

Edward Gan

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Researcher passionate about developing novel algorithms and systems for machine learning data management.

EDUCATION

Stanford University

Stanford, CA

PhD in Computer Science, advised by Peter Bailis

Sep 2015 – June 2020

- **Thesis:** Data summaries for scalable, high-cardinality analytics

Harvard University

Cambridge, MA

A.B. Summa Cum Laude in Computer Science and Mathematics

May 2013

EXPERIENCE

Databricks

San Francisco, CA

Senior Software Engineer

June 2020 – Present

- **Model Monitoring Platform:** I led development of the statistical analyses in model monitoring including data quality, data drift, and model accuracy measures. This required designing a novel staged architecture for allowing both optimized computation and user customization.
- **Data Profiling:** I worked on the Spark backend for the Databricks notebook data exploration tool, which includes a custom aggregator for high-cardinality categorical data, and worked with design and security to launch this across all notebooks.
- **ML Platform Usability:** I led an effort to improve ML platform usability by implementing improved navigation flows, an experiments browser, and driving a documentation overhaul.

Stanford Computer Science, DAWN Lab

Stanford, CA

PhD Research

Sep 2015 – June 2020

- **Data summaries for scalable analytics:** I proposed a novel system architecture and statistical methods for analytics on small pre-computed summaries. These methods allow for interactive queries on large, high-cardinality datasets inspired by cloud monitoring needs.
- **ML Data Management:** I developed hyperparameter tuning methods for transfer learning across different domains, as well as sampling techniques for labeling expensive video data. These allow model training to work efficiently with very limited training data.
- **MacroBase:** MacroBase is a system for explaining shifts in data streams. I contributed optimized feature selection routines and deployed the system with collaborators at Microsoft.

Google Brain

Mountain View, CA

Research Intern

June 2019 – September 2019

- **Tensorflow Extended (TFX):** I implemented C++ streaming operators to speed up end to end processing of data validation by 10% and evaluated methods for automatic feature engineering.

Airbnb

San Francisco, CA

Engineering Intern

June 2016 – September 2016

- **ML Price Recommendation:** I developed the backend for an e-mail upsell campaign by extracting calibrated scores from the booking prediction model, outperforming existing similar campaigns.

Facebook

Software Engineer

Menlo Park, CA

Aug 2013 – July 2015

- **Data Pipelines:** I developed Python APIs, scheduling logic, and UX to allow users to customize and execute ETL backfills on-demand, enabling more iterative workflows.

SELECTED PUBLICATIONS

CoopStore: Optimizing Precomputed Summaries for Aggregation VLDB
Edward Gan, Peter Bailis, Moses Charikar 2020

- Algorithms for pre-computing efficient data summaries in high cardinality query engines.

Approximate Selection with Guarantees using Proxies VLDB
Daniel Kang, Edward Gan*, Peter Bailis, Tatsunori Hashimoto, Matei Zaharia* 2020

- Sample-efficient methods for model calibration in models used for text/video retrieval.

CrossTrainer: Practical Domain Adaptation with Loss Reweighting DEEM
Justin Chen, Edward Gan, Kexin Rong, Sahaana Suri, Peter Bailis 2019

- Automatic hyperparameter tuning for a general method of transfer learning across datasets.

DIFF: A Relational Interface for Large-Scale Data Explanation VLDB
Firas Abuzaïd, Peter Kraft, Sahaana Suri, Edward Gan, . . . , Peter Bailis, Matei Zaharia 2019

- Semantics for a SQL operator to explain differences between datasets.

Moment-Based Quantile Sketches for . . . Aggregation Queries MLSys, VLDB
Edward Gan, Jialin Ding, Kai Sheng Tai, Vatsal Sharan, Peter Bailis 2018

- Distributed quantile estimation using a maximum entropy model.

Scalable Kernel Density Classification via Threshold-Based Pruning SIGMOD
Edward Gan, Peter Bailis 2017

- Unsupervised, non-parametric outlier classification, outperforming scikit-learn.

MacroBase: Prioritizing Attention in Fast Data SIGMOD
P. Bailis, E. Gan, S. Madden, D. Narayanan, K. Rong, S. Suri 2017

- Anomaly detection and feature selection on multi-dimensional event log data.

SKILLS AND AWARDS

- **Languages:** Proficient with Python, Java, SQL, Spark, PyTorch. Familiar with Javascript, Scala, C++.
- **Awards:** NSF Graduate Research Fellowship 2015-2020