ALEX HAGIOPOL

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EXPERIENCE

Facebook (tech.fb.com/ar-vr/)   San Francisco Bay Area, CA
Software Engineer, Facebook Reality Labs   Mar 2020 - Present
- Contributed technical leadership and production software to Facebook's effort to ship the world's next computing platform. Created the foundation of Oculus augmented reality products by writing fundamental mathematical software, scientific research paper implementations, and critical software infrastructure in C++ and CUDA.
- Designed and implemented on-device algorithms for scene reconstruction. Performed scientific literature review, software implementation, and evaluation. Influenced hardware teams to implement my work into on-product silicon.
- Designed and implemented a GPGPU mathematical algorithm pipeline used to simulate silicon implementations of on-product computer vision algorithms. This effort unblocked research and development efforts across a 300+ person organization. Designed and implemented a linear algebra library, computational geometry library, numerical optimizer library, the algorithms themselves, and build and testing infrastructure all in multithreaded modern C++ and CUDA.
- Led my org's engineering standards committee. Designed the engineering documentation system used by my >45 person org. Designed the software quality standards used by my 10 person team. Individually mentored >15 people — including senior-to-me engineers and engineering managers — on programming and documentation standards.

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 scientific research papers into features for the HoloLens 2 augmented reality headset. Contributed machine learning and computer vision research in addition to production software in modern C++, CUDA, and Python.
- Designed and implemented my organization's core computer vision technology in the form of a GPU-accelerated dense 3D scene reconstruction system. Designed and implemented the core mathematical algorithms in the following areas: linear algebra, image processing, computational geometry, computer vision, and machine learning. This work replaced a legacy technology in 20X fewer lines of code and achieved 10X faster performance.
- Designed and implemented a machine learning system for high-precision segmentation system based on research in statistical learning and deep learning. Advanced the group's state-of-the-art in the problem domain and sole-authored a granted patent, US10902608B2 Segmentation for Holographic Images. Designed and implemented the core statistical learning algorithms in C++ and CUDA. Leveraged Python and TensorFlow for neural network components.
- 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++ computational geometry engine that computes 3D maps using 2D drone-captured imagery.
- Contributed C++ software features yielding a 3D mapping reliability increase from < 50% to 99.9% in 8 months without affecting result quality or computation speed.
- 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.

NASA (nasa.gov)   Hampton, VA & Remote
Research Intern, Autonomy Incubator Group   May 2015 - May 2016
- Researched and implemented computer vision and machine learning algorithms applied to autonomous robotics.
- Investigated computer vision based localization techniques applied to NASA's prototype robots for Mars exploration. Contributed implementation improvements, literature research, and visualization tools for performance evaluation.
- Developed a 3D reconstruction system based multi-object tracking and numerical optimization of 3D poses. Implemented region-of-interest detection, region tracking, optimization mathematics, visualization pipeline in C++. Presented results at AIAA conference and to NASA leadership which led to earning grant funding for my M.Sc. studies.

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.