MARIHA SIDDIKA AHMAD

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Education

PhD, Electrical Engineering ***Aug 2022 – Present***
University of Arkansas, Fayetteville, Arkansas

Bachelor in Electronics & Communication Engineering ***April 2015 – March 2019***
Khulna University of Engineering & Technology, Khulna, Bangladesh

Work Experience

Graduate Research Assistant ***Aug 2022 – Present***
University of Arkansas

- **Damage Assessment in Fog Computing Systems**
  - Developed blind write lineage approach for damage assessment in fog computing environments
  - Designed algorithms to construct Blind Write Set (BWSi) and Children Data Set (CDSi)
  - Implemented transaction log analysis techniques to trace data lineage
  - Demonstrated efficient identification of compromised data items for rapid recovery
- **Simulation-Based Validation of Blind Write Lineage Model**
  - Conducted comprehensive simulation analysis of blind write lineage model
  - Evaluated model performance under various parameters including transaction count and blind writes
  - Validated effectiveness of log-based approach for damage assessment
  - Demonstrated performance advantages over traditional damage assessment methods
- **ClusteredLog: Optimized Log Structures for Database Recovery**
  - Designed novel logical organization of log structures clustering related operations per data item
  - Developed data structures and algorithms for creating clustered logs
  - Implemented dependency tracking and update operations on data items
  - Demonstrated significant acceleration in damage assessment and recovery times through simulation
- **Fuzzy Recovery System for Post-Attack Database Restoration**
  - Developed fuzzy logic framework for rapid database recovery using statistical range estimation
  - Implemented triangular fuzzy membership functions to score transaction plausibility
  - Designed dual-processor architecture for real-time anomaly detection and parallel recalculation
  - Conducted simulations demonstrating system maintains throughput during recovery

Grading Assistant- Artificial Intelligence ***Jan 2023 – May 2023***
University of Arkansas

- Graded assignments, exams, and projects for undergraduate artificial intelligence courses
- Provided detailed feedback on student submissions to enhance understanding of AI concepts
- Assisted students during office hours with debugging code and clarifying complex algorithms
- Maintained grade records and ensured timely feedback delivery to students

Specialist, Product Configuration, Application Architecture, Demand and Product Management ***Sep 2021 – July 2022***

Robi Axiata Ltd. , Dhaka

- Configured telecom offerings and packages in different BSS charging and policy control systems
- Provided support for User Acceptance Testing (UAT), Go live and post UAT activities
- Gathered business requirements and converted ideas into technically configurable solutions

Publications

Peer Reviewed Publications (Total Citations: 8) Google Scholar Profile

Journal Papers

1. **M. S. Ahmad** and B. N. Panda, "ClusteredLog: Optimizing Log Structures for Efficient Data Recovery and Integrity Management in Database Systems," *Electronics*, vol. 13, no. 23, p. 4723, Nov. 2024. DOI: 10.3390/electronics13234723

Conference Papers

1. **M. S. Ahmad** and B. N. Panda, "Validating Damage Assessment: A Simulation-Based Analysis of Blind Write Lineage in Fog Computing," *In Proceedings of the 5th Workshop on Secure IoT, Edge and Cloud Systems (SIoTEC) 2024*, Philadelphia, PA, May 6-9, 2024
2. **M. S. Ahmad** and B. N. Panda, "Damage Assessment in Fog Computing Systems: A Blind Write Lineage Approach," *In Proceedings of the 2024 IEEE/ACM 24th International Symposium on Cluster, Cloud and Internet Computing Workshops (CCGridW)*, 2024. DOI: 10.1109/CCGridW63211.2024.00012
3. **M. S. Ahmad**, M. M. Rahman and K. M. Morshed, "Design and Performance Analysis of a Compact Implantable PIFA Antenna for Biomedical Applications," *2019 5th International Conference on Advances in Electrical Engineering (ICAEE)*, Dhaka, Bangladesh, 2019, pp. 617-622. DOI: 10.1109/ICAEE48663.2019.8975528

Projects

Malware Detection Using Pyramid Vision Transformer

- Implemented malware analysis using image classification with Pyramid Vision Transformer (PVT)
- Developed binary planting detection by converting binary sequences into decimal pixel representations
- Achieved 0.94 precision and 94.8% accuracy in detecting malicious code planted in vulnerable application file systems

Hotel Booking Cancellation Prediction

- Developed predictive models to forecast hotel booking cancellations using machine learning algorithms
- Performed data preprocessing and feature engineering on booking dataset
- Implemented and compared Logistic Regression, Random Forest, and XGBoost models
- Conducted hyperparameter tuning to optimize model performance

Skills

Programming Languages: C, Python, HTML, CSS, PHP
Engineering Tools: MATLAB, Cisco Packet Tracer, CST
Other Software: Microsoft Office Suite, Adobe Illustrator
Languages: Bengali (Native), English (Fluent)

Awards and Certificates

- Reginald R. "Barney" & Jameson A. Baxter Graduate Fellowship, University of Arkansas (2023-2024)
- Cisco Networking Academy Program Completion Certificate (Year)
  - Completed courses in networking fundamentals and infrastructure
  - Gained hands-on experience configuring routers, switches, and network protocols
  - Utilized Cisco Packet Tracer for network simulation and troubleshooting exercises
  - Studied TCP/IP protocols, subnetting, VLANs, and network security principles

Graduate Courses

Database Management System: Relational database design, SQL query optimization, transaction management, normalization, indexing strategies, database security principles
Malware Analysis: Static and dynamic malware analysis techniques, reverse engineering, exploit detection, behavioral analysis, threat mitigation strategies
Computer Security: Cryptographic protocols, authentication mechanisms, access control systems, vulnerability assessment, intrusion detection, security best practices
Deep Learning: Neural network architectures, convolutional neural networks (CNNs), recurrent neural networks (RNNs), backpropagation, optimization techniques, frameworks like TensorFlow and PyTorch
Artificial Intelligence: Search algorithms, knowledge representation, planning, machine reasoning, expert systems, natural language processing, AI ethics
Network Security: Firewall configuration, VPN implementation, intrusion detection/prevention systems, network vulnerability assessment, cryptographic protocols, secure network design
Algorithm: Algorithm design and analysis, complexity theory, data structures, sorting and searching algorithms, graph algorithms, dynamic programming, greedy algorithms
Machine Learning: Supervised and unsupervised learning, classification and regression techniques, model evaluation, feature engineering, ensemble methods, applications of scikit-learn