Shaghayegh (Shirley) Shajarian

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EDUCATION

North Carolina Agricultural and Technical State University Jan 2023 – Present
Ph.D. in Computer Science; GPA: 3.92/4.0 *Greensboro, NC*
- Advised By: Dr. Sajad Khorsandroo and Dr. Mahmoud Abdelsalam

Science and Research Branch of Azad University Sep 2016 – Aug 2019
Master of Computer Software Engineering; GPA: 4.0/4.0 *Tehran, Iran*
- Advised By: Dr. Ali Movaghar and Dr. Ali Rezaee
- Winner of Three Minute Thesis (3MT) Competition
- Ranked 2nd in Cumulative GPA among all the Computer Engineering Students

University of Mazandaran Sep 2011 –Feb 2016
Bachelor of Computer Software Engineering *Babolsar, Iran*

PUBLICATIONS AND PREPRINTS

- **Shaghayegh Shajarian**, Sajad Khorsandroo, Mahmoud Abdelsalam. A Survey on Self-Running Networks: Concepts, Components, Opportunities, and Challenges, Preprint, 2024.
- Harikha Manthena*, **Shaghayegh Shajarian***, Jeffrey Kimmel, Mahmoud Abdelsalam, Maanak Gupta, Sajad Khorsandroo. Explainable Malware Analysis: Concepts, Approaches and Challenges, Preprint, 2024.
- Fikirte Demmese, **Shaghayegh Shajarian**, and Sajad Khorsandroo. Transfer learning with ResNet50 for malicious domain classification using image visualization. Discover Artificial Intelligence, 2024.

** Equal Contribution*

EXPERIENCE

Graduate Research Assistant, *North Carolina A&T State University, Greensboro, NC* **Jan 2023 – Present**
- Autonomous Cybersecurity and Resilience Lab, Self-Driving Networks Group

Graduate Teaching Assistant, *North Carolina A&T State University, Greensboro, NC* **August 2023 – Present**
- AI and Machine Learning Course

Graduate Teaching Assistant, *North Carolina A&T State University, Greensboro, NC* **Jan 2023 – May 2023**
- Advanced Security for Emerging Networks Course

Graduate Research Assistant, *Science and Research Branch of Azad University, Iran* **Dec 2017 – Sep 2019**
- Distributed System Group

Undergraduate Internship, *Hashemi Health Center, Iran* **Jun 2014 – Sep 2015**
- Data Analytics Team

Full Stack Web Developer, *Freelance, Iran* **May 2014 –March 2015**

RESEARCH INTEREST

- My research interests lie in **Large Language Models, Retrieval-Augmented Generation, and Autonomous Network Management**, with a growing emphasis on **Human-Centered AI**. I explore enhancing LLMs by incorporating real-time external data through RAG and developing AI-driven autonomous systems to optimize network operations. I aim to create intelligent systems that automate complex tasks and align with human needs, minimizing intervention while ensuring efficiency, scalability, and user-centered outcomes in network management and beyond.

PROJECTS

Retrieval-Augmented Generation System for Document Query Answering **July 2024**

Information Retrieval and NLP Project

- Developed an advanced RAG-based system to answer natural language queries from large document repositories.
- Implement a two-stage pipeline: a retriever leveraging vector similarity search (FAISS) to fetch relevant documents, followed by a generator using a transformer-based model (T5) to produce context-aware responses.
- Utilize cosine similarity to calculate the relevance score between user queries and document embeddings, improving precision in information retrieval.

Predictive Analysis of Hospital Ratings Using PySpark **May 2024**

Fundamentals of Big Data Analysis Course

- Provide the assessment of hospital performance through data-driven approaches.
- Handle missing values on a large, complex dataset.
- Implement four machine learning techniques, which are Linear Regression, Decision Trees, Random Forest, and Gradient Boosting Machines, and analyze their performance.

Malware Detection Using Convolutional Neural Networks **Dec 2023**

AI-Assisted Malware Detection and Classification Course

- Apply the CNN model by leveraging batch normalization and dropout techniques to achieve an accuracy equal to 0.92 in a malware detection task.
- Extract features from Cuckoo reports and training decision tree model for malware classification in the Cuckoo sandbox.
- Implement an adversarial attack using the Fast Gradient Sign Method (FGSM) against CNN.

Multi-label Text Classification with Bidirectional Encoder Representations from Transformers (BERT) **May 2023**

Deep Learning Course

- Conduct a study on self-attention mechanism and transformer.
- Utilize the Stack Overflow Code Corpus dataset to extract the concepts based on associated tags.

TECHNICAL SKILLS

Languages: Python, C++, R, HTML, CSS, PHP, Java, SQL, MATLAB
Machine Learning Packages: Keras, PyTorch, Tensorflow, PySpark, Matplotlib, Scikit-learn, HuggingFace Transformers
Tools: GIT, MySQL Workbench, LangChain, LlamaIndex, Bootstrap, LaTeX