

Ramnath Kumar

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RESEARCH INTERESTS & SUMMARY

Robust, efficient and scalable large-scale deep learning algorithms, especially for representation learning, and applications in domains such as LLMs, meta-learning and dense retrieval. I also maintain a small blog of few interesting papers [here](#).

EDUCATION

University of California, Los Angeles (UCLA)

PhD. in Computer Science

Los Angeles, USA

09/2024 – Present

. Advisor: [Prof. Cho-Jui Hsieh](#), UCLA Samueli School of Engineering

BITS Pilani, Hyderabad Campus

B.E. in Computer Science, MSc. in Economics

Hyderabad, India

08/2016 – 08/2021

. CGPA in Computer Science major: **9.65/10.0** (Top 10 in class of 255)

. Overall CGPA: 8.92/10.0

SELECTED RESEARCH/WORK EXPERIENCE

Google DeepMind

Pre-Doctoral Researcher in MLO Group & Ads ML Team

Bangalore, India

07/2022 – 08/2024

. Advisor: [Dr. Prateek Jain](#) and [Prof. Inderjit S. Dhillon](#)

. Developed an end-to-end efficient retrieval architecture [3] which improved upon prior retrieval benchmarks by up to **1.45%** at the fixed compute budget. EHI is slated for integration into various Google products.

. Led a cross-functional team in developing and deploying RGD [2] solutions, demonstrating leadership in product-driven research and innovation improving upto **1.01%** on ImageNet-1K with ViT.

. Coordinated efforts between the MLO and Ads ML teams, ensuring seamless collaboration and alignment with real-world applications, receiving a [spot bonus](#) leading to significant rise in revenue.

. Took initiative in proposing a novel end-to-end retrieval architecture, improving efficiency and robustness in ongoing projects, with contributions recognized in 🌐 🐦.

Google Research

Research Associate in Machine Learning and Optimization Group (MLO)

Bangalore, India

04/2022 – 07/2022

. Advisor: [Dr. Dheeraj Nagaraj](#)

. Devised IER, a replay buffer sampler inspired by prior method - RER, with potential to enhance convergence of RL algorithms such as DQN, TD3, and more [6] by up to **7x** speedup.

Mila - Quebec Artificial Intelligence Institute

Consultant

Montreal, Canada

07/2021 – 03/2022

. Advisor: [Prof. Yoshua Bengio](#)

. Initiated and led a project exploring impact of diversity in meta-learning, collaborating closely with another PhD student. Designed and executed experiments, leading to an oral presentation at AAAI [4] that challenged the conventional wisdom surrounding meta-learning.

. Demonstrated strong leadership and communication skills by presenting findings at AAAI and co-authoring workshop publications, including presentations at the EEML summer school [8].

Amazon ML

Applied Scientist Intern

Bangalore, India

01/2021 – 06/2021

. Advisor: Dr. Gokul Swamy

. Published at Amazon's internal conference (AMLC 2021) and investigated causal attributions and its significance within the Amazon sales model 🤖 at capacity of first-author.

Mila - Quebec Artificial Intelligence Institute

Research Intern

Montreal, Canada

11/2020 – 04/2021

. Advisor: [Prof. Samira E. Kahou](#)

. Collaborated with a team of PhD students and advisors on the Limits of Multi-modal Meta-Learning [7].

CoCo Lab, Université de Montréal

Research Intern

Montreal, Canada

06/2020 – 11/2020

. Advisor: [Prof. Karim Jerbi](#)

. Studied Brain based subject identification using EEG data 🧠.

Kno.e.sis, Wright State University

Research Intern

Dayton, USA

05/2019 – 08/2019

. Advisor: [Prof. Amit P. Sheth](#) and [Prof. Krishnaprasad Thirunarayan](#)

. Collaborated with a large team from multiple time-zones and led a research at the capacity of a first-author.

Developed a sybil detection system in darknet markets using an unsupervised multi-view framework [5].

PUBLICATIONS




- [1] [FastLane: Accelerating Multi-View Search with Dynamic View Routing](#)
Ramnath Kumar, Prateek Jain, and Cho-Jui Hsieh
Under Preparation, ICLR 2025
- [2] [Stochastic Re-weighted Gradient Descent via Distributionally Robust Optimization](#)
Ramnath Kumar, Kushal Alpesh Majmundar, Dheeraj Mysore Nagaraj, and Arun Suggala
Transactions on Machine Learning Research, 2024.
ICLR 2023 Workshop on Pitfalls of limited data and computation for Trustworthy ML.
[Google AI Blog Coverage.](#)
- [3] [EHI: End-to-end Learning of Hierarchical Index for Efficient Dense Retrieval](#)
Ramnath Kumar*, Anshul Mittal*, Nilesh Gupta, Aditya Kusupati, Inderjit Dhillon, and Prateek Jain
Transactions on Machine Learning Research, 2024.
- [4] [The Effect of diversity in Meta-Learning](#) 🧠
Ramnath Kumar, Tristan Deleu, and Yoshua Bengio
AAAI 2023 (Oral; Acceptance Rate: 4.7%).
NeurIPS Workshop on Meta-Learning, 2021.
[SyncedReview Blog Coverage.](#)
- [5] [eDarkFind: Unsupervised Multi-view Learning for Sybil Account Detection](#) 🧠
Ramnath Kumar, Shweta Yadav, Raminta Daniulaityte, Francois Lamy, Krishnaprasad Thirunarayan, Usha Lokala, and Amit Sheth
The Web Conference (WWW), 2020.
- [6] [Introspective Experience Replay: Look Back When Surprised](#) 🧠
Ramnath Kumar and Dheeraj Nagaraj
Transactions on Machine Learning Research, 2024
NeurIPS Workshop on DeepRL, 2022.
[Google Research: “Algorithms for efficient deep learning” Blog Coverage.](#)
- [7] [On the Limits of Multi-modal Meta-Learning with Auxiliary Task Modulation Using Conditional Batch Normalization](#)
Jordi Armengol-Estapé, Vincent Michalski, **Ramnath Kumar**, Pierre-Luc St-Charles, Doina Precup, and Samira Ebrahimi Kahou
NAACL Workshop on Insights from Negative Results, 2024
- [8] [Rethinking Learning Dynamics in RL using Adversarial Networks](#) 🧠
Ramnath Kumar, Tristan Deleu, and Yoshua Bengio
NeurIPS Workshop on DeepRL, 2022.
Presented findings at EEML 2022.

[9] [Temporal Dynamics and Spatial Content in IoT Malware detection](#) 

Ramnath Kumar and G Geethakumari

TENCON 2019.

SELECTED AWARDS AND HIGHLIGHTS

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|---|-----------|
| Quad Fellowship , accepted QUAD fellowship of 40,000\$ for research aiding positive social impact  . | 2024 |
| Graduate Dean's Scholars Award , UCLA scholarship of 15,000\$. | 2024 |
| Google Blog , RGD work [2] was highlighted, and well accepted   . | 2023 |
| Presentee , AAAI Oral Presentation (Acceptance Rate: 4.7%). | 2023 |
| Awardee , NTSE Scholar (Awarded to 775 students amongst 0.5 million candidates). | 2014-2020 |

ACADEMIC SERVICES

- **Reviewer:** NeurIPS (2022, '23, '24) and ICML (2022, '23), ICLR(2023), AutoML (2022) and ICWSM (2020, '21, '22, '23)
- **Volunteer:** COLT (2023)

RELEVANT COURSEWORK AND SKILLS

- **Math, Stats and Machine Learning:** Calculus, Linear Algebra, Probability and Statistics, Differential Equations, Convex Optimization, Foundations of Data Science, Artificial Intelligence, Machine Learning, Information Retrieval
- **Summer School:** Eastern European Machine Learning Summer School, Vilnius Lithuania (EEML 2022), *ML Foundations*; Research Week with Google, India (2022), Machine Learning Summer School, Taipei (2021), Google AI Summer School, India (2020)
- **Programming Languages and Libraries:** Python, C++, Pytorch, Tensorflow, Jax, OpenCV