HARSHAN ASHWAD

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CAREER SUMMARY

Driven software developer with strong focus and expertise in ML, deep learning, predictive modeling, and data science. Proven experience in building scalable applications, leveraging advanced algorithms to optimize performance, delivering data-driven solutions, enhancing user interfaces, and managing end-to-end project delivery.

EDUCATION

National University of Singapore (NUS) **Jan 2024 - Present**
Master Of Computing in Artificial Intelligence
GPA: 4.3
Relevant Coursework: Neural Networks and Deep Learning (ANN and CNN), Graph Neural Networks, Reinforcement Learning, Data Mining, Uncertainty Modeling, Platform Design and Information Visualization

Thiagarajar College of Engineering (TCE) **Jul 2018 – Jun 2022**
Bachelor of Engineering in Computer Science
GPA: 9.35/10 (Anna University)

EXPERIENCE

IBM **Jan 2022 - Nov 2023**
Bangalore, India
Software developer

- Built and maintained the Quote to Cash application using **Node.js and Vue.js**, taking full ownership after 4 months and ensuring round-the-clock system reliability.
- Developed and deployed **RESTful APIs** in JavaScript and Node.js, addressing **20+ weekly user requests** and integrating with IBM Sales Cloud backend services.
- Revamped frontend components using **Vue.js** and responsive design techniques to **reduce UI bug incidence** and improve user experience.
- Created an **SMTP-based health alert system** using **Node.js and cron**, which **reduced downtime by 25%** through early detection of system anomalies.
- Engineered real-time **webhook integrations** to replace polling-based logic, improving backend performance
- Optimized middleware performance and Vue.js rendering logic, cutting bug resolution time by 30% and enhancing UI responsiveness.
- Used AWS services (**EC2, IAM, S3**) for deploying new features and managing infrastructure access securely and efficiently.
- Developed a custom Python-based monitoring tool to **mimic AWS CloudWatch and Cost Explorer functionality**, **cost collecting CPU, memory, and metrics** via Requests and Pandas.
- Implemented **ML-based anomaly detection** using Isolation Forest and **ARIMA** (scikit-learn, statsmodels) **to flag spikes in resource usage** and forecast cost trends.
- Integrated Python scripts with **SMTP and Slack Webhooks** for real-time anomaly alerts, enabling a **20% reduction in cloud resource costs.**
- Automated remedial actions (idle resource shutdowns, data cleanup) via Python cron jobs, **removing manual cost-tracking burdens** from QA team.
- Built an interactive dashboard using **Dash and Plotly** to visualize usage trends and **cost-saving impact**, empowering stakeholders to make data-driven decisions.

PROJECTS

- **LLM-Powered Context Aware Q&A Assistant with Chat History (RAG)**
  Built a document-aware Q&A system using LangChain, LangGraph, and Hugging Face Transformers with RAG pipelines. Integrated vector search, prompt tuning, and conversational memory for multi-turn query handling. Fine-tuned domain-specific LLMs and improved retrieval relevance via custom prompt engineering. |
  Natural Language Processing, NUS (2025)

- **Image Denoising using Markov Random Fields (Computer Vision)**
  Implemented image denoising techniques using MRF-based approaches (Graph Cuts, Gibbs Sampling, ICM) to handle salt-and-pepper, Gaussian, and uniform noise. Conducted comparative analysis of denoising performance against CNN baselines using PSNR and SSIM, highlighting trade-offs between interpretability and performance | Uncertainty Modeling in AI, NUS (2025)

- **Spatio-Temporal Traffic analysis (Graph Neural Networks)**:
  Developed GNN-based models (STGCN, A3TGCN, A3TGAT-CBAM) to forecast short-term traffic in road networks using spatial-temporal data. Improved prediction accuracy over traditional models, supporting actionable insights for urban planning. Handled preprocessing, graph structuring, and training pipeline for time-series forecasting tasks. | Graph ML, NUS (2024)

- **Movie Profitability analysis (Data Science)**
  Analyzed the TMDB 5000 dataset to predict movie profitability using EDA, Logistic Regression, and Random Forest. Applied Association Rule Mining to uncover relationships between genres, release timing, and success patterns. Generated data driven insights to guide production and release strategies for maximizing returns. | Knowledge Discovery and Data Mining, NUS (2024)

SKILLS

- **AI/ML Frameworks**: Large Language Models (HuggingFace), Neural Networks, Computer Vision (opencv), Keras, Pytorch, Pandas, Numpy, scikit-learn, Scipy, Matplotlib
- **Retrieval-Augmented Generation (RAG):** LangGraph, LangChain, LlamaIndex
- **Development Frameworks:** Node js, Vue js, Flask, Docker, Microservices, HTML, CSS
- **Cloud design and fundamentals**: AWS (IAM, EC2, S3), GCP, Application Load Balancer and Auto Scaling
- **Data Visualization**: Tableau and Power BI
- **Programming Languages**: Python, Javascript, C++, Java
- **Concepts**: **EDA**, **PCA**, Ensemble Learning, Naive Bayes, **ARIMA**, Model comparison and evaluation

CERTIFICATIONS

- **AWS** certified Cloud Practitioner (2022) [Validation number: 4G8VKNVKZ2B41F97]
- **AlgoExpert** certificate for completing 100 coding questions (2022)
- Machine Learning A-Z: Hands on Python & R in Data Science (**Udemy** certificate 2021)
- **Complete Python Developer** course in **ZeroToMastery.io** (2021)

CO-CURRICULAR ACTIVITIES

- Organized internal knowledge-sharing sessions at IBM on Quote To Cash business logic, improving team adoption of best practices
- Attended a hands-on workshop on Agile methodology covering sprint planning, backlog grooming, user stories, and velocity tracking
- Volunteered as an event coordinator for internal IBM recreational events, including chess tournaments and team-building activities
- Actively engaged in cross-team retrospectives and agile ceremonies, fostering collaboration and continuous improvement culture