ALEX HAGIOPOL

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EXPERIENCE

Facebook (tech.fb.com/ar-vr/)   San Francisco Bay Area, CA
Computer Vision Engineer, Facebook Reality Labs   Mar 2020 - Present
- Contributed computer vision software and research to the core technology stack of future Oculus and Portal products.
- Designed and implemented on-device depth estimation algorithms. Performed literature review, software implementation, and evaluation. Influenced adjacent team to incorporate work into on-product silicon implementations.
- Core contributor to on-product runtime optimization of core computer vision algorithm implementations in modern C++.

Microsoft (microsoft.com/en-us/mixed-reality)   San Francisco Bay Area, CA
Software Engineer, AI Perception and Mixed Reality Group   Oct 2017 - Nov 2019
- Collaborated with Microsoft Research (MSR) to develop computer vision research papers into features and content for products including HoloLens 2. Contributed R&D in areas of geometric computer vision and machine learning based computer vision. Made software engineering contributions in modern C++, CUDA, and Python.
- Designed and implemented a GPU-accelerated dense 3D scene reconstruction system based on MSR research in multi-view stereo. Created software implementations of core linear algebra routines, image processing, stereo vision geometry, disparity estimation via GPU PatchMatch, dense point cloud generation (triangulation, fusion, filtering, and normals estimation) from scratch in pure C++ and CUDA based on research literature. This work replaced a legacy point cloud generator in < 10% the number of lines of code. Current work is CPU and GPU performance optimization as well as algorithm-level improvements to reconstruction quality.
- Designed and implemented a high-precision human segmentation system based on research in statistical learning and deep learning applied to image segmentation. Implemented statistical learning mathematics in C++ and implemented neural network structure and training in Python and TensorFlow. This work advanced the group's state-of-the-art in the problem domain and led to first-authoring a patent application, *"Segmentation for Holographic Images",* approved by Microsoft Legal and currently under review by the U.S. Patent and Trademark Office.
- Maintained, refactored, and unit tested MSR algorithm codebases as the code moved from research to production. Created a unit testing system, removed over 3 million lines of C++ and CUDA code through refactoring, and converted the codebases' version control systems from deprecated internal tools to Git.

DroneDeploy (dronedeploy.com)   San Francisco Bay Area, CA
Software Engineer, Computer Vision Group   May 2016 - June 2017
- Contributed to a C++ 3D mapping engine that computes 3D maps using 2D aerial imagery captured by drones.
- Contributed software features yielding a 3D mapping reliability increase from < 50% to 99.9% in 8 months. This work included contributions in areas such as point cloud generation, mesh generation, and mesh texturing.
- Contributed new product features including neural network based classifier for map regions of interest, and fast 2D map preview using feature detection, feature matching, and image transformations. Both implemented in Python.

NASA (nasa.gov)   Hampton, VA & Remote
Research Intern, Autonomy Incubator Group   May 2015 - May 2016
- Investigated computer vision based localization techniques applied to NASA's prototype UAV for Mars exploration. Contributed implementation improvements, literature research, and visualization tools for performance evaluation.
- Integrated and adapted visual odometry and visual SLAM algorithms into the UAV's navigation system, performed performance evaluations, and reported results and recommendations to technical leadership.

Institute for Robotics & Intelligent Machines @ Georgia Tech (robotics.gatech.edu)   Atlanta, GA
Graduate Research Assistant (Advisor: Frank Dellaert)   Aug 2014 - May 2016
- Researched and implemented computer vision and artificial intelligence algorithms applied to robotics.
- Collaborated with NASA researchers to develop a 3D reconstruction system based on frame-to-frame region-of-interest tracking and 3D planar region pose optimization. Implemented region-of-interest detection, region tracking, optimization mathematics, visualization pipeline in C++, MATLAB, and GTSAM. Presented results at AIAA conference.

EDUCATION

Georgia Institute of Technology (cc.gatech.edu)   Atlanta, GA
M.Sc. in Computer Science   (GPA: 3.8, Full Scholarship, Dean's List)   Dec 2016
Studied Computer Vision, Machine Learning, Computational Photography, Advanced Algorithm Design & Analysis, and Robotics.

B.Sc. in Mechanical Engineering (GPA: 3.9, Full Scholarship, Dean's List, Vice President of Tau Beta Pi)   May 2012
Studied Linear Algebra, Calculus, Statistics, Numerical Methods, Data Structures, Algorithm Design & Analysis, and Robotics.