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: 3.88/4.0
Research Focus: Deep Learning, Graph Machine Learning
Current Supervisor: 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

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*]

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*
[Code] [*Presentation*]

Impact of Large Language Models in DBMS *August 2023 - December 2023*
Investigated literature 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. [*Code*] [*Presentation*]

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*]

uRECO: Web project for online gesture recognition *January 2018 - June 2018*
Developed web application for real-time image processing tasks: sentiment detection from facial expression, digit recognition from hand gestures of American Sign Language (ASL), and on-screen keyboard with fingertip usage. [*Code*] [*Demo Video*]

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.*
[*Code*] [*Demo Video*] [*Poster Link*]

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, Artificial Intelligence, Data Mining, Statistical Machine Learning, Natural Language Processing, 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*.

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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