Bhuvesh Kumar
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EDUCATION

GEORGIA INSTITUTE OF TECHNOLOGY   PH.D. IN COMPUTER SCIENCE | 2022
Atlanta, Georgia

GEORGIA INSTITUTE OF TECHNOLOGY   M.S. IN COMPUTER SCIENCE | 2022
Atlanta, Georgia

IIT KANPUR   B.TECH IN COMPUTER SCIENCE AND ENGINEERING | 2017
Kanpur, India

WORK EXPERIENCE

TIKTOK   MACHINE LEARNING SCIENTIST | JAN 2023 - PRESENT
- Part of the core recommendation team designing large-scale recommendation systems serving 100s of millions of users
- Contributing to all stages of the recommendation pipeline including recall, first-stage ranking, final-stage ranking, with special focus on reranking using state of the art ML techniques leading to actual Active Users and Stay Duration gains.
- Spearheaded the key project of transformation of the recommendation system in US from a single datacenter based architecture to a disaster-tolerant multi-datacenter architecture for 4 main recommendation verticals including the follow page, friends page, hashtag page, and the complete user recommendation pipeline

AMAZON   APPLIED SCIENTIST INTERN | MAY 2021 - AUG 2021
- Worked on **fairness and transparency in machine learning** with Prof. Michael Kearns and Dr. Matthäus Kleindessner
- Introduced a **new notion for group fairness** in multi arm bandits and designed a no-regret algorithm

UNIVERSITY OF WASHINGTON   RESEARCH SCIENTIST | JAN 2021 - APRIL 2021
- Worked on **designing simple and incentive compatible auctions** for revenue maximization in repeated auctions

FACEBOOK   RESEARCH INTERN | MAY 2020 - NOV 2020
- Part of the **Economics, Algorithms, and Optimization research** team in Core Data Science
- Developed algorithms for **optimal spend plan prediction** and **automatic bid pacing** for budget constraint ad campaigns
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FACEBOOK   MACHINE LEARNING ENGINEERING INTERN | MAY 2019 - JUL 2019
- Optimized for Return on Ad Spend for **ads ranking** and products ranking in Dynamic Product Ads using **deep learning**
- Introduced a two-tower model architecture and **increased ad revenue while saving 60 TB memory usage (86 % decrease)**

JOHNS HOPKINS UNIVERSITY   RESEARCH INTERN | MAY 2016 – AUG 2016
- Worked on **stochastic methods for Kernel PCA** by extending Stochastic PCA methods using non linear feature maps

PUBLICATIONS

[1] **ActiveHedge: Hedge meets Active Learning** with Jacob Abernethy and Venkatesh Saligrama
International Conference on Machine Learning (ICML) 2022 (Spotlight)
- Also selected as oral talk at Complex Feedback in Online Learning Workshop, ICML 2022
- Also presented at Adaptive Experimental Design and Active Learning in the Real World Workshop, ICML 2022

[2] **Observation Free Attacks on Stochastic Bandits** with Yinglun Xu and Jacob Abernethy
Neural Information Processing Systems (NeurIPS), 2021

[3] **Optimal Spend Rate Estimation and Pacing for Ad Campaigns with Budgets** with Jamie Morgenstern, and Okke Schrijvers
Talk at INFORMS Annual Meeting 2021

[4] **Learning Auctions with Robust Incentive Guarantees** with Jacob Abernethy, Rachel Cummings, Jamie Morgenstern, Samuel Taggart
Neural Information Processing Systems (NeurIPS), 2019
- Preliminary version presented at the Learning in Presence of Strategic Behavior Workshop, EC 2019

[5] **Accelerated Federated Optimization with Quantization** with Yeojoon Youn and Jacob Abernethy.
Oral at Federated Learning Workshop, NeurIPS 2022

[6] **Bridging Truthfulness and Corruption-robustness in Multi-Armed Bandit Mechanisms** with Jacob Abernethy, Thodoris Lykouris, and Yinglun Xu
Incentives in Machine Learning Workshop, ICML 2020

[7] **Accelerated Parallelizable Projection-Free Algorithm for the Nuclear-Norm Ball Constraint** with Jun-Kun Wang and Jacob Abernethy. *Preprint*

AWARDS

- Awarded **Chair's fellowship** by The School of Computer Science, Georgia Tech, 2017
- Received the **NeurIPS Travel Award** to attend NeurIPS 2019, Vancouver, BC, Canada
- Received the **Academic Excellence Award** each year at IIT Kanpur (2013-2017) for outstanding academic achievements
- Secured **All India Rank 269 (99.98 Percentile)** in IIT-JEE 2013
- Cleared the **Mathematics**, **Informatics**, and **Astronomy** Olympiads organized by the Govt. of India, 2012
- Awarded the **KVPY fellowship** for higher studies in Sciences by the Dept. of Science and Technology, Govt. of India, 2011
- Awarded the **National Talent Search Examination (NTSE) scholarship** by the Govt. of India, 2009

TEACHING

- **Instructor**, Online Decision Making in Machine Learning (ECE8803) — Georgia Tech: Fall 2022
- **TA**, Machine Learning for Trading (CS7646) — Georgia Tech: Spring 2022, Summer 2022, Fall 2022
- **TA**, Machine Learning Theory (CS7545) — Georgia Tech: Fall 2018, Fall 2019
- **TA**, Introduction to Computing (ESC101) — IIT Kanpur: Fall 2016, Spring 2017

OTHER RESEARCH EXPERIENCE

ACTION RECOGNITION IN VIDEOS — DR. GAURAV SHARMA, IITK | 2017

- Used **deep learning** with trajectory pooled features for **action recognition in videos** and achieved state of the art results.
- Implemented alternating minimization for homography estimation to **speed up train and test time by 50%**.

ROBUST PCA — DR. P. KAR, IITK AND DR. PRATEEK JAIN, MICROSOFT RESEARCH | 2016

- Solved non-convex Robust PCA for **background subtraction** in surveillance **videos with moving cameras.**
- Extended methods for still camera to camera motion by devising fast methods for homography estimation.

OBJECT AND FACE RECOGNITION IN VIDEOS — DR. H. KARNICK, IITK | 2016

- Developed methods for **object recognition** for traffic surveillance from traffic camera videos using **deep learning.**

LEADERSHIP / SERVICE

- **Conference reviewer for:** NeurIPS, ICML, COLT, ALT, EC, SODA, JMLR
- **Vice President | SCS Graduate Student Association, GaTech:** Founding vice-president of the newly formed School of Computer Science Graduate Student Association at Georgia Tech, 2021-2022
- **Grand Award Judge | ISEF 2022:** Judged the finals of International Science and Engineering Fair (ISEF) in the Robotics and Intelligent Systems track, 2022
- **Faculty hiring student nominee | School of Computer Science, GaTech:** Organized students-candidate meetings and represented the student body in faculty hiring decisions of the department, 2019-2020
- **Co-organizer | ACO Student Seminar, GaTech:** Organized weekly seminars on algorithms, combinatorics, optimization, and machine learning, 2018-2019
- **Coordinator | Programming Club, IITK:** Organized various programming contests, hackathons, summer projects, programming workshops and events for the community while managing a team of over 15 members, 2015-2016
- **Group Leader | Science Coffeehouse, IITK:** Organized regular meets, contests and managed the administrative tasks for the Science discussion group at IITK, 2015-2016

SELECT PROJECTS

- **photoCENTER - Image/Video Processing App:** Developed an open-source multi-platform software to edit videos and images including background extraction capabilities using computer vision techniques.
- **Artify:** Designed a web app in Django for deep neural style transfer written in Tensorflow creating artistic images.
- **ColourIT:** Developed a learning algorithm to automatically colour a grayscale image using deep learning.
- **Research Group Website** Designed a package to manage a research group's website using Node.js.

SKILLS

Languages	Scientific Libraries	General Tools	Webdev
C++ • Python • C Matlab • Octave	Tensorflow • Keras PyTorch • SKlearn OpenCV • pandas	MySQL • Presto • Git Latex • OpenGL	Node.js •Django • CSS Javascript • HTML