Dr. Anwar Said

Office: A417 ISIS building 1025, 16th Avenue, South, Nashville, TN, 37212, USA
@ anwar.said@vanderbilt.edu; Homepage Google Scholar GitHub

About

I am a postdoctoral research scholar at Vanderbilt University, TN. My research belongs to the area of graph machine learning (GML), an emerging field of research with extensive applications in various fields, including recommendation, forecasting, drug discovery & development, and optimization. Specifically, I work on the design of GML approaches to improve their performance and then apply them to solve different real-world problems. I have developed several GML approaches and applied them to problems such as circuit design completion, link prediction in Ethereum data, and fraud detection in social networks. Furthermore, I also work in data science, graph theory, and network science. More recently, I have expanded my research to include GML applications in electronic design automation and graph transformers.

Education

Postdoctoral Research Scholar Mar. 2021-Present

- Institute for Software Integrated Systems,
  Department of Computer Science,
  Vanderbilt University, TN, USA.
- Advisor: Prof. Xenofon Koutsoukos
- Area: Graph machine learning and its applications

Ph.D. Computer Science Nov. 2021

- Information Technology University, Lahore, Pakistan
- Advisors: Prof. Saeed-Ul Hassan, Prof. Mudassir Shabbir
- *Dissertation:* Novel Graph Representations for Machine Learning Applications

M.Phil. Computer Science Aug. 2016

- Quaid-i-Azam University, Islamabad, Pakistan
- *Dissertation:* Discovering Community Structure of Complex Networks
- Major Area of Study: Social Network Analysis, Graph Theory
- Minor Area of Study: Artificial Intelligence

M.Sc. Computer Science Dec. 2013

- University of Swat

Industry Experience

- **C++ Programmer** Jul. 2014 - Sep. 2017
  Shaheen Foundation, Islamabad

- **Graph Data Scientist** Jan. 2021 - Mar. 2022
  BUILD & CODE Germany
  Build & Code is a new startup that aims to design AI-powered automated systems to process large documents, enhance matching and search, and provide recommendations. My responsibility at Build & Code was to develop graph machine

learning models for the completion of a knowledge graph containing over 10 billion data points. We built machine learning frameworks that could predict links with promising accuracy.

Research Experience

Vanderbilt University
Postdoctoral Research Scholar Mar. 2022 - Present
Research Interests: Graph Machine Learning, Graph Descriptors, Circuit Design Completion, Data Science, Graph Theory

Information Technology University, Lahore Sep. 2017 - Oct. 2022
PhD Fellow
Projects: Graph Machine Learning, Social Network Analysis, Altmetrics, Ethereum Network Analysis, Call Data Record Analysis, Federated Learning

Master Student: Quaid-i-Azam University, Islamabad Aug. 2016 - Sep. 2017
Research areas: Community detection in social networks, Genetic Algorithms, Machine Learning

Teaching Experience

Information Technology University, Lahore
Teaching Assistant for: Aug. 2018 - June 2020

- Advanced topics in social Network Analysis (Spring 2018)
- Information retrieval (Fall 2018)
- Database (Spring 2019)
- Data Science (Fall 2019)
- Data Structures (Spring 2020)

Instructor at Hira and Khyber Technical College, Kabal, Swat 2009-2011

- Physics (Undergrad/college level)
- Surveying (Undergrad/college level)
- Mathematics (Undergrad/college level)
- Chemistry (college level)

Awards and Honors

- Recipient of the Vanderbilt University, *Postdoctoral Research Scholar Fellowship*
- Recipient of the *travel grant* for attending the "Youth in High Dimensions: Machine Learning, High-dimensional Statistics, and Inference for the New Generation" Conference, 2020, ICTP, Trieste, Italy.
- Recipient of the Information Technology University, *Ph.D. Fellowship*
- Recipient of the *Gold Medal* from University of Swat for achieving highest academic ranking

Publications

Under review

1. **Said, A.,** Shabbir, M., Abbas, W., Derr, T., Koutsoukos, X., Empowering Graph Neural Networks using Subgraph Embeddings, PAKDD2023

2. Ali, A., **Said, A.**, Safder, I., Hassan, S., Aljohani, N.R., Shabbir, M., MSDGSD: A Scalable Graph Descriptor for Processing Large Graphs, IEEE Transactions on Computational Social Systems
3. Ahmed, A., **Said, A.**, Shabbir, M., Koutsoukos, X., Sequential Graph Neural Networks for Source Code Vulnerability Identification, ACM Symposium on the Science of Security 2023.
4. **Said, A.**, Shabbir, M., Broll, B, Volgyesi, P, Abbas, W, & Koutsoukos, X., "Circuit Design Completion Using Graph Neural Networks", journal of Neural Computing and its applications.
5. **Said, A.**, Ahmad, U, Abbas, W., Shabbir, M., & Koutsoukos, X. Network Controllability Perspectives on Graph Representation, IEEE Transaction on Knowledge and Data Engineering (TKDE).
6. **Said, A.**, Shabbir, M., Hassan, S. U., Hassan, Z. R. & Ahmed, A. On Augmenting Topological Graph Representations for Attributed Graphs, Applied Soft Computing journal, Elsevier.
7. Athar, S, Abbasi, R. A., Saeed Z., **Said A.**, ASBiNE: Dynamic Bipartite Network Embedding for Incorporating Structural and Attribute Information, expert system with application journal.

Published

1. Sandborn, M., Olea, C., **Said, A.**, Shabbir, M., Volgyesi, P., Koutsoukos, X., White, J., What a drag! Streamlining the UAV design process with design grammars and drag surrogates, the 2022 International Conference on Computational Science & Computational Intelligence (CSCI'22)
2. Attaullah, Abbasi, R A., Khattak, A. and **Said, A.** Identifying Misinformation Spreaders: A Graph-Based Semi-Supervised Learning Approach, Multimedia Evaluation Benchmark Workshop 2022
3. Mian, A., Shah, S, Ullah, S., **Said, A.**, Heimerl, K., & Crowcroft, J. A Value-Added IoT Service For Cellular Networks using Federated Learning, computer networks (2022).
4. **Said, A.**, Janjua, M. U., Hassan, S. U., Muzammal, Z., Saleem, T., Thaipisutikul, T., ... & Nawaz, R. (2021). Detailed analysis of Ethereum network on transaction behavior, community structure and link prediction. PeerJ Computer Science, 7, e815.
5. **Said, A**., Hassan, S. U., Tuarob, S., Nawaz, R., & Shabbir, M. (2021). DGSD: Distributed graph representation via graph statistical properties. Future Generation Computer Systems, 119, 166-175.
6. **Said, A.**, Hassan, S. U., Abbas, W., & Shabbir, M. (2021). NetKI: A kirchhoff index based statistical graph embedding in nearly linear time. Neurocomputing, 433, 108-118.
7. Hassan, S. U., Shabbir, M., Iqbal, S., **Said, A.**, Kamiran, F., Nawaz, R., & Saif, U. (2019). Leveraging Deep Learning and SNA approaches for Smart City Policing in the Developing World. International Journal of Information Management, 102045.
8. **Said, A.**, Bowman, T. D., Abbasi, R. A., Aljohani, N. R., Hassan, S. U., & Nawaz, R. (2019). Mining network-level properties of Twitter altmetrics data. Scientometrics, 120(1), 217-235.

9. **Said, A.**, Shah, S., Farooq, H., Mian, A., Imran, A., & Crowcroft, J. (2018). Proactive Caching at the Edge Leveraging Influential User Detection in Cellular D2D Networks. Future Internet, 10(10), 93.
10. Imran, M., Akhtar, A., **Said, A.**, Safder, I., Hassan, S. U., & Aljohani, N. R. (2018, September). Exploiting Social Networks of Twitter in Altmetrics Big Data. In 23rd STI 2018 conference, September 12-14, 2018, Leiden, The Netherlands. Centre for Science and Technology Studies (CWTS).
11. **Said, A.**, Abbasi, R. A., Maqbool, O., Daud, A., & Aljohani, N. R. (2018). CC-GA: A clustering coefficient based genetic algorithm for detecting communities in social networks. Applied Soft Computing, 63, 59-70.

Referee Services Conferences

- International Conference on Machine Learning (ICML) 2020 - Present
- Neural Information Processing Systems (NeurIPS) 2021 - Present

Referee Services Journals

- Swarm and Evolutionary Computation (Elsevier) 2017 - Present
- IEEE Access 2019 - Present
- IEEE Transactions on Computational Social Systems 2020 - Present
- ACM Transaction on Social Computing 2020 - Present
- Journal of Ambient Intelligence and Humanized Computing 2021 - Present
- Network Science 2022 - Present

Mentoring (not an advisor)

Quaid-i-Azam University, Islamabad

- Attaullah, M.Phil. Computer Science 2022
  - Co-authored "Identifying Misinformation Spreaders: A Graph-Based Semi-Supervised Learning Approach" Multimideia Eval 2022
- Sajjad Athar M.Phil. Computer Science 2021
  - Co-authored "ASBiNE: Dynamic Bipartite Network Embedding for Incorporating Structural and Attribute Information" ES2021

Information Technology University, Lahore

- Muhammad Ali, Master in Computer Science 2022
  - Co-authored "MSDGSD: A Scalable Graph Descriptor for Processing Large Graphs" ITCSS 2022
- Ammar Ahmed, Bachelor of Computer Science 2020
  - Co-authored "Sequential Graph Neural Networks for Source Code Vulnerability Identification" HotSoS2023
- Muhammad Huzaifa, Bachelor of Computer Science 2019

Invited talks/guest lectures

- Graph Machine Learning in Circuit Design Completion 2022
  Vanderbilt Postdoctoral Association Symposium
- Graph Neural Networks for Knowledge Graph Completion 2022
  Build & Code
- On the Analysis of Cryptocurrency Networks 2021
  Blockchain Lab, ITU
- Community Detection in Social Networks 2020
  Intelligent Machine Lab, ITU

- Network Analysis for Social Good 2020
  STI conference 2020

Certification (courses)

- Responsible Conduct of Research course (RCR) (Vanderbilt) 2022
- RCR training (Vanderbilt) 2022
- Social Network Analysis (Vanderbilt)
- Deep Learning (Coursera)
- Machine Learning (Coursera)
- Probability Theory (Coursera)
- Linear Algebra (Online MIT)
- Graph Machine Learning (Online Stanford)
- Social Network Analysis (Online Stanford)
- 1-year survey diploma (KPK TTB)
- MS Office (SDC Peshawar)
- AutoCAD (SDC Peshawar)

Volunteering

- Volunteer at ICML 2021
- Volunteer at NeurIPS 2022
- Intro to CS @ Govt. Middle School Dhero (middle school students) 2020
- Intro to AI @ Govt. High School Kabal (high school students) 2019
- Intro to OOP @ Govt. JPG Swat (undergraduate students) 2019
- Volunteer flood relief in Swat 2011
- Volunteer with "save the children" NGO, Swat 2010
- Volunteer earthquake relief in Abbottabad 2005

Programming Tools

- Python, Networkx, TensorFlow, Scikit-learn, PyG, PyTorch, Deep Graph Library, Multiprocessing, SQL, Neo4J, C++, AWS, Jira, iGraph, Message Passing Interface (MPI), Socket Programming

Research Impact Number of citations: 240
Impact factor: 43