

Research Interests

Graph Deep Learning (Graph Neural Networks); Natural Language Processing; Knowledge Graphs; Topological Analysis of Neural Networks; Explainability and Interpretability of Deep Neural Networks.

Work Experience

- June, 2021– Present **Research Scientist (Pre-Doctoral Researcher)**, GOOGLE AI. Full Time
- June, 2020– August, 2020 **Deep Learning Intern**, LEARNGRAM AI. Summer Internship 2020
- January, 2018– May, 2018 **NLP and Software Developer Intern**, NEWSINFO.

Education

- July, 2017– June 2021 **Bachelor Of Technology In Computer Science And Engineering**, Indian Institute of Technology(IIT) Hyderabad, CGPA – 9.13/10.
- April, 2015– March, 2017 **Senior Secondary**, Modern Vidya Niketan School, Faridabad, Percentage – 95.0.

Publications

Conference Publications

- 2020 Title: **Learning Representations using Spectral-Biased Random Walks on Graphs**. Paper Link: <https://arxiv.org/pdf/2005.09752.pdf>
Authors: Charu Sharma, **Jatin Chauhan** and Manohar Kaul
[A] Conference: **International Joint Conference on Neural Networks (IJCNN) 2020, Glasgow, UK**
Description: A novel random walk method based on spectral similarity of a node to its neighbours. The model was equipped with a novel Wasserstein regularizer in the final objective function.
- 2020 Title: **Few-Shot Learning on Graphs via Super-Classes based on Graph Spectral Measures**. Paper link: <https://www.openreview.net/forum?id=Bkeeca4Kvr>
Authors: **Jatin Chauhan**, Deepak Nathani and Manohar Kaul
[A*] Conference: **International Conference on Learning Representations (ICLR) 2020, Addis Ababa, Ethiopia**
Description: We proposed to study the problem of Few-shot classification in the graph domain for the first time. We proposed a novel method for clustering the samples prior to learning which takes into account the spectral similarity of the samples with one another via Wasserstein distance over the distribution of the graph spectrum.

- 2019 Title (Long Paper): **Learning Attention-based Embeddings for Relation Prediction in Knowledge Graphs**. Paper link: <https://www.aclweb.org/anthology/P19-1466.pdf>
 Authors: Deepak Nathani*, **Jatin Chauhan***, Charu Sharma* and Manohar Kaul
 (* denotes *equal contribution*)
[A*] Conference: **Association for Computational Linguistics (ACL) 2019, Florence, Italy**
 Description: We proposed a novel method to improve the aggregation and propagation of information amongst the entities in the graph by utilizing Graph Attention Networks equipped with relation specific attention.
- [Preprints](#)
- 2021 Title: **Target Model Agnostic Adversarial Attacks with Query Budgets on Language Understanding Models..** Paper link: <https://arxiv.org/pdf/2106.07047.pdf>
 Authors: **Jatin Chauhan**, Karan Bhukar and Manohar Kaul
 Description: We propose a target model agnostic adversarial attack method that works well under limited query budget settings and generates highly transferable adversarial samples.
- [Under Review](#)
- 2021 Paper Titled: **BERTOPS: Studying BERT Representations under a Topological Lens**.
 Authors: **Jatin Chauhan** and Manohar Kaul
 Conference: Under Review in A* conference
 Description: We propose a novel scoring function based on Persistence Homology which serves as an accurate estimator of the test set performance and adversarial vulnerability of fine-tuned BERT models.

Achievements

- 2020 **Undergraduate Research Excellence Award**
- 2019 **Secured 5th rank in PanIIT Hackathon: Artificial Intelligence for India**
- 2019 **Received Microsoft Research Travel Grant for ACL 2019 held in Florence, Italy**
- 2018 **Runner-Up: Tinkerer's Lab Competition on AI**
- 2017 **IIT JEE Advanced Rank - 554**
- 2017 **KVPY Fellowship**

Teaching

- August 2019 – **Introduction to Programming:** My responsibilities included grading assignments and
 November 2019 exams, conducting lab sessions for students and assisting in preparing the teaching material.
 and August 2018 –
 November 2018

Service

- Reviewer:** NeurIPS 2021
- External Reviewer:** ICML 2021, AAAI 2021, ICLR 2021, NeurIPS 2020, EMNLP 2020, ACL 2020, NeurIPS 2019
- Volunteering:** IIT Hyderabad ACM Chapter, NSS IIT Hyderabad

Projects

- January, 2020 – **Mathematical Question Answering via NALU based Transformers:** Designed a new Transformer architecture with arbitrary kernel mechanisms replacing the standard Multi-Head Attention for higher capacity. Additionally, each layer was integrated with a Neural Arithmetic Logic Unit which includes a bias for mathematical calculations thus achieving better performance than standard Transformer model.
- March, 2020
- February, 2020 – **Image Captioning via Kernelised Attention:** Designed a new image captioning model containing kernel-based attention mechanism coupled with gating to improve information filtration as well as sparse activation functions to improve the model performance and generalization.
- April, 2020
- August, 2019 – **Distant Supervision Relation Extraction Using Manifold-Mixup:** Designed an improved version of the BERT model via manifold-mixup to improve the generalization of the BERT model as well as achieving higher performance.
- October 2019
- August, 2019 – **Knowledge Graph Embeddings via Attention based Random Walks:** A new encoder-decoder framework for knowledge graph embedding methods. To leverage the KG structure, multiple random walks are performed over the KG and are aggregated for each entity and passed through ON-LSTM language model. The entity and relation embeddings are then fed to the decoder. The method achieves higher performance than existing baselines which don't leverage graph structure.
- November 2019
- January, 2019 – **Peer to Peer file sharing and distributed downloading system:** A peer to peer file sharing and downloading system in Golang via concurrent programming. Integrated message system which allows peers to chat simultaneously while sharing files.
- February, 2019

Technical skills

- Languages Python, C++, Golang
- Frameworks Git, Django
- ML Frameworks Pytorch, Tensorflow, Scikit-Learn, Matplotlib

Courses

- Institute Courses Causal Inference, Software Engineering, Information Retrieval, Data Mining, Theory of Computation, Principles of Programming Languages, Computer Networks, Databases, Data Structures, Operating Systems, Compilers, Algorithms, Discrete Mathematics, Calculus, Probability, Linear Algebra