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Md Rezanur Islam
AI & Data Science Engineer

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Google Scholar

AI and Data Science Engineer with **4 years of research-driven expertise** in **real-time detection of cyber threats and aggressive driving behaviors in in-vehicle networks (IVN)**, as well as **LLM fine-tuning, MLOps, and model optimization**. Adept at leveraging cutting-edge technologies such as **PyTorch, LangChain, Hugging Face, OpenAI APIs**, and employing techniques like **quantization and scalable AI pipeline deployment**. A proactive collaborator with a strong analytical mindset, contributing to project success through **innovative AI-driven safety and cybersecurity solutions** on autonomous vehicle ecosystems.

SKILLS

Programming Languages	Python, C++ (Basic), LaTeX
Machine Learning & AI	Deep Learning (PyTorch, Keras), Large Language Models (LLMs), Supervised & Unsupervised Learning, Reinforcement Learning
Cybersecurity	Intrusion Detection Systems (IDS), In-Vehicle Network (IVN) Security, Automotive Penetration Testing, CAN/LIN Protocol Analysis
MLOps & Model Optimization	Model Fine-Tuning, Quantization, LoRa, QLoRA, Knowledge Distillation, ONNX, Docker, Jenkins, MLflow, Data Version Control
Quantitative Analysis	Mathematical Optimization, Time Series Analysis, Statistical Analysis, Frequency Domain Analysis
Tools and Frameworks	Git, Jupyter Notebook, Hugging Face, LangChain, OpenAI APIs, Scikit-learn, Pandas, NumPy, Matplotlib
Communication	English, Bangla

TECHNICAL EXPERIENCE

Associate Researcher   Feb 2021 — **Present**
Lab of Information Systems Security Assurances   *Asan-si, South Korea*

Team Leader (Machine Learning Team)

*Led a team of 4 researchers, advancing AI-driven cybersecurity and automotive safety solutions. Authored and co-authored multiple journal and conference papers on **Intrusion Detection Systems (IDS), In-Vehicle Network (IVN) Security, and AI-driven anomaly detection**. Presented research findings at **IEEE, BWCCA, ICBC, and IMIS** conferences.*

Project 1: Universal Intrusion Detection System (IDS) for IVN

- Designed and developed the **Universal IDS (UIDS I)** integrating **Pearson correlation and deep learning (ResNet-50)** to detect cyber threats across diverse vehicle architectures.
- Enhanced the system with **UIDS II**, incorporating **feature engineering, segmentation, mutual information analysis**, and **Cognitive Belief-Driven Q-Learning** for improved detection accuracy and efficiency.
- Applied **wavelet transformation** for data generalization, ensuring robustness across firmware updates and various vehicle models.

Project 2: Real-Time Aggressive Driving Detection System

- Developed a **real-time aggressive driving detection system** using **CAN data** to differentiate between driver behavior and cyber-attacks.
- Optimized a **MobileNetV1-based deep learning model** for resource-constrained automotive environments, achieving **99% accuracy** with low latency.
- Improved model efficiency for deployment in embedded automotive security systems.

Data Analyst   Dec 2019 — **Feb 2021**
Aleshamart   *Dhaka, Bangladesh*

Led a team of 6 data analysts, driving data-driven decision-making and optimizing reporting processes.

- Utilized **Python, Pandas, and Matplotlib** to optimize sales data and support strategic business intelligence.
- Conducted **sales trend, customer behavior, and product performance analysis** to identify market opportunities.
- Designed **visual reports** to effectively communicate key performance metrics to stakeholders.
- Enhanced **data accuracy and reporting efficiency** by collaborating with cross-functional teams.
- Led **customer purchasing trend analysis**, providing insights for sales growth and inventory optimization.

Junior Officer   **Sep 2016 — Aug 2019**
bKash Limited   *Dhaka, Bangladesh*

Collaborated within an 8-member team to improve fraud detection, fund recovery, and complaint resolution.

- Investigated **fraudulent activities** and performed **fraudulent data analysis** to detect patterns and prevent financial risks.
- Executed **fund recovery processes**, ensuring compliance with financial regulations and minimizing financial losses.
- Resolved **complaints** from **retailers, consumers, merchants, and corporate clients**, ensuring adherence to policies.
- Conducted **training sessions** on fraud prevention, complaint handling, and regulatory compliance for internal teams.

EDUCATION

Doctor of Philosophy (PhD) in Software Convergence, *Soonchunhyang University*   March 2023 — Present
Brain Korea 21 (BK21) Scholar
Master's Degree in Smart Convergence Security, *Soonchunhyang University*   March 2021 — March 2023
Brain Korea 21 (BK21) Scholar
B.Sc. in Engineering, Electrical & Electronic Engineering, *University of Asia Pacific*   March 2012 — March 2016

ACHIEVEMENTS

- **Best Paper Award** at the **18th International Conference on Innovative Mobile and Internet Services in Ubiquitous Computing (IMIS-2024)** for the paper titled *"Enhancing Road Safety with In-Vehicle Network Abnormal Driving Behavior Detection"*. Conference held at Tunghai University, Taichung, Taiwan, July 2024.

- **SCI Journal Publications:**

  - **Adaptive RNN Hyperparameter Tuning for Optimized IDS Across Platforms**. Published in *IEEE Open Journal of Vehicular Technology*. DOI: 10.1109/OJVT.2025.3547761.

  - **CF-AIDS: Comprehensive Frequency-Agnostic Intrusion Detection System on In-Vehicle Network**. Published in *IEEE Access*. DOI: 10.1109/ACCESS.2023.3346943.

  - **CANPerFL: Improve In-Vehicle Intrusion Detection Performance by Sharing Knowledge**. Published in *Applied Sciences*. DOI: 10.3390/app13116369.

  - **LPMSAEF: Lightweight Process Mining-Based Software Architecture Evaluation Framework for Security and Performance Analysis**. Published in *Heliyon*. DOI: 10.1016/j.heliyon.2024.e26969.

  - **Chirality Dependence of Gas Adsorption Property of Single Wall Carbon Nanotubes**. Published in *Materials Science Forum*. DOI: 10.4028/www.scientific.net/MSF.889.248.

- Recognized as a **Brain Korea 21 (BK21) Scholar** for both PhD and Master's programs at Soonchunhyang University.

CERTIFICATIONS

- **Feature Selection for Machine Learning** – Udemy (6h)

- **Complete Generative AI Course with Langchain and Huggingface** – Udemy (54h 6m)

- **LLM Engineering: Master AI, Large Language Models & Agents** – Udemy (25h 16m)

- **Modern Computer Vision & Deep Learning with Python & PyTorch** – Udemy (11h 30m)

- **Advanced AI: Deep Reinforcement Learning in Python** – Udemy (10h 38m)

- **End-to-End MLOps Bootcamp: Build, Deploy, and Automate ML with Data Science Projects** – Udemy (50h 46m)

ACTIVITIES

- **Graduate Student Council Representative**, Soonchunhyang University   2023 — Present

- **Poster Presenter**, Computer Science and Application CSA 2024, Soonchunhyang University   Fall 2024

- **AI & Cybersecurity Workshop Facilitator**, Soonchunhyang University   Fall 2023

- **Research Presenter**, Science and Engineering Showcase   Spring 2023

- **Research Presenter**, Graduate Research Showcase, University of Asia Pacific   Spring 2016