Mati Ur Rehman

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Education

Master of Science in Computer Science January 2023 – May 2025
University of Virginia — GPA: 4.0/4.0 Charlottesville, VA
Relevant Coursework: Natural Language Processing, LLM Fairness & Security, Graph Machine Learning Network Security, Threat Detection & Response, Software Security

Bachelor of Science in Computer Science September 2018 - June 2022
Lahore University of Management Sciences — GPA: 3.8/4.0 Lahore, Pakistan
Relevant Coursework: Software Engineering, Machine Learning, Deep Learning, Data Science Computer Vision, Data Mining, Computational Biology

Professional Experience

Machine Learning Intern June 2024 – August 2024
Corvic Inc *Mountain View, California*
- Developed unsupervised distributed graph embedding pipeline using the Microsoft DeepGNN framework.
- Integrated this pipeline into Corvic's Python backend and developed front-end components in React.js.
- Achieved **20% accuracy improvement** in node classification tasks compared to existing solutions.

Research Assistant - Machine Learning & Security January 2023 – Present
University of Virginia *Charlottesville, Virginia*
- Designed data pipelines for analyzing large-scale system logs using Python Dask and Polar libraries.
- Developed **FLASH**, an **open-source IDS** that surpasses existing systems with **3x processing speed** and offers detection **precision of 98%** and **recall of 99%**.
- FLASH is implemented in Python, with data processing in Dask, graph learning in PyTorch & PyG, text embeddings in Gensim, and anomaly classification via XGBoost.

Machine Learning Engineer June 2022 – January 2023
Katana Graph Inc *Austin, Texas*
- Developed multi-modal embedding generation techniques for text, graph, and tabular data.
- Implemented Temporal Graph Network (TGN) link predictor for forecasting medical trends.
- TGN achieved **96% accuracy** in trend prediction and was adopted by the biotech company **AbbVie Inc**.

Publications

1. Rehman, M. U., Ahmadi, H., & Hassan, W. U. (2024, February). FLASH: A Comprehensive Approach to Intrusion Detection via Provenance Graph Representation Learning. In 2024 IEEE Symposium on Security and Privacy (SP) (pp. 139-139). IEEE Computer Society
2. Liu, Q., Shoaib, M., Rehman, M. U., Bao, K., Hagenmeyer, V., & Hassan, W. U. (2024). Accurate and Scalable Detection and Investigation of Cyber Persistence Threats. arXiv preprint arXiv:2407.18832

Projects

Red Team Attack Emulation | *Linux, Caldera, Metasploit, Mitre ATT&CK* May 2023 – August 2023
- Designed Linux system attacks following complete APT lifecycle. Attack phases included Reconnaissance, Initial Access, Privilege Escalation, Lateral Movement, and Data Exfiltration.
- Constructed **100GB** of Linux system logs dataset containing attack simulations using Zeek-Agent.

Full Stack E-commerce Website | *React.js, Node.js, Firebase* Jan 2022 – May 2022
- Developed an e-commerce platform with user website and admin portals handling over **5k monthly users**.
- Implemented features including wish lists, order tracking, inventory management, and product search with filters.
- Conducted A/B testing to optimize UI/UX, leading to an **8% increase** in user retention.

Achievements

1. Received the **Best Research Award** at the UVA AI/ML Resource Fair 2024
2. Served as a **conference committee member** for IEEE Transactions on Forensics & Security 2024
3. Organizing committee member at the DMV Security Workshop 2024, hosted by the University of Virginia