

# Amit Roy

Lafayette, Indiana, USA

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in amitroy7781

🔗 google scholar

🌐 amitroy7781.github.io

## Education

### Purdue Univeristy

PhD Student in Computer Science (Offered Ross Fellowship)

Current CGPA: 3.88/4.0

Research Focus: Deep Learning on Graphs, Graph Anomaly Detection (GAD)

Advisor: Prof. Pan Li

West Lafayette, Indiana, USA

August 2022 - Present

### Univeristy of Dhaka

B.Sc in Computer Science and Engineering | Undergraduate Curriculum

CGPA: 3.96 out of 4.00 (Class Rank: 1<sup>st</sup> out of 65 students)

Thesis Topic: Utility-based Graph Mining

Advisor: Dr. Chowdhury Farhan Ahmed

Dhaka, Bangladesh

January 2016 - January 2020

## Professional Experience

### Artificial Intelligence and Cybernetics Lab (AGenCy Lab)

Research Assistant - Machine Learning on Graphs

Developed GNN-based models for spatiotemporal, traffic forecasting, node classification, and graph classification supported by ICT Division, Government of Bangladesh. Advisors: Dr. Amin Ahsan Ali and Dr. AKM Mahbubur Rahman

Dhaka, Bangladesh

February 2020 - June 2022

### Tiger IT Bangladesh Ltd.

Software Engineer - Machine Learning

Worked as a backend developer on applied computer vision projects from real-time video data e.g. Automated Number Plate Recognition and object detection.

Dhaka, Bangladesh

December 2020 - August 2022

## Research Projects

GAD-EBM: Graph Anomaly Detection using Energy-Based Models (Under Review)

August 2023

Amit Roy, Juan Shu, Olivier Elshocht, Jeroen Smeets, Ruqi Zhang, Pan Li

GAD-NR: Graph Anomaly Detection via Neighborhood Reconstruction (Under Review)

January 2023

Amit Roy, Juan Shu, Jia Li, Carl Yang, Olivier Elshocht, Jeroen Smeets, Pan Li

[Paper] [Code]

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

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**Investigating Knowledge 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 Simsim [Project Report] [[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. [[Code](#)] [[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. [[Code](#)]

**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. [[Code](#)]

**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

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

## Courseworks and Problem Solving

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- o **Related Courses:**
  - Computation & Machine Learning over Graphs, Deep Learning, Statistical Machine Learning, Natural Language Processing, Artificial Intelligence, Data Mining, Mathematical and Statistical Analysis for Engineers, Linear Algebra, Introduction to Probability and Statistics
- o **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

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- o 2022: "**University Grants Commission of Bangladesh Scholarship**" for the first position in the Faculty of Engineering and Technology, University of Dhaka [[Certificate](#)]
- o 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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Dr. Pan Li  
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Computer Science, Purdue University,  
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Dr. Amin Ahsan Ali  
Associate Professor  
Department of Computer Science and Engineering  
Independent University, Bangladesh  
Email: aminali@iub.edu.bd | Homepage

Dr. A K M Mahbubur Rahman  
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Department of Computer Science and Engineering  
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