Ibne Farabi Shihab

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Education

- **Ph.D., Computer Science, Ames, IA, Iowa State University** *Anticipated Dec 2025*
- **M.S., Artificial Intelligence, Ames, IA, Iowa State University** *Graduated Jan 2024*
- **B.Sc., Computer Science & Engineering, Dhaka, Bangladesh, BRAC University** *Graduated 2018*

Experience

- **Data Scientist, SoilSerdem, Ames, IA** *Jan 2024 – Dec 2024*
  - **Soil Mapping Engine**: Engineered the Soil Mapping Engine, a foundational tool for the company, for delivering accurate, personalized soil maps to growers/farmers and enabling accurate geospatial analyses.
  - **QGIS Tools for AWS**: Streamlined operations by designing QGIS tool scripts for portability and seamless AWS integration, reducing the hosting cost of QGIS software.
  - **Environmental Data Models**: Optimized environmental data processing by validating models, uncovering actionable patterns, and improving decision-making accuracy.
  - **Interdisciplinary Projects**: Deployed machine learning applications that provided actionable insights, enhancing collaboration across departments and meeting project goals.
  - **Data Analysis**: Accelerated stakeholder decisions by analyzing complex datasets, creating detailed visualizations, and delivering actionable reports.
- **Graduate Assistant, Ames, IA, Iowa State University** *August 2020 – Present*
  - **Iowa DOT Snowplow Project**: Led deployment of navigation solutions to enhance Iowa DOT snowplow operations in Tama, Iowa.
  - **Crash Video Analysis**: Developed real-time crash detection and narrative generation using Large Language Models (LLMs), incorporating synthetic crash video simulation.
  - **ADAS Development**: Engineered and tested ADAS under extreme conditions, improving traffic safety.
  - **Crash Analysis**: Designed data-driven frameworks reducing operational risks and fatality rates for Iowa DOT.
  - **Deep Learning Research**: Developed predictive deep learning models for health monitoring, leading to multiple publications.
  - **Quantum-Driven Zero Trust Framework**: Co-authored research on integrating Quantum Neural Networks (QNNs) with Zero Trust Architecture for anomaly detection and cybersecurity in 7G networks.
  - **Reinforcement Learning**: Implemented RL models for cellular simulations and CAR T-cell therapy optimization.
  - **Research Publications**: Published on crash severity analysis, traffic simulation, video-based crash detection, and ensemble learning for urban navigation.
  - **Teaching**: TA for Motion Planning for Robotics and Autonomous Systems, Advanced Programming Techniques, Introduction to Spreadsheets and Databases, Machine Learning, and Deep Learning. Contributed to the development of the curriculum for the latter two courses.
- **Data Engineer Intern, Etalyc Inc, Ames, IA** *May 2021 – Jul 2021*
  - **Analytics Protocols**: Developed advanced analytics protocols, improving data accuracy and predictive capabilities.
  - **Pedestrian Safety**: Created machine learning models for pedestrian movement prediction, enhancing safety measures.
  - **Strategic Reports**: Produced data-driven reports highlighting key trends and anomalies for strategic improvements.
- **Graduate Teaching Assistant, The University of Vermont, Burlington, VT** *Aug 2019 – May 2020*
  - **Teaching Machine Learning**: Taught machine learning and deep learning concepts to over 100 undergraduate students, improving course understanding by 20%.
  - **Innovative Materials**: Developed innovative teaching materials, fostering higher student engagement and retention.
- **Trainee, Artificial Intelligence Trainee, Dhaka, Bangladesh** *Oct 2018 – Feb 2019*
  - **Traffic Sign Detection**: Led a team of three to deliver a traffic sign detection system with 95% accuracy.
  - **Team Communication**: Implemented efficient team communication strategies, resulting in streamlined project execution.

Skills

- **Programming & Development**
  Languages: Python,Java, SQL, C++, R, Go;
  Web: FastAPI, Flask, Streamlit, React (Amateur);
  DBs: MySQL, PostgreSQL, MongoDB, SQLite, Elasticsearch, Amazon Athena;
  DevOps: AWS, Git, GitHub, Jenkins, Docker, Kubernetes, Terraform
- **Machine Learning & GenAI**
  Frameworks: PyTorch, Scikit-learn, Keras, ONNX Runtime;
  LLMOps: Azure Databricks, LangChain, Ollama, TorchServe;
  Vector DBs: Chroma, Faiss, Pinecone
- **Data Engineering**
  Big Data: Spark, PySpark, Hadoop;
  Pipelines: ETL, AWS Data Pipeline, Apache Kafka;
  Monitoring: Splunk, Datadog
- **Computer Vision & Simulation**
  Tools: OpenCV, SUMO, Isaac Gym, CARLA, OpenAI Gym
- **Reinforcement Learning**
  Frameworks: Ray, RLlib, Stable Baselines3
- **Data Visualization & GIS**
  Tools: Tableau, Matplotlib, Seaborn, Plotly, QGIS, ArcGIS;
  Capabilities: Digital mapping, remote sensing, terrain modeling, spatial analytics
- **Statistical Analysis**
  Tools: R Studio, MATLAB
- **QNN and QML**
  Frameworks: torchquantum, Qiskit, strawberryfields, PennyLane
- **Specialized Expertise:** Crash Data Analysis, prompt engineering, fine-tuning, Predictive modeling, regression, time series forecasting, Autonomous systems, decision optimization, Robotics, synthetic data, traffic simulation, Anomaly detection
- **Certifications:** Google Cybersecurity, Meta Database Engineer, Data Engineer Prof., Google Data Analytics, Udacity Deep Learning