Keith F. Ma

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Software engineer with 10 years experience translating cutting-edge research into practical software and a strong background in science and ML. Looking to build tools that make hard tasks easy and the world a better place.

Skills

Languages Python, Javascript, MATLAB, C, Fortran, Shell, SQL

Tools AWS, Airflow, PostGIS, Docker, CircleCI, GDAL/OGR, scipy, SQLAlchemy, celery, flask

Experience

Indigo Ag *Boston, MA*

Staff Software Engineer *March 2023 - Present*

Senior Software Engineer *Jan. 2019 - March 2023*

- Lead engineer for life-cycle analysis model (LCA) of agricultural CO_2 emissions that automates this labor-intensive task so it can be done at scale («1s per harvest, >50k harvests). Includes a novel method for LCA model uncertainty, currently in the patent application process.
- Core developer for soil carbon quantification system that estimates soil organic carbon over time for >10k fields in the US, leading to >130k tons CO_2 sequestered so far. Responsible for data remediation service that integrates ML inferences, statistical reports, and subject matter expertise to identify missing/erroneous data and patch it with scientifically-defensible synthetic data. Designed and tested in collaboration with science and policy teams.
- Built tools for satellite imagery visualization and analysis, including an on-demand image tiling service for interactive visualization of the latest 20m/pixel resolution imagery in Indigo's web applications with a 100ms response time.
- Improved team performance and built internal alignment by mentoring junior engineers, sharing knowledge with peers, and collaborating with science and product teams on requirements, milestones, and prioritization.

TellusLabs (acquired by Indigo Ag) *Somerville, MA*

Software Engineer *Aug. 2018 - Jan. 2019*

- Core developer for a global satellite analytics platform predicting agricultural yields from field- to national-scale

Insight Data Science *Boston, MA*

Data Science Fellow *June 2018 - Present*

- Built an MVP navigation webapp that optimizes for comfortable outdoor travel by simulating sunlight and shade along potential routes from dense LiDAR points and the OpenStreetMap graph

Boston Fusion Corp *Lexington, MA*

Research Scientist *June 2016 - May 2018*

- Created ML-based analytical tools to address a wide range of Department of Defense needs, including adaptive decision support systems, data exploration via multi-level graphs, and gaming artificial intelligence

Boston University Research Computing Services *Boston, MA*

Scientific Programmer / Analyst *Sept. 2014 - June 2016*

- Consulted with BU faculty and students to design, optimize, and parallelize research software for HPC clusters

Yale University Department of Geology & Geophysics *New Haven, CT*

Doctoral Candidate *Sept. 2007 - Sept. 2014*

- Designed and built a distributed numerical model to simulate erosion by rivers and glaciers
- Created a method for reconstructing past topography by decomposing and scaling modern topographic features
- Built an analog model of mountain formation and software for measuring velocity fields from experiment imagery

Education

Yale University *New Haven, CT*

M.Phil in Geology & Geophysics *Dec. 2009*

Brown University *Providence RI*

BA in Geology - Biology *May 2005*