ALEX HAGIOPOL

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EXPERTISE

- Technical Leadership (listening and influencing, roadmap development and execution, talent development).
- Software Engineering (modern C++, CUDA, Python, systems design, implementation, optimization, code review, refactoring, unit testing, large codebase maintenance, version control).
- Research and Development (scientific literature review, algorithm development, algorithm implementation, algorithm evaluation, technical communication in reports and presentations).

EXPERIENCE

Facebook (https://tech.fb.com/ar-vr/) San Francisco Bay Area, CA
Software Engineer, Facebook Reality Labs Mar 2020 - Present

- Contributed technical leadership and production-grade software to Oculus augmented reality products.
- Designed and implemented mathematical software that unblocked product development for a 100+ person effort across 5+ engineering teams. Delivered a real time, modern C++ and CUDA algorithm pipeline that emulates the behavior of algorithms implemented in physical silicon. Enabled augmented reality product developers to do their work 1+ years before physical silicon availability. Shipped this system to its users and provided support to ensure success.
- 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 also contributed. Designed and implemented the pipeline's architecture and made key contributions in areas such as a linear systems solver, a computational geometry library, a depth estimation algorithm, a machine learning based segmentation algorithm, and a visualization system.
- Produced a >500X end-to-end performance improvement by reimplementing and refactoring legacy components: before I joined to lead the project, my organization considered such a pipeline infeasible to implement in real time.
- Developed my team's technical expertise on topics such as modern C++ concurrency, CUDA performance optimization, and computer vision algorithms.
- 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 (https://www.microsoft.com/en-us/hololens) San Francisco Bay Area, CA
Software Engineer, AI Perception and Mixed Reality Group Oct 2017 - Nov 2019

- Developed 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 GPU implementation 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 legacy 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.

PUBLICATIONS

- U.S. Patent 10902608B2, *Segmentation for Holographic Images,* 2020 (link).
- *Cracking The Coding Interview Solutions with Automated Unit Tests,* 2020 (link).
- *Review of Dense Surface Reconstruction*, 2019 (link).
- *Image Segmentation with Gaussian Mixture Models: A Hands-On Tutorial*, 2019 (link).

EDUCATION

Georgia Institute of Technology (https://www.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.