Shrabani Ghosh

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Research Interest

My research revolves around intersections in machine learning, text mining, and large graph mining. In graph mining, I concentrate on graph embedding on homogeneous and heterogeneous graphs in various fields, including social sciences (signed graph, friendship networks, collaboration networks), community detection, link prediction, node classification and visualization. In social media analysis, my focus is on sentiment analysis, misinformation propagation, and community clustering using NLP techniques (e.g., LLM) models.

Education

University of North Carolina Charlotte, PhD in Computer Science — Sept 2020 – Present

- GPA: 3.66/4.0

Old Dominion University , Masters in Computational Modeling & Simulation Engg — Aug 2016 – Dec 2019

- GPA: 3.62/4.0

Selected Research Projects

Community Detection for Downstream Tasks (Advised by Dr. Erik Saule) — June 2023 – Present

- Collected and preprocessed large-scale graph data across multiple applications, including anomaly detection, trust prediction, and recommendation systems.
- Applied community detection techniques—from statistical models to Graph Neural Networks (GNNs)—for task-specific performance analysis on complex networks.
- Evaluated downstream task performance: anomaly detection using XGBoost, trust prediction with TrustSVD, and recommendation using collaborative filtering.
- Designing a framework to guide data scientists in selecting appropriate community detection methods based on application needs and visualized network structures using igraph, NetworkX, and Gephi.

Railroad Trespassing & Safety Analysis on Twitter (Advised by Dr. Yuting Chen) — May 2022 – August 2023

- Scraped and preprocessed Twitter data on railroad safety.
- Conducted topic modeling, sentiment analysis, emotion analysis, and hashtag analysis using LLM.
- Investigated FRA data for railroad companies' social media activity

Scholarly Network Analysis (Advised by Dr. Bojan Cukic & Dr. Erik Saule) — Jan 2022 – Mar 2025

- Collected and constructed collaboration network from large-scale Google Scholar, ORCID, and DBLP data.
- Investigated publication patterns, influential authors and frequently affiliated organizations
- Applied BERTopic to extract top research themes and trends over time and GPT-4 Turbo to classify institutional collaboration categories and analyze their research involvement.
- Investigated and compared network structures and collaboration dynamics across distinct research fields.
- Identified bias & disparities based on gender and race in research communities.

Selected Publications

The Role of Community Detection Methods in Performance Variations of Graph Mining Tasks (under review) — Gitrepo

Shrabani Ghosh, Erik Saule

Railroad Trespassing and Safety: A Systematic Analysis of Twitter Data — Gitrepo

Shrabani Ghosh, Yuting Chen,Wenwen Dou

10.1016/j.cstp.2024.101154

Examining Different Research Communities: Authorship Network — Gitrepo

Shrabani Ghosh

10.1007/978-3-031-82435-7-6

A Survey on Signed Graph Embedding: Methods and Applications (review)

Shrabani Ghosh

arXiv

Towards an anatomical modeling pipeline for simulation and accurate navigation for brain and spine surgery

Audette, Michel A., Tanweer Rashid, ***Shrabani Ghosh****, Nirmal Patel, Sharmin Sultana*

10.5555/3140065.3140079

Academic Experience

Research Assistant

- Independently led end-to-end research projects—from data collection and preprocessing to building scalable predictive modeling pipelines. Design and implement experimental frameworks and develop optimized solutions for real-world applications using graph algorithm and text mining techniques.

Instructor & Teaching Assistant

- Courses teach on Logic, Data Structure, Algorithm.
- Lectured on Petri Nets, and Dynamic Modeling topics.
- Served as Teaching Assistant for course Introduction to Data Mining, Design & Implementation Object-oriented Systems, and Intro to Operating System & Networking
- Designed course projects, assignments, and exams.
- Supervised undergraduate students for projects design and implementations.
- Graded assignments and conducted office hours.

Awards

- Future Faculty Teaching Fellowship Award UNC Charlotte (FFTF) 2025
- Graduate School Summer Fellowship Award UNC Charlotte (GSSF) 2025
- Summer Institute in Computational Social Science (SICSS-Atlanta) 2023
- Grace Hopper Celebration Scholarship (GHC) 2022
- Grad-Cohort Conference Scholarship (CRA-WP) 2022
- Full scholarship award, Old Dominion University.
- Attained 5th place in Intra-University Programming Contest. (UIU)

Skills

Languages: Python, C++, MATLAB, HTML/CSS, Slurm

Machine Learning Libraries: PyTorch, TensorFlow

GPU Computing & Parallelization: CUDA, PyTorch with GPU, TensorFlow-GPU, SLURM, MPI

High-Performance Computing (HPC): GPU clusters (e.g., ORION, Nebula), SLURM job scheduling, parallel processing on multi-node systems

Large-Scale Graph Processing: NetworkX, iGraph

Visualization Toolkit: ITK, VTK, Matplotlib
Documenting: LATEX, Microsoft Suite