Rajlaxmi

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EXPERIENCE

Google — Discover Ads
Jan 2023 - Current

Led Modeling efforts for Click-through rate prediction

- **Spearheaded** various **click-through** rate prediction modeling initiatives, designing work-streams and contributing to the strategic **planning** of modeling objectives (OKRs).
- **Led** the research and **execution** of technically complex, multi-quarter projects in collaboration with **DeepMind** and vertical pCTR teams, resulting in a revenue increase of xxM$ impacting xB daily interaction users (DAU).
- Enhanced click-through rate prediction by developing and implementing a **mixture of experts** variant algorithm. This involved investigating latest research methods, analyzing **model scaling laws** and performance-resource tradeoffs, executing multiple experiments, and collaborating with legal and privacy teams to deploy the algorithm.
- Analyzed **scaling laws** for various model components, delivering insights that guided the optimization of **performance** and **resource tradeoffs** in subsequent initiatives.
- Spearheaded the development and launch of CTR prediction for **video traffic**, significantly improving ad performance on video slice and contributing to xxM$ revenue growth. Received a **spot bonus** from the **organization's VP** for the impactful results. Led 3 engineers and collaborated across orgs (formats, feature pipeline, youtube, infrastructure teams) to launch the effort.
- Explored and improved **model reproducibility** and scaled up **teacher model** using scaling laws.
- Served as the primary **point of contact** for modeling-related inquiries. Delivered **presentations** on model architecture to **directors** and various vertical teams, facilitating enhanced understanding and collaboration.
- Provided **technical leadership** in the **evaluation** and selection of proposed **pCTR** model **changes**, ensuring optimal balance between performance and resource utilization. Reviewed design docs and code implementations.
- **Leveraged** insights from **industry research** and other pCTR teams, improving model performance.
- Technical skills: Python, Keras, Tensorflow, Colab, C++.

Google — Cloud Financial Services
Feb 2020 – Jan 2023

Founding engineer. Click through rate prediction on 3P ads surfaces.

- Founding engineer of the team building **ad recommendation systems** for 3P financial customers.
- Worked on **ML problem framing**, breaking down recommendation system into Click-through rate (CTR) prediction, Conversion rate (CVR) prediction with PMs and partner financial institution.
- Led **formulation** of **conversion** and conversion **attribution** in collaboration with PMs and partnering banks.
- **Built** v0 **pCTR model** architecture in keras. Collaborated with **Cloud AI Research** team to refine the model. Built data analysis pipelines and performed feature engineering.
- Built E2E Live Experimentation A/B testing framework. Implemented bucketed jackknife for confidence interval.
- Technical skills: Python, Keras, Tensorflow, Colab.

Indian Institute of Science
May 2019 – Oct 2019

NLP Research Associate

- Conducted research on natural language processing with Dr. Partha Talukdar's NLP group on language grounding, relation extraction and GNNs.

Previous Roles
Jun 2015 – Mar 2019

Software Engineer

- High Frequency Trading (2015 – 2018): Developed Order Routing Systems to place orders to stock exchange in micros and nano-seconds. Experimented with optimizations at software and OS level to reduce latency. Built scalable infrastructure on cloud to scale modeling strategies. Skills: Operating systems, Networking, C++.
- Amazon (2018 – 2019): Built ad recommendation models for Amazon Affiliate program.

EDUCATION

Indian Institute of Technology (IIT), Bombay
Mumbai, India

B.Tech in Computer Science and Engineering
2011 – 2015

Miscellaneous

Supervised Program for Alignment — SPAR

- Researched how fine-tuning and RLHF affect representations. Investigated affects of fine-tuning on the representations of targets, with the goal of interpreting how fine-tuning techniques change model capabilities on a mechanistic level.

LLMs and Mathematical Reasoning

- Explored advancing LLM models' mathematical reasoning skills and drive frontier knowledge using AI Mathematical Olympiad (AIMO) competition data.

Writings

- rajlaxmi.github.io: Personal Portfolio with an account of personal projects, blogs and more.
- mindsx0fmachines.substack.com: Exploring path to superintelligence.

Open Source Implementations — GitHub

- Recsys implementations: Mixture of Experts, DCN, Isotonic Regression, Transformer, Attention.
- Alignment and Mechanistic interpretability: Sparse Autoencoder, Contrastive Activation Addition, Transformer from scratch

Mentorship

- Women @ Google: Mentored women at the start of their careers.
- Women Who Code: Taught Python to women from non-tech backgrounds, sharing industry experiences and networking to address their questions to support their transition into tech.
- Software Product Sprint (SPS): Instructor at SPS, an organization dedicated to increasing representation in tech by building a network of support for students who identify with historically excluded groups.

Awards & Achievements

- Secured an **All India Rank 134** and **State Rank 8** in All India Engineering Entrance Examination (AIEEE) 2011 competing among 1.2 million candidates.
- Secured an **All India Rank 851** in IIT Joint Entrance Examination 2011 competing among 485,000 candidates.
- **Department Representative** for IITB Computer Science Institute Academic Council.
- Secured All India Rank **101** and **108** in National Level Science Talent Search Examination (NSTSE) held by Unified Council in Jan 2010 and 2011 respectively.
- Awarded Certificate of Merit in **National Standard Examination in Physics (NSEP)** held by Indian Association of Physics Teachers for being among state top 1% students (2010-11).
- Awarded Certificate of Merit in **Chemistry** in intermediate/+2 for being in top 0.1% students in India.

Relevant Coursework

Major coursework: Dynamic Programming and Reinforcement Learning, Linear Optimization, Probability and Random Processes, Discrete Structures, Data Structures and Algorithms, Network Security and Cryptography, Program Derivation, Computer Architecture

Others: Nonlinear Optimization, Network Optimization, Applied Probability and Stochastic Models, Deep Reinforcement Learning, Decision Making and Control, Statistical Learning Theory; Foundations of Decisions, Learning, and Games; Algorithmic Game Theory (CMU)

Skills

Languages: C/C++, Python, Go, Rust, Javascript, Typescript, SQL

Technologies: Keras, TensorFlow, PyTorch, GCP