Amit Roy

Lafayette, Indiana, USA

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Education

Purdue Univeristy   **West Lafayette, Indiana, USA**
PhD Student in Computer Science   *August 2022 - Present*
Current CGPA: 3.88/4.0
Research Focus: Graph Anomaly Detection
Advisor: Prof. Pan Li

Univeristy of Dhaka   **Dhaka, Bangladesh**
B.Sc in Computer Science and Engineering   *January 2016 - January 2020*
CGPA: 3.96 out of 4.00 (Class Rank: 1st out of 65 students)
Thesis Topic: Utility-based Graph Mining
Advisor: 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 spatial-temporal traffic forecasting, node classification, and graph classification 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. Automatic Number Plate Recognition and object detection and deep fake-based face animation generation using First-Order-Motion Model.

Publications

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*]

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*]

* indicates Equal Contribution

Academic Projects

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. [*Github*] [*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 [*Github*] [*Presentation*]

Reproducing "Taking a long look at QUIC" *August 2022 - December 2022*
Performed file download latency and fairness comparison between two transport layer protocols QUIC and TCP. [*Github*] [*Demo Video*]

interviewGeek : An online interview platform *January 2019 - June 2019*
Developed a real-time mock interview platform with online IDE, user profiles, and personalized feeds. [*Github*]

cricHUB : A website for cricket news updates *July 2018 - November 2018*
Developed cricket-based website with live scores, cricket news, match predictors, player and tournament statistics. [*Github*]

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

Technical Skills

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

Problem Solving and Courseworks

- **Core Courses:**
  - **Undergrad Level**: Linear Algebra, Introduction to Probability and Statistics, Artificial Intelligence, Mathematical and Statistical Analysis for Engineers, Data Mining
  - **Grad Level**: Deep Learning, Machine Learning on Graphs, Statistical Machine Learning, Natural Language Processing
- **MOOC Courses:** Machine Learning, Coursera [*Certificate*], Neural Networks and Deep Learning, Coursera [*Certificate*], Structuring Machine Learning Projects, Coursera [*Certificate*] Improving Deep Neural Networks: Hyperparameter tuning, Regularization and Optimization, Coursera [*Certificate*] Build Basic Generative Adversarial Networks (GANs), Coursera [*Certificate*]
- Solved 1000+ problems in different Online Judges including Codeforces, Codechef, UVA.
- Reached Expert (Rating 1640) in Codeforces and 5* (Rating 2160) in Codechef, username: *amitroy7781*.

Awards and Achievements

- 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

Dr. Pan Li
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Computer Science, Purdue University
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