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 Oculus augmented reality products.
- Designed and implemented mathematical software that unblocked product development for a 100+ person effort across 5+ engineering teams. This took the form of a real time, modern C++ and CUDA algorithm pipeline that emulates the behavior of algorithms implemented in physical silicon. This software allowed augmented reality product developers to do their work ~2 years before physical silicon availability.
- Led the pipeline's development which included collecting user needs, doing most of the design and implementation, and reviewing code changes from 30+ engineers who made major and minor contributions over 1+ years of development and use. Designed and implemented the pipeline's architecture as well making key contributions to major sub-components such as a linear systems solver, a computational geometry library, a computer vision based scene reconstruction algorithm, a machine learning based image segmentation algorithm, and a visualization system. Refactored legacy components and produced a >500X end-to-end performance improvement: before I joined to lead the project, the organization considered such a pipeline infeasible to implement in real time. Developed the my team's technical expertise on topics such as modern C++ concurrency, CUDA performance optimization, and computer vision algorithms. Shipped this system to its users and provided support to ensure their (and their organizations') success.
- Led my organizations's engineering standards committee. Designed the engineering documentation system used by my 55+ person organization. Designed the software quality practices used by my immediate 10 person team. Individually mentored 25+ engineers 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.

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)
Studied Linear Algebra, Calculus, Statistics, Numerical Methods, Data Structures, Algorithm Design & Analysis, and Robotics.