Samvit Jain

Curriculum Vitae

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Research Interests

Large-scale machine learning, video analytics, efficient inference, computer vision.

Education

2017 - 2019 **University of California, Berkeley**, M.S. Computer Science.
Fully funded, research Master's program in machine learning and computer systems. GPA: 4.0 / 4.0.
- Member of RISE Lab. Advised by Prof. Joseph Gonzalez. Focus: **large-scale visual inference**.
- Courses: Deep Reinforcement Learning, Advanced Topics in Computer Systems, Computer Vision.

2013 - 2017 **Princeton University**, B.S.E. Computer Science.
Graduated *summa cum laude* (with highest honors) as a member of the Phi Beta Kappa, Tau Beta Pi, and Sigma Xi honor societies. Received Shapiro Prize for Academic Excellence.
- Notable coursework: Distributed Systems, Operating Systems, Artificial Intelligence, Statistics, Computer Architecture, Networks, Security, Functional Programming, Quantum Computing, Quantum Mechanics.

Research Experience

June 2018 - Present **Resource-Efficient Video Analytics**, *Microsoft Research*.
Reducing compute cost in large-scale video analytics by exploiting learned cross-camera correlations.
- First-author paper in submission to VLDB 2019. Position paper in submission to HotMobile 2019.

Sep 2017 - Present **Efficient Inference on Video**, *UC Berkeley*.
Master's research. Accelerating semantic segmentaton on video by exploiting video compression techniques and feature similarity across frames. Papers: block motion-based feature warping (1), corrective fusion (2).
- First-author paper (1) presented in contributed talk at ECCV 2018 IWVS in Munich, Germany.
- First-author paper (2) in submission to CVPR 2019.

2016 - 2017 **Secure Micropayments**, *Princeton University*.
Senior thesis with CS Professor Brian Kernighan. Developed security protocol and client-server infrastructure to enable paid access of HTTP endpoints, without requiring user login. Thesis.

Spring 2016 **Bitcoin Micropayments**, *Princeton University*.
Research with CS Professor Arvind Narayanan. Built and evaluated prototype implementation of a Bitcoin micropayments-based system for online content monetization. Technical report.

Spring 2015 **Bitcoin Security**, *Princeton University*.
Research with CS Professor Edward Felten. Derived and experimentally verified closed-form solution for the optimal threshold on hot wallet storage in a Bitcoin exchange.
- First-author paper accepted to WEIS 2016 (26% accept rate) and Journal of Cybersecurity (via invitation).

Professional Experience

Summer 2018 **Microsoft Research**, *Research Intern*, Redmond, WA.
Intern on the Live Video Analytics team. Mentors: Junchen Jiang, Yuanchao Shu, G. Ananthanarayanan. Built and evaluated cross-camera person tracking and re-identification system. Position paper.

Summer 2016 **Databricks**, *Software Engineering Intern*, San Francisco, CA.
Architected full-text search feature backend (Apache Solr) as a multi-tenant, containerized microservice in Kubernetes. Shipped system to 1000s of live online course participants.
Databricks is a Series C, Andreessen Horowitz-backed big data startup commercializing Apache Spark.

Summers 2014, 2015 **LinkMeUp**, *Founder/CEO*.
Developed video link messaging app for iOS and Android. Components: link sharing, messages and reactions, social integration, push notifications, real-time data updates, session logging and analytics.
Reached over 1500 users in 70+ countries to date. Roles: Built iOS app (~12,000 lines of code), web presence, and analytics tools. Hired and managed Android engineer. Led marketing efforts.

Teaching Experience

Spring 2017 **COS 461: Computer Networks**, *Lab TA (Volunteer)*, Princeton University.
Assisted students in developing an HTTP proxy with DNS prefetching in Go.

Projects

Summer 2017 Started research blog focused on advances in deep learning and data systems. Five posts to date. Reached top 15 on HackerNews and over 8,000 unique visitors.

Academic Honors

2017 **Phi Beta Kappa** – Top 10% of students in graduating Princeton class.

2015 **Tau Beta Pi** – Early induction. Top 12.5% of Princeton engineering class.

2015 **Shapiro Prize for Academic Excellence** - Top 3.9% of students in Princeton class (2014-15).

Major Awards

2012 **AMC 12** – Top 200 in the U.S. in national mathematics competition (60,000 participants).

2009 **National History Day Contest** – 1st place in the U.S. for Historical Paper (500,000 participants in 5 categories). Year-long research project.

Papers

2018 **Samvit Jain**, J. Jiang, Y. Shu, G. Ananthanarayanan, J. Gonzalez. *ReXCam: Resource-Efficient, Cross-Camera Video Analytics at Enterprise Scale.* In submission to **VLDB 2019**. [arXiv]

2018 **Samvit Jain**, Xin Wang, and Joseph Gonzalez. *Accel: A Corrective Fusion Network for Efficient Semantic Segmentation on Video.* In submission to **CVPR 2019**. [arXiv]

2018 **Samvit Jain**, Ganesh A., Junchen Jiang, Yuanchao Shu, and Joseph Gonzalez. *Scaling Video Analytics Systems to Large Camera Deployments.* In submission to **HotMobile 2019**. [arXiv]

2018 **Samvit Jain** and Joseph Gonzalez. *Fast Semantic Segmentation on Video Using Block Motion.* In **ECCV 2018 International Workshop on Video Segmentation (IWVS)**, Munich. [arXiv]

2016 **Samvit Jain**, Edward Felten, and Steven Goldfeder. *Determining an Optimal Threshold on the Online Reserves of a Bitcoin Exchange.* In **WEIS 2016**, Berkeley, CA. (26% accept rate.) [pdf]

Skills

Languages Java, Python, Objective-C, C Familiar: Go, Scala, OCaml, Javascript

Tools git, Linux, MongoDB, AWS, Docker, Kubernetes, Apache Spark, TensorFlow, MXNet, PyTorch