# Ramnath Kumar

Email ◇ Website ◇ Github ◇ LinkedIn ◇ Scholar

## Research Interests

- **Generalization:** AI that can generalize concepts and is robust to i.i.d. as well as o.o.d. data distribution.
- **Causality:** Fundamentals of causality to interpret the decision process of black-box algorithms.
- **Theoretical Machine Learning:** AI with convergence guarantees, covering problems from the domains of optimization, game theory, and statistics.
- **Real-world representation Learning:** AI that can learn fair, robust, efficient and generalizable representations with applications in language, vision, speech, robotics, healthcare, and education.

## EDUCATION

**BITS Pilani, Hyderabad Campus** — Hyderabad, India
*Masters of Science in Economics* — *Aug 2016 – Jun 2021*
*Bachelor of Engineering in Computer Science*

. Achieved overall distinction in Computer Science courses
. CGPA in Computer Science major: **9.65/10.0** (Top 10 in class of 255)
. Overall CGPA (B.E. Computer Science and Msc. Economics): 8.92/10.0

## RESEARCH/WORK EXPERIENCE

**Google** — Bangalore, India
*Research Associate* — *Apr 2022 – Present*
. Research Supervisor: Dr. Dheeraj Nagaraj and Dr. Praneeth Netrapalli
. Machine Learning and Optimization Group

**Mila - Quebec Artificial Intelligence Institute** — Montreal, Canada
*Consultant* — *Jul 2021 – March 2022*
. Research Supervisor: Prof. Yoshua Bengio
. Topic: Deep learning algorithms; Meta-Learning

**Amazon ML** — Bangalore, India
*Applied Scientist Intern* — *Jan 2021 – Jun 2021*
. Mentor: Dr. Gokul Swamy
. Topic: Stochastic Insight into Neural Networks
. Published at Amazon's internal conference (AMLC 2021) as the first author. Worked on causal attributions and their implications on the Amazon sales model.

**Mila - Quebec Artificial Intelligence Institute** — Montreal, Canada
*Research Intern* — *Nov 2020 – Apr 2021*
. Research Supervisor: Prof. Samira E. Kahou
. Affiliated University: École de technologie supérieure
. Topic: Theoretical machine learning in the domain of graph neural networks

**Qubole** — Bangalore, India
*Engineer Intern* — *Jul 2020 – Dec 2020*
. Mentor: Gururaj Krishnamurthy
. Worked on automating the rollout process (*Frost 2.0*) for the company
. Built a package for monitoring jobs on jenkins, and notify the user on slack upon completion
. Wrote and managed a pipeline which analyses various internal tests, and generates ad statistics and communicated results with the core-qa team

**CoCo Lab, Université de Montréal** — Montreal, Canada
*Research Intern* — *Jun 2020 – Nov 2020*

. Research Supervisor: Prof. Karim Jerbi
. Topic: Brain based subject identification using EEG data

**Kno.e.sis, Wright State University** — Dayton, USA
*Research Intern* — *May 2019 – August 2019*

. Research Supervisor: Prof. Amit P. Sheth and Prof. Krishnaprasad Thirunarayan
. Topic: eDarkFind: Unsupervised Multi-View Learning for Sybil account detection
. Worked on sybil detection in the darknet markets using an unsupervised multi-view learning framework.
. Worked on object detection models for disaster management.
. Built an image segmentation model to aid the prediction of nutritional data of food.
. Worked on GANs and NLP to detect suicidal posts in *Suicide Watch* and *Mental Health* subreddits.

**BITS Pilani, Hyderabad Campus** — Hyderabad, India
*Undergraduate Research Assistant* — *July 2018 – Jun 2020*

. *Machine Learning in Malware detection in IoT* under Prof. Geethakumari
. *Machine Learning in Astronomy* under Prof. Rahul Nigam
. *Machine Learning in P2P Lending* under Prof. Hussain Yaganti
. *R-Package for Inequality with Ordinal Data* under Prof. Bheemeshwar Reddy

**Infibeam** — Ahmedabad, India
*Engineer Intern* — *May 2018 – July 2018*

. Mentor: Paras Pitroda
. Developed a dynamic portal for UAE to provide various services such as renew the visa, employment letter, etc.
. Created API endpoints for the project to aid easy app deployment.

## SELECTED AWARDS/ACHIEVEMENTS

**Invitee**, *ML Foundations*; Research Week with Google, India — 2022

**Invitee**, Machine Learning Summer School, Taipei — 2021

**Invitee**, Google AI Summer School, India (Acceptance Rate: 1.5%) — 2020

**Travel Grant**, The Web Conference, Taipei (Acceptance Rate: 19%) (Declined) — 2020

**Awardee**, INSPIRE Scholar (Acceptance Rate: 1%) (Declined) — 2016-2021

**Awardee**, NTSE Scholar (Awarded to 775 students amongst 0.5 million candidates) — 2014-2020

**National Olympiad**, SOF National Science Olympiad Qualifier (2015), SOF International Math Olympiad Qualifier (2015)

## PUBLICATIONS


[1] **Ramnath Kumar**, Tristan Deleu, and Yoshua Bengio. "Rethinking Learning Dynamics in RL using Adversarial Networks". In: *39th International Conference on Machine Learning, ICML*. 2022. **Under Review**.

[2] **Ramnath Kumar**, Tristan Deleu, and Yoshua Bengio. "The Effect of diversity in Meta-Learning". In: *39th International Conference on Machine Learning, ICML*. 2022. **Under Review**.

[3] **Ramnath Kumar**, Tristan Deleu, and Yoshua Bengio. "Effect of diversity in Meta-Learning". In: *NeurIPS Workshop on Meta-Learning*. 2021.

[4] **Ramnath Kumar** and Gokul Swamy. "Stochastic Insight into Neural Networks". In: *Amazon Machine Learning Conference (AMLC), 2021*. AmazonML Internal Conference. 2021.

[5] **Ramnath Kumar**, Shweta Yadav, Raminta Daniulaityte, Francois Lamy, Krishnaprasad Thirunarayan, Usha Lokala, and Amit Sheth. "eDarkFind: Unsupervised Multi-view Learning for Sybil Account Detection". In: *Proceedings of The Web Conference 2020*. 2020, pp. 1955–1965. .

[6] **Ramnath Kumar** and G Geethakumari. "Temporal Dynamics and Spatial Content in IoT Malware detection". In: *TENCON 2019-2019 IEEE Region 10 Conference (TENCON)*. IEEE. 2019, pp. 1590–1595. .

## PROFESSIONAL SERVICE

### Reviewer

| | |
|---|---|
| NeurIPS | 2022 |
| ICML | 2022 |
| AutoML | 2022 |
| NeurIPS, MetaLearn Workshop | 2021 |
| ICWSM | 2020,2022 |

## RELEVANT COURSEWORK

| | |
|---|---|
| **MATH-F111**, Calculus | by K.V. Ratnam |
| **MATH-F112**, Linear Algebra | by P.K. Sahoo |
| **MATH-F113**, Probability and Statistics | by D.K. Satpathi |
| **MATH-F211**, Differential Equations | by T.S.L. Radhika |
| **CS-F320**, Foundations of Data Science | by N.L. Bhanumurthy |
| **CS-F407**, Artificial Intelligence | by Chittaranjan Hota |
| **CS-F464**, Machine Learning | by N.L. Bhanumurthy |
| **CS-F469**, Information Retrieval | by Aruna Malapati |
| **Udemy**, Deep Learning A-Z | by Kirill Eremenko |
| **Coursera**, Neural Networks and Deep Learning | by Andrew NG |
| **Coursera**, Improving Deep Neural Networks | by Andrew NG |
| **Coursera**, Structuring Machine Learning Projects | by Andrew NG |
| **Coursera**, Convolutional Neural Networks | by Andrew NG |
| **Coursera**, Sequence Models | by Andrew NG |

## LANGUAGES

English (Native/Fluent), Hindi (Experienced), Tamil (Experienced), Japanese (Beginner)