Amit Roy

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Education

Purdue Univeristy **West Lafayette, Indiana, USA**
Graduate Student in Computer Science (*Offered Ross Fellowship*) *August 2022 - Present*
Current CGPA: 3.68/4.0 (MS Expected by May 2024) | *Grad School Webpage*
Research Focus: Deep Learning, Graph Machine Learning
Research Advisor: Prof. Pan Li

Univeristy of Dhaka **Dhaka, Bangladesh**
B.Sc in Computer Science and Engineering | Undergraduate Curriculum *January 2016 - January 2020*
CGPA: 3.96 out of 4.00 (Class Rank: 1^{st} out of 65 students)
Thesis Topic: Utility-based Graph Mining
Supervisor: Dr. Chowdhury Farhan Ahmed

Professional Experience

Purdue University **West Lafayette, Indiana, USA**
Graduate Research and Teaching Assistant *August 2022 - Present*
Worked on Graph Anomaly Detection research project and published papers using neighborhood Reconstruction and subgraph-score matching-based training with energy-based models supported by Sony, Belgium, and served as a teaching assistant in Machine Learning courses at Purdue CS | Advisor: Prof. Pan Li

Artificial Intelligence and Cybernetics Lab (AGenCy Lab) **Dhaka, Bangladesh**
Research Assistant - Machine Learning on Graphs *February 2020 - June 2022*
Developed GNN-based models for spatiotemporal traffic forecasting, node classification, and graph classification tasks supported by ICT Division, Government of Bangladesh. Advisors: Dr. Amin Ahsan Ali and Dr. AKM Mahbubur Rahman

Tiger IT Bangladesh Ltd. **Dhaka, Bangladesh**
Software Engineer - Machine Learning *December 2020 - August 2022*
Worked as a backend developer on applied computer vision projects from real-time video data e.g. Automated Number Plate Recognition and object detection.

Research Projects

GAD-NR: Graph Anomaly Detection via Neighborhood Reconstruction **March 2024**
***Amit Roy**, Juan Shu, Jia Li, Carl Yang, Olivier Elshocht, Jeroen Smeets, Pan Li*
The 17th ACM International Conference on Web Search and Data Mining (WSDM-2024) [*Paper*] [*Code*] [*PyGOD*]

GAD-EBM: Graph Anomaly Detection using Energy-Based Models **December 2023**
***Amit Roy**, Juan Shu, Olivier Elshocht, Jeroen Smeets, Ruqi Zhang, Pan Li*
New Frontiers in Graph Learning (GLFRONTIERS), NuerIPS Workshop 2023 [*Paper*]

Before Joining Purdue CS:

Unified Spatio-Temporal Modeling for Traffic Forecasting using GNN **April 2021**
Amit Roy, Kashob Kumar Roy*, Amin Ahsan Ali, M Ashraful Amin and A K M Mahbubur Rahman*
The International Joint Conference on Neural Networks (IJCNN-2021) [*Paper*] [*Code*]

SST-GNN: Simplified Spatio-temporal Traffic forecasting model using Graph Neural Network **February 2021**
Amit Roy, Kashob Kumar Roy*, Amin Ahsan Ali, M Ashraful Amin and A K M Mahbubur Rahman*
The 25th Pacific-Asia conference on Knowledge Discovery and Data Mining (PAKDD-2021) [*Paper*] [*Code*]

Node Embedding using Mutual Information and Self-Supervision based Bi-level Aggregation **April 2021**
Kashob Kumar Roy, **Amit Roy***, Amin Ahsan Ali, M Ashraful Amin and A K M Mahbubur Rahman*
The International Joint Conference on Neural Networks (IJCNN-2021) [*Paper*] [*Code*]

Structure-Aware Hierarchical Graph Pooling using Information Bottleneck **April 2021**
Kashob Kumar Roy, **Amit Roy***, Amin Ahsan Ali, M Ashraful Amin, and A K M Mahbubur Rahman*
The International Joint Conference on Neural Networks (IJCNN-2021) [*Paper*] [*Code*]

Mining High Utility Subgraphs **September 2021**
*Md. Tanvir Alam, **Amit Roy**, Chowdhury Farhan Ahmed, Md. Ashraful Islam, Carson K. Leung*
UDML 2021: 4th Workshop on Utility Driven Mining and Learning @ ICDM 2021 [*Paper*] [*Code*]

UGMINE: Utility-based Graph Mining **February 2022**
*Md. Tanvir Alam, **Amit Roy**, Chowdhury Farhan Ahmed, Md. Ashraful Islam, Carson K. Leung*
Applied Intelligence Journal, Impact Factor: 5.086 [*Paper*] [*Code*]

*** indicates Equal Contribution**

Academic Projects

Hierarchical Clustering to classify images generated from Multi-generator GAN *August 2023 - December 2023*
Combined hierarchical clustering with multi-generator GAN architecture to classify images. [*Project Report*] [*Presentation*] [Code]

Impact of Large Language Models in DBMS *August 2023 - December 2023*
Investigated SOTA models and evaluated the performance of LLM for DBMS tasks e.g. text-to-SQL, query disambiguation.[*Presentation*]

Investigating Knowlege Graph Completion with Pre-trained Language model and GNN *January 2023 - April 2023*
Developed architecture with pre-trained word embeddings from BERT and Relational Graph Convolutional Network (RGCN) for link prediction in knowledge graphs. [*Presentation*] [*Code*]

Exploring the loss landscape of self-supervised learning with MCMC sampling *January 2023 - April 2023*
Employed Hamiltonian Monte Carlo MCMC sampling algorithm to find a potential fragility in the optimization of a state-of-the-art self-supervised learning method Simsiam [*Project Report*] [*Presentation*]

iGest Recognito : Mobile App for sign language based communication *July 2017 - November 2017*
Developed an android application as a communication medium between regular text messaging and sign language, awarded as the Champion at ***DUITS-ROBI National IT Fest****, 2018 (Results) and presented as a poster in* ***International conference on Emerging technologies in data Mining and Information Security(IEMIS)****, 2018 in Kolkata, India.* [*Poster Link*] [*Demo Video*] [*Code*]

Technical Skills

Programming Languages:	Python, C++, C, Java
Data Science Tools:	PyTorch, NumPy, Scikit-Learn, Matplotlib, NetworkX, OpenCV, PyGOD
Web Development:	FrontEnd - HTML, JavaScript | BackEnd - Flask, MySQL, MongoDB
Miscellaneous:	Git, LaTeX

Courseworks and Problem Solving

- **Related Courses:**
  - Computation & Machine Learning over Graphs, Deep Learning, Data Mining, Statistical Machine Learning, Natural Language Processing, Artificial Intelligence, Algorithm Design, Analysis, and Implementation, Database Systems, Mathematical and Statistical Analysis for Engineers, Linear Algebra, Introduction to Probability and Statistics
- **Problem Solving**
  - Solved 1000+ problems in different Online Judges including Codeforces, Codechef, and UVA.
  - Reached Expert (Rating 1640) in Codeforces and 5* (Rating 2160) in Codechef, username: *amitroy7781*.

Teaching Experinence

- Teaching Assistant - Department of Computer Science, Purdue University
  - CS 37300 : Data Mining and Machine Learning, Spring 2024
  - CS 57800 : Statistical Machine Learning, Fall 2023

Awards and Achievements

- 2022: **Ross Fellowship** by Purdue University for outstanding graduate student.
- 2022: "**University Grants Commission of Bangladesh Scholarship**" for the first position in the Faculty of Engineering and Technology, University of Dhaka [*Certificate*]
- 2022: **"Professor Dr. M Lutfur Rahman Award"** for securing the highest CGPA in the Bachelor of Science Examination of 2019 in Computer Science and Engineering, University of Dhaka. [*Certificate*]

References

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