

Nupur Kumari

Graduate Student (MSR)
Robotics Institute
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Education

Indian Institute of Technology Delhi (I.I.T Delhi), India	2012 - 2017
Integrated M. Tech in Mathematics and Computing - 9.15/10.0 Department Rank : 5	
CBSE	
Senior Secondary Exam 12 th grade - 92.7%	2010 - 2012
Higher Secondary Exam 10 th CGPA - 10.0/10.0	2010

Publications

- Puneet Mangla*, Nupur Kumari*, Mayank Singh*, Vineeth N Balasubramanian, Balaji Krishnamurthy. **Data Instance Prior for Transfer Learning in GANs**. arxiv preprint (paper link)
- Parth Patel*, Nupur Kumari*, Mayank Singh*, Balaji Krishnamurthy. **LT-GAN: Self-Supervised GAN with Latent Transformation Detection**. WACV 2021 (paper link)
- Mayank Singh*, Nupur Kumari*, Puneet Mangla, Abhishek Sinha, Balaji Krishnamurthy, Vineeth N Balasubramanian. **Attributional Robustness Training using Input-Gradient Spatial Alignment**. ECCV 2020 (paper link)
- Puneet Mangla*, Mayank Singh*, Nupur Kumari*, Abhishek Sinha*, Balaji Krishnamurthy, Vineeth N Balasubramanian. **Charting the Right Manifold: Manifold Mixup for Few-shot Learning**. WACV 2020 (paper link)
- Gunjan Aggarwal*, Abhishek Sinha*, Nupur Kumari*, Mayank Singh*. **On the Benefits of Models with Perceptually-Aligned Gradients**. ICLR workshop, Towards Trustworthy ML, 2020 (paper link)
- Nupur Kumari*, Siddarth Ramesh*, Akash Rupela*, Piyush Gupta*, Balaji Krishnamurthy. **ShapeVis: High-dimensional Data Visualization at Scale**. WWW 2020 (paper link)
- Nupur Kumari*, Mayank Singh*, Abhishek Sinha*, Harshitha Machiraju, Balaji Krishnamurthy, Vineeth N Balasubramanian. **Harnessing the Vulnerability of Latent Layers in Adversarially Trained Models**. IJCAI. 2019. (paper link)
- Mayank Singh*, Nupur Kumari*, Abhishek Sinha*, Balaji Krishnamurthy. **Understanding Adversarial Space through the lens of Attribution**. Nemesis - ECML workshop. 2018. (paper link).
- Bishal Deb, Ankita Sarkar, Nupur Kumari, Akash Rupela, Piyush Gupta, Balaji Krishnamurthy. **MultiMapper: Data Density Sensitive Topological Visualization**. ICDM workshop, 2018. (paper link).
(* denotes equal contribution)

Work Experience

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|--|-------------------|
| Adobe Systems, Noida, India | Jun 2017-Jan 2021 |
| – Topological Data Visualization
Working on a scalable data visualization approach which aims at preserving the shape/topological properties of the data. <i>Adobe P8569-US</i> patent has been approved by Adobe for the algorithm. | |
| – Adaptive Customer Journey
Working on a reinforcement learning based approach to arrive at personalized user journeys for marketing campaigns. <i>Adobe P7958-US</i> patent was internally approved by Adobe for the approach. | |
| – Adversarial Robustness
We proposed a regularization loss while training of neural network to promote disentangled feature learning at deeper layers of neural network which further helped in adversarial robustness. <i>Adobe P8327-US</i> patent was approved by Adobe for the proposed methodology. | |

Internships

- **Adobe Systems, Noida, India** May-July 2016
Topological Data Analysis
Unsupervised user segmentation leveraging techniques from topological data analysis and deep learning. Trained a seq2seq neural network model on time-series data of users to get a low dimensional vector representation. Afterwards, calculated the persistent homology features of the point cloud of each user for segmentation.
- **Curofy, Gurgaon, India** May-July 2015
Application Development
Implemented a personalized notification system for the application based on past behavioural data of users. The algorithm ranked the recommended content for each user using a tf-idf based approach.

Other Projects

- **Sim2Real in Reinforcement Learning** Sept-Nov 2019
Worked on the problem of learning policies which are robust to changes in the environment. Current work in domain randomization aims at achieving this goal by training the agent on a distribution of simulation environments. We guided the sampling distribution of environment using an adversarial loss for finding the worst environment within small perturbations and observed improvement in the total reward.
- **Natural Language Processing** Jan-April 2016
Implemented a sentiment classifier for predicting sentiments expressed in the tweet specific to a personality. Used domain adaptation techniques to exploit large amount of labelled tweet data on general sentiment and few domain specific labels. Experimented with attention based hierarchical seq2seq model for abstractive summarization of movie reviews.

Scholastic Achievements

- Qualified for **INMO (Indian National Mathematics Olympiad)** 2012 organized by HBSCE by securing second position in the region and 19 overall in India in JMO (Junior Mathematics Olympiad).
- Recipient of highest CGPA in semester award for two semesters at IIT Delhi. 2016-2017

Positions of responsibility

- **Mentor of internship projects** May-July 2018-19
 - **Topological features for Deep Learning** The project aimed at exploring the use of persistent homology based features of data for predicting network architecture.
 - **Adversarial Attacks** In this project, we developed a fast data independent technique of computing class-wise universal adversarial perturbation for classification neural networks. (project link)
- **Teaching Assistantship**
 - **Discrete Mathematics, Data Mining, and Linear Algebra** Responsible for assignment evaluation and conducting tutorial sessions for the courses at IIT Delhi.
 - **Machine Learning course on classification and deep learning** Worked as a teaching instructor for a Machine Learning course that was offered to employees at Adobe.
- **Electrical coordinator at Robotics Club IIT Delhi** 2014-2015
 - Responsible for guiding a team of 10 students in building the drive and circuit of a remote controlled robot that can play badminton. We participated in Abu-Robocon India 2015 competition and qualified till the quarter-finals round among more than 60 participating teams.

Languages and Libraries

Proficient: Python, Tensorflow, Pytorch

Familiar: C++, Java