AVISHEK BOSE

@ avishek.csedu.res@gmail.com   📞 +1(785)317-6675   ✉ 2401 Yellow Birch Way, Apt 301, Knoxville, TN 37931, USA
🅂 tinyurl.com/aboseGscholar   in avibose   ⬤ abose17   🌐 abose17.github.io   ⓘ orcid.org/0000-0001-5936-3170

EXPERIENCE

Postdoctoral Research Associate
Learning systems group, Data and AI Systems Section, CSMD, CCSD at Oak Ridge National Laboratory (ORNL)

📅 Jan 2023 – present   📍 Oak Ridge, Tennessee, USA

- Currently, I am contributing to a project called NAERM which is a sub-project of the DOE-sponsored Eagle-I initiative. My role here is to leverage the underlying topological structures of power stations, sub-stations, and critical infrastructure to predict their power outages during hazardous weather events by analyzing explicit and implicit correlations.

- I am leading a project to transform isocontours data from various scientific visualization data sets (weather, fluid dynamics, human skull, etc.) into graph-structured data to apply GNNs to reduce the processing time of depth calculation. My implementation using GNNs performed the calculation 100 times faster than the conventional ways.

- I am working on an NIH-sponsored drug discovery project where my task is to predict thousands of drug functionalities at a time even when there are shortages of labeled data using graph neural networks (GNNs), recurrent neural networks (RNNs), and Transformers. Another task is to predict similar drug molecules based on their properties and results in a reverse engineering fashion.

- I worked on **Ascend** project where my task was to enrich material knowledge graph by providing hidden information from materials research papers automatically, using pre-trained large language models (LLMs such as GPT-LLaMA, GPT-NeoX and BERT) with an attention mechanism. I also made a couple of significant analyses on BERT and GPT models according to their structural differences and usability such as why GPT models are better than BERT models, in which context BERT performs better, principles of fusing of embedding models, etc.

Research Assistant
KDD Lab, Department of Computer Science, Kansas State University

📅 Jun 2018 – Dec 2022   📍 Manhattan, Kansas, USA

- Worked on Cyber Threat Intelligence (CTI) project to extract cyber-threat intelligence, classify their types, and rank threat events from social media texts such as Twitter data stream using PyTorch, scikit-learn, etc. by adopting relevant methods from GNN, NLP, and SNA research domains (**5 peer-reviewed papers accepted**, paper-1 has 94.62% and 81.99% accuracy on CTI Relevance and Threat Type respectively, paper-2 achieves a significant precision 93.75%, and paper-3 outperformed baselines by 23.23% on average, paper 5 proposed novel robust GNN layer and network)

- Worked on HPC Analytics project to predict the status of a submitted job and its resource requirements by training Graph Neural Network (GNN) models on computing cluster log data using PyTorch (**2 peer-reviewed papers accepted**, paper-1 achieves $R2$ of 95% with 99% accuracy and paper-2 achieves a remarkable 88% F1_score)

Probationary Officer: Software Developer
ICT Division, Dutch Bangla Bank

📅 Jul 2016 – Dec 2016   📍 Dhaka, Bangladesh

- Worked on the back-end part of a project called *Agent Banking* and there I used to write Pl/SQL scripts to support query requests from the Tomcat application server

EDUCATION

Ph.D. in Computer Science
Kansas State University

📅 Nov 2022   📍 Manhattan, Kansas, USA

- **Coursework:** Deep Learning, Information Retrieval and Text Mining, Key Phrase Extraction, Artificial Intelligence, Real-Time Systems, Software Specification, Applied Linear Statistics Models

- **Thesis:** "Learning representations for information mining from text corpora with applications to cyber threat intelligence"

Ph.D. in Computer Science (Student)
University of Nevada, Reno

📅 Spring 2017   📍 Reno, Nevada, USA

- **Coursework:** Big Data Analysis, Reliability and Security of Computing Systems

M.S. in Computer Science and Engineering
University of Dhaka

📅 2015   📍 Dhaka, Bangladesh

- **Coursework:** Image Processing, Introduction to Bioinformatics, Advanced Logic Design, Project Management

B.Sc. in Computer Science and Engineering
University of Dhaka

📅 2013   📍 Dhaka, Bangladesh

TECHNICAL SKILLS

Frameworks and Tools: PyTorch, PyTorch Geometric, scikit-learn, Tensorflow, Keras, Apache Hadoop, Django, Android SDK, GeoPandas, PySpark

Programming Languages: Python, Java, C++, C, R

Web Languages: Php, Javascript, XML, HTML

Database: MySQL, PostgreSQL, MongoDB

System and Software: Linux, Windows, PyCharm, Eclipse, NetBeans, Microsoft Visual Studio, AWS, Docker

Others: Latex, Github

GRANTS AND AWARDS

- Graduate Student of the Month in November 2022 from the Carl R. Ice College of Engineering, Kansas State University

- Fellowship (320000 BDT) from the Ministry of ICT of the Peoples Republic of Bangladesh for outstanding research work in MS

- Travel grant: 1900 USD from ERGP and Dept. of CS at K-State to present a paper in Seattle, WA; 1200 USD from the Department of Computer Science at K-State to present a paper in Vancouver, BC, CA; 600 USD GSC and ERGP at K-State to present a paper in San Antonio, TX