AHSAAS BAJAJ

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Senior Machine Learning Engineer and Researcher specializing in large-scale recommendation systems, applied NLP, and production ML. Inventor of patented ML systems deployed at scale, author of peer-reviewed research with 100+ citations, and invited reviewer and program committee member for top-tier AI venues including AAAI, KDD, UMAP, and ACL-affiliated conferences.

PROFESSIONAL EXPERIENCE

Instacart - New York City — Apr 2022 – Present
Senior Machine Learning Engineer II, Content AI Team

- Delivered **$17.3M+ in cumulative incremental contribution profit** and influenced **$202M+ in incremental GTV** by inventing and deploying personalized replacements ML systems; success publicly cited in Instacart's Q2'25 and Q4'24 Shareholder Letters.
- Drove a **+0.3165 percentage-point improvement in Good Fill Rate** and a **24% cumulative reduction in disapproved replacements** by architecting production ML systems supporting 300M+ annual requests with 95%+ customer satisfaction.
- Achieved step-function gains in 2025 alone (**+$8.2M profit**, **−16% disapproved replacements**) by designing a real-time, multi-surface ranking platform powering customer and shopper substitution flows.
- Served as de facto technical lead for replacements ML, defining roadmap, experimentation standards, and observability practices adopted across multiple ML teams.
- Established replacements ML as a platform capability by leveraging product, inventory, and consumer data to improve marketplace outcomes and brand insights.

Walmart Labs - Sunnyvale, California — Feb 2021 - Apr 2022
Data Scientist, Personalization Team

- Built large scale recommendation systems to power Walmart grocery experience using personalization
- Led efforts on the customer repurchase journey & improved diversity in top recommendations for existing customers
- Achieved 1% improvement in basket predictions by incorporating affinity of customers for different product types

Instabase - San Francisco, California — May 2020 - Aug 2020
Software Engineering Intern, Documents Insights Team

- Delivered BERT-based entity recognition and Table Question Answering in production using GRPC & Kubernetes
- Improved recall by 17% for extraction of person & company names from client datasets of w2 forms and resumes
- Developed NLP framework to run on company infrastructure that allows model training, fine-tuning & evaluation
- Incorporated use-cases like NER (structured data) and Question-Answering (natural language data) in framework

Samsung R&D Institute - Bangalore, India — Jul 2017 - Jul 2019
Software Engineer, on-Device Artificial Intelligence Team

- Commercialized on-device unified search engine for Samsung flagship phones, handling 5M search queries

daily

- Improved first search performance by 40x using design patterns and Flatbuffers for serializing dictionary tries
- Increased recall by 25% using Rocchio query expansion and semantic matching for contacts, apps, calendar search
- Delivered Machine Learning models for personalization (ranking) and user-context awareness in Android platform

PATENTS

Systems and methods for altering a graphical user interface (GUI) based on affinity and repurchase intent (Granted, US) [Walmart Apollo, LLC]
Ahsaas Bajaj, Aleksandra Cerekovic, Evren Korpeoglu, Kannan Achan, Sinduja Subramaniam

- Describes systems that infer real-time user affinity and repurchase intent from in-session behavior and dynamically adapt GUI elements to improve relevance, engagement, and conversion.

Generating item replacements using machine learning based language models (Published, US)
[Maplebear Inc. (Instacart)]
Ahsaas Bajaj, Shishir Kumar Prasad

- Describes LLM-based systems that generate product replacements, evaluate replacement quality, and produce natural-language explanations for low-quality substitutions.

Selecting replacement items for an order based on machine-learned predictions (Published, US)
[Maplebear Inc. (Instacart)]
Ahsaas Bajaj, Shishir Kumar Prasad, et al.

- Describes predictive ML systems that rank and select replacement items using weighted probabilities of positive and negative fulfillment outcomes.

EDITORIAL REVIEWING SERVICE

Program Committee & Invited Reviewer (2022–Present)
- **Venues:** AAAI, KDD (Applied Data Science), UMAP, WWW (LARS Workshop), ACL (Rolling Review, SRW, ECNLP), NLDB.
- **Role:** Served on 10+ technical program committees and review boards, evaluating research on LLMs, personalization, and applied ML for premier AI conferences.

SELECT PUBLICATIONS

- Total citations: 127, H-index: 5, Total Papers: 9 [Google Scholar]

Peer-Reviewed Academic Publications

- **Ahsaas Bajaj**, Pavitra Dangati, Kalpesh Krishna, et al. "Long Document Summarization in a Low Resource Setting using Pretrained Language Models," ACL-IJCNLP 2021.

- Daivik Swarup, **Ahsaas Bajaj**, Rajarshi Das, Andrew McCallum, et al. "An Instance Level Approach for Shallow Semantic Parsing in Scientific Procedural Text," Findings of EMNLP 2020.

- **Ahsaas Bajaj**, Shubham Krishna, et al. "Learning Mobile App Embeddings using Multi-task Neural Networks," Springer NLDB 2019.

- **Ahsaas Bajaj**, Shubham Krishna, et al. "RelEmb: A relevance-based application embedding for mobile app retrieval," CICLing 2019.

- **Ahsaas Bajaj**, Hemant Tiwari, Vanraj Vala. "Enhanced Learning to Rank using Cluster-loss Adjustment," ACM CODS-COMAD 2019.

MEDIA AND PUBLIC RECOGNITION

- **Instacart Engineering Blog (2024)** — Author of a technical article detailing the design and deployment of large-scale machine learning systems for product replacements, published on Instacart's official engineering blog.

- **Public Shareholder Communications** — Technical contributions referenced in Instacart's Q2'25 and Q4'24 shareholder letters, highlighting the business impact of machine learning systems on order quality and customer experience.

- **Data Tinkerer (2026, forthcoming)** — Featured in an in-depth technical interview/article on production-grade machine learning systems and real-world recommendation challenges, to be published by Data Tinkerer.

INVITED TALKS AND SPEAKING ENGAGEMENTS

- **Cohere Labs — ML Industry Perspectives** (Jan 2026) Invited speaker on operating production-grade machine learning systems and real-world recommendation challenges.

- **Data Science Salon — DSS Break** (Feb 2026) Invited for a 15-minute interview discussing applied machine learning, system design, and evaluation practices in industry.

- **New York AI Engineers Tech Talk** (Mar 2026) Invited to present technical insights on machine learning systems for e-commerce and personalization.

- **Data Science Salon — E-commerce & Retail (Seattle)** (Apr 2026) Invited speaker on applied machine learning in e-commerce, focusing on quality, evaluation, and business impact at scale.

MEMBERSHIPS AND AWARDS

- **Forbes Technology Council Member** — Invitation-only membership (10–11% acceptance rate) recognizing senior technology leaders for professional achievements, thought leadership, and industry impact.

- **Instacart Individual Tech Achievement Award (2024)** — Recognized for exceptional technical contributions and high-impact ML initiatives.

- **Certificate of Achievement, Instabase CEO** — Awarded 2nd place in a company-wide hackathon for delivering product-impacting innovation through fearless experimentation.

- **Samsung Citizen Award (Highfliers Category)** — Recognized for outstanding individual performance and contributions beyond functional scope.

- **Samsung Software Competency Level: Professional** — Ranked among the top 20% of the organization.

- **Institute Rank 2** — Ranked 2nd among 800+ undergraduate students.

- **ACM ICPC India Nationals Qualifier (2015)** — Qualified for the Indian Nationals of a highly competitive global programming contest.

EDUCATION

University of Massachusetts Amherst, MA Sep 2019 - Dec 2020

MS in Computer Science GPA: 4/4

Graduation/Completion Date: 01 Feb 2021

Coursework: Intro to Natural Language Processing, Neural Networks, Knowledge Graphs, Machine Learning, Information Retrieval, Algorithms for Data Science, Principles of Software Engineering

Netaji Subhas Institute of Technology, University of Delhi, India Jul 2013 - Jun 2017

B.E. in Electronics and Communication Engineering Percentage: 85.78%

First Class with Distinction Department Rank: 2/180

Graduation/Completion Date: 28 Sep 2017

Coursework: Computer System Organisation, Programming Languages, Microprocessors, Switching Automata, Operating Systems, Software Engineering

SKILLS

Languages & Frameworks   Python, PyTorch, Tensorflow, scikit-learn, PySpark, Scala, SQL, C/C++, Java

Tools   Sagemaker, Snowflake, Apache Spark, Hadoop, Docker, AWS, Flask, Hive, Jupyter, Tableau, Matplotlib

Expertise   Deep Learning, Machine Learning, NLP, Data Science, Information Retrieval, Knowledge Graphs