

ROHAN V KASHYAP

Indian Institute of Science, Bangalore

+91 9632145522 || rohanvkashyap.github.io || linkedin.com/in/rohanvkashyap || github.com/RohanVKashyap

EDUCATION

Bangalore Institute of Technology

Bachelor of Engineering in Electronics and Communication Engineering

August 2016 – August 2020

GPA: 8.81/10 / Rank: 5 / 180

Advisor: Dr. Narendra C.P. Research: Gaussian Process and Neural Networks using limit theorems.

PUBLICATIONS

Pavan S.K.*, Rohan V Kashyap*, Prathosh A.P. Neural discovery of permutation subgroups. Artificial Intelligence and Statistics (AISTATS) 2023. [Paper]

Pavan S.K.*, Rohan V Kashyap*, Prathosh A.P., Aditya Gopalan. A Unified Framework for Discovering Discrete Symmetries. Artificial Intelligence and Statistics (AISTATS) 2024 (under review). [Paper]

Rohan V Kashyap. A Survey of Deep Learning Optimizers – First and Second Order Methods. IEEE Transactions on Neural Networks and Learning Systems (under review). [Paper]

Rohan V Kashyap*, Vivek V Kashyap, Narendra C.P. GPT-Neo for Commonsense Reasoning - a Theoretical and Practical lens. ACM Transactions on Audio, Speech and Language Processing (under review). [Paper]

EXPERIENCE

Indian Institute of Science

Bangalore, India

Research Assistant, Deep Representation Learning Lab, Advisor: Dr. Prathosh A.P.

Jan 2022 – Present

- Designed and implemented novel methodologies to incorporate invariance symmetries into neural networks. We provide strong theoretical results for discovering permutation, cyclic and dihedral groups when the underlying group is unknown; **accepted** at AISTATS 2023.
- Proposed a unified architecture for automatic symmetry discovery of discrete groups using tensor-valued functions in a multi-armed bandit setting. We devised a theoretical framework to handle invariance symmetries for a generic class of permutation subgroups and product groups with 95% accuracy; **under review** at AISTATS 2024.
- Conducted research on the analysis of orbit separation of group symmetries using invariant polynomial rings and devised a novel methodology to learn matrix lie groups using their corresponding lie subalgebras for equivariant MLPs.
- Working on single-step dataset condensation methods (1-example per-class) using diffusion-based models. We utilize the probability-flow ODE trajectories and the consistency distillation objective for high-resolution sample generation on the ImageNet, CIFAR-10 and LSUN dataset.

Gupshup

Bangalore, India

Machine Learning Engineer

Jan 2021 – Dec 2021

- Migrated workflows to AWS SageMaker Studio for Transformer-based models (BERT, GPT-2) using large-scale EC2 servers for data processing, model training, batch predictions on GPU's and deployed model endpoints using AWS lambda.
- Implemented GraphSAGE graph neural networks (GNN) using the Deep Graph Library (DGL) and PyTorch for handling prompt queries and aggregating relevant semantic parsers from web crawls with a recall @3 (R@3) of 0.223.
- Designed and evaluated sparse attention-based Transformer models (Reformer) for adaptive transfer learning on question-answering, autocompletion and later devised a model distillation procedure with a 22.3% increase in model perplexity.

Needl.AI

Bangalore, India

Research Intern, Advisor: Vikram Srinivasan

Mar 2020 – Nov 2020

- Worked on BERT model optimization for reduced latency and accelerated inference on GPU's using adaptive model pruning and knowledge distillation to obtain a 5x smaller model size for numerous NLP tasks with 94% accuracy.
- Investigated meta-learning and unsupervised domain adaptation of language models (LMs) using a plug-and-play cross-lingual decoder model for efficient feature-transfer using custom financial dataset on downstream tasks.

Honeywell

Bangalore, India

Research Intern

July 2019 – Aug 2019

- Implemented the facial recognition task using GANs which was successfully integrated into the product pipeline.

TEACHING EXPERIENCE

- Provided office hours, designed and graded assignments and quizzes for 3 consecutive semesters for the following graduate-level courses: Advanced Deep Representation Learning (Fall 2022, Fall 2023 (current); Dr. Prathosh A.P.) and Pattern Recognition and Neural Networks (Spring 2023; Dr. Prathosh A.P.).

ACHIEVEMENTS

- First student in the VTU University to secure 100/100 in Signals and Systems (Fourth Semester).
- Selected for Google's Tensorflow Dev Summit at Sunnyvale, California (2020).
- Selected for AI Summer School Workshop at IIT Madras Research Park (2019).
- Served as a reviewer for AISTATS and NeurIPS conferences under Prof. Prathosh A.P.
- Selected for the AIS – Lie groups and Lie algebras 2023 workshop conducted in the Department of Mathematics, Indian Institute of Science (IISc), India.

RESEARCH PROJECTS

Group Equivariance for Matrix Lie groups / *Advisor: Dr. Prathosh A.P, Dr. Aditya Gopalan*

- Implemented Group Equivariant neural network for discovering simply-connected lie groups using their correspondence with the finite-dimensional representations of the lie subalgebra.
- Examined the equivariant MLP and L-conv architectures for model implementation and obtained interpretable lie algebra basis representations for $SO(3)$, $SO(1, 3)_+$, $SE(2)$ and the affine group.

Generalized Flow-based models / *Advisor: Dr. Prathosh A.P.*

- Examined continuous normalizing flows (CNF) and diffusion-based models for supervised training using generalized probability path trajectories to study its influence on the number of inference steps against sample-quality for image generation tasks.
- Investigated the sampling path trajectories of the score function for these models using a gaussian source distribution in both the class-conditional and unconditional setting with an FID of 6.72 on the ImageNet (32*32) dataset.

TECHNICAL SKILLS

- **Languages:** Python, C++
- **Libraries:** Pytorch, Tensorflow, Scikit-learn
- **Software:** Git, Docker, AWS Cloud
- **IISc Coursework:** Probability Theory (MA 361), Real Analysis (MA 221), Abstract Algebra (MA 212), Differential Manifolds (MA 235), Advanced Deep Representation Learning (E1-285).

BLOGS

- Group Equivariance for Matrix Lie groups. [\[Article\]](#)
- Score-based generative modeling. [\[Article\]](#)

