices". International Symposium on Robotics Research (ISRR), 2019.
- [C2]. Kejian J. Wu, [Tien Do](#), Luis C. Carrillo-Arce, and Stergios I. Roumeliotis, "On the VINS resource-allocation problem for a dual-camera, small-size quadrotor". International Symposium on Experimental Robotics (ISER), 2016.
- [C1]. [Tien Do](#), Luis C. Carrillo-Arce, and Stergios I. Roumeliotis, "Autonomous flights through image-defined paths". International Symposium on Robotics Research (ISRR), 2015, [**Invited to IJRR Special Issues**].

SELECTED COURSEWORK

Computer Science

- Machine Learning, Professor Banerjee Arindam
- Computer Graphics, Animation and Planning in Games, Professor Stephen Guy
- Sensing and Estimation in Robotics, Professor Stergios Roumeliotis
- Computational Aspects of Matrix Theory, Professor Yousef Saad
- Sparse Matrix Computations, Professor Yousef Saad

Aerospace Engineering

- Convex Optimization methods in Control Theory, Professor Peter Seiler
- Intermediate Dynamics, Professor Richard Linares

- Advanced Dynamics, Professor Yohannes Ketema

Electrical Engineering

- Optimization Theory, Professor Tom Luo
- Detection and Estimation Theory, Professor Georgios Giannakis
- Robust control, Professor Tryphon Georgiou
- Linear System Theory, Professor Murti Salapaka

TECHNICAL SKILLS

Computer skills

- Programming language: Assembly, C/C++, Matlab, Python.
- Operating system: Ubuntu, Windows.
- Software libraries: Open CV, Open GL, Open3D, Bullet Physics Engine, PyTorch, TensorFlow.