AYESHA RAHMAN

Software/Machine Learning Engineer

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Summary

High-achieving MEng Computer Science with AI graduate (University of Leeds) specializing in **large-scale AI/Machine Learning deployment**, enterprise cybersecurity, and privacy-first innovation**. Microsoft Certified in Security, Compliance, and Identity,** with extensive experience building secure digital platforms**,** large-scale data systems, and AI applications across regulated sectors like **Financial Services** and **Digital Health**. Proven ability to leverage cloud technologies (**Azure, AWS**) and **Blockchain** for robust financial forecasting, high-volume data analysis, and secure system architecture. Passionate about driving cutting-edge technological delivery.

Technical Skills

Cloud Computing & DevOps

- **Microsoft Azure** (AI, Security, Compliance & Identity Certified)
- **AWS** (EC2, S3, Cloudfront, Deployment & Security Best Practices, IAM, Lambda)
- **Docker & Containerization**, GitHub Actions, CI/CD pipelines
- Google Cloud

Security & Privacy

- **Microsoft certified: Security, Compliance, and Identity Fundamentals**
- **Data Encryption** (Flask-Bcrypt, HTTPS, Secure Authentication Systems)
- Knowledge of **OWASP** guidelines
- Web Security: CORS Policies, **Secure APIs**, Risk Mitigation
- **Ethical Data Handling**: Anonymization, Consent Protocols
- Blockchain Applications in Financial Security & DeFi

Work Experience

Freelance Software Developer: Outlier

(Remote : December 2024 - September 2025)

- Designed and tested AI prompts with a focus on edge cases and robust quality assurance.
- Developed **full-stack web applications** (Flask, HTML/CSS/JS) to client specifications, ensuring robust architecture and maintainability.
- Managed cross-border collaboration with international teams to deliver web tools that significantly **improved operational efficiency** while ensuring strict **data privacy and compliance** standards

Equity Research Analyst: UTI Mutual Fund,

(India, Mumbai : July 2023 - September 2023)

- Engineered and deployed two automated **Python-based Web Scraping tools** to aggregate **high-volume, structured datasets** (e.g., hotel and flight pricing) for critical financial market analysis.
- Performed **sector-specific comparative research** (Travel/Hospitality), providing **data-driven insights** that directly informed investment and capital allocation decisions.
- Produced comprehensive equity and sectoral analysis reports, incorporating **detailed risk assessment**, market benchmarking, and **financial forecasting models**.
- Drove **team-wide efficiency improvement** by introducing Python analytical scripts, resulting in a quantifiable **30% reduction in manual data processing** effort.

Certifications

1. Microsoft Certified: Security, Compliance, and Identity Fundamentals
2. Microsoft Certified: Azure AI Fundamentals
3. Blockchain Transformations of Financial Services (INSEAD)
4. Python for Everybody Specialization (Coursera | University of Michigan)
5. Blockchain, Cryptoassets, Decentralized Finance (Coursera | INSEAD | online)
6. Microsoft Certified: Azure Fundamentals (Microsoft)
7. Foundations of User experience (UX) Design (Coursera | Google | online)
8. Global Financial Markets and Instruments (Coursera | Rice University | online)

Industry Specific and Foundational Training: Completed multiple virtual experience programs (e.g., **Lyft Back-end Engineering**, Visa Token Service Technology) and specialised courses in **Financial Services** (Corporate Finance, Global Financial Markets) and foundational skills (UX Design, Computational Thinking)

Projects

Enterprise-Scale Time-Series Forecasting: US PCE Inflation

- Developed a forecasting system to predict US inflation (PCE Index) using deep learning models such as LSTM, GRU, RNN, SARIMAX, ARIMAX, N-BEATSx, N-HiTS and ARDL.
- Responsible for the design, implementation, and evaluation of the N-BEATS model family using Fourier, lag, and momentum-based exogenous features and ARDL.
- Designed a robust processing pipeline with exogenous variables ensuring securely stored results and version-controlled workflows for reproducibility and integrity.

Artificial Intelligence & Data Science

- Natural Language Processing (NLP): Sentiment Analysis, Semantic NLP, **LLM Prompt Engineering**
- Machine Learning (Regression, Classification, Forecasting)
- **Deep Learning:** PyTorch, TensorFlow, NeuralForest, RNNs, CNNs, Transformers
- **Time-Series Forecasting**

Data Engineering & Analytics

- **SQL/NoSQL Databases**: PostgreSQL, SQL/NoSQL, SQLite, MongoDB
- **Data Processing & Analytics**: Pandas, NumPy, Scikit-learn
- **Data Engineering**: Data Cleaning, Preprocessing, Feature Engineering
- **Full-Stack Data Capability**: Large Dataset Handling, **Web Scraping**, and **API Integration**

Programming & Development

- **Python**, **C++,** C, C#, Java, JavaScript, TypeScript, **SQL**, MATLAB, R (basic)
- Flask, React, Node.js, Express.js, HTML5, CSS3, RESTful APIs, LSON/XML
- .NET, ASP.NET, Django, Bootstrap, jQuery
- Object-Oriented Design (OOD), Object-Oriented Programming (OOP), Test-Driven Development (TDD), **Agile/Scrum**, Git-based **CI/CD pipelines**
- Desktop (C# .NET), Cross-platform apps, API Integration, Microservices

Tools & Platforms

- Jupyter Notebook, VS Code, PyCharm, IntelliJ IDEA, Eclipse, Visual Studio
- Git/GitHub, GitLab, BitBucket, Agile project tools (Jira, Trello),
- macOS, Linux (Ubuntu), Windows

Soft Skills

- Leadership & teamwork
- Cross-cultural collaboration
- Clear technical communication
- Problem-solving & critical thinking
- Adaptability & fast learning
- Project & time management (Agile, Scrum)
- Attention to detail & quality assurance
- Stakeholder engagement
- Security & privacy awareness
- Innovation & creativity
- Strategic thinking & decision-making
- Emotional intelligence & resilience
- Negotiation & conflict resolution
- Presentation & public speaking
- Collaboration with non-technical stakeholders
- Continuous learning & professional growth
- Change management & flexibility in dynamic environments
- Analytical & data-driven mindset

- Conducted detailed model validation, applied data preprocessing techniques, and used PyTorch-based forecasting pipelines to achieve low error metrics.
- Collaborated in a 7-member team to assess model performance across multiple horizons and compare with multiple statistical, machine learning and deep learning models.
- Stored results securely and implemented version-controlled workflows (Github) to ensure reproducibility and integrity of financial data.

Secure, Full-Stack Digital Health AI/ML Diagnostic Platform (AWS/Flask/React)

- Developed an AI-based Digital Health application prototype using ML models (eye-tracking, note analysis, NLP social interaction game) with a privacy-based approach for diagnosing and tracking Autism Spectrum Disorder (ASD) in adults.
- Deployed backend on AWS EC2 with Flask + React, integrating Amazon S3 and CloudFront for secure, scalable data delivery.
- Implemented HTTPS encryption, Flask-Bcrypt authentication, and CORS policies to enforce privacy-first design.
- Conducted backend load testing on AWS Free Tier to ensure reliability in handling concurrent healthcare application users.
- Applied **ethical safeguard**s including encrypted storage, anonymisation of sensitive data, and clear informed consent protocols.

Multi-Modal CNN-RNN Framework for Visual Recognition and Image Captioning

- Architected an end-to-end deep learning pipeline, coupling a CNN for high-dimensional visual feature extraction with an RNN for sequence-based natural language generation.
- Optimised CNN performance on **TinyImageNet30** (13.5k images, 30 classes) via data augmentation**,** dropout regularisation**,** and hyperparameter tuning, achieving robust generalisation.
- Enhanced captioning fidelity through transfer learning and transformer-driven embedding integration for semantic alignment.
- Validated outcomes with confusion matrices, ROC curves, and Kaggle leaderboard benchmarking, evidencing proficiency in model fine-tuning and multi-modal evaluation.

NLP Sentiment Analysis for Predictive Stock Market Signal

Objective was to develop a model that could identify positive or negative customer reactions and establish correlations in discretized stock price data. The research aimed to predict stock market movements by analysing sentiment from social media posts and customer reviews, with potential implications for investment decisions.

Advanced Black-Box Neural Network Optimization (Bio-Inspired Algorithms)

- Compared four algorithms (PSO, MPA, LM-IMPA, Adam) on mathematical benchmarks and real-world classification using the Breast Cancer dataset.
- Implemented evolutionary algorithms in Python to optimize neural network weights and architectures without backpropagation.
- Analysed convergence patterns, robustness, and generalization capabilities.
- Demonstrated the effectiveness of LM-IMPA and MPA over gradient-based baselines in black-box optimization tasks.

Wildlife Knowledge Base (Prolog, AI Reasoning)

Built an expert system for zoo management and wildlife governance using Prolog; encoded 68 facts and 71 rules to perform over 130 inferences using logical chaining, negation, and rule-based reasoning.

C++ Video Editing Application with Custom Graphical User Interface –

implemented object-oriented design principles (OOP)