

# Amin Asgharzadeh

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## Bio

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Amin Asgharzadeh is a Senior Data Scientist at the American Bureau of Shipping (ABS), specializing in Generative AI and Large Language Models with over five years of experience in Machine Learning. His key achievements include developing an AI-powered search platform using LLMs that generated \$4.2M in additional revenue, designing agentic RAG chatbots for streamlining internal knowledge access, implementing Model Control Protocol (MCP) to improve LLM safety and reliability, and fine-tuning language models for specialized document processing. He has also created time-series forecasting models using recurrent neural networks for surveyor workload and implemented customer churn predictive models through robust data pipelines. Proficient in vector databases and MLOps practices in Azure Cloud Infrastructure, he implements advanced AI solutions that significantly improve operational efficiency and business performance.

## Experience

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**Senior Data Scientist**, American Bureau of Shipping – Spring, TX Oct 2022 – Current

- **AI Search application for internal products;**  
Designed and implemented an AI-driven search platform from POC to a fully developed product that allows rapid identification of potential certification renewal opportunities. This product has resulted in over **\$4.2M in revenue** in 2024. Reduced production app maintenance efforts by **3x** by implementing **Unit Testing in CI/CD** to evaluate the consistency of AI model responses.  
*Tech stack: Azure (AI Search, OpenAI, VM, App Service), DevOps, Locust, Flask, SQL.*
- **AI RAG chatbots for internal documentation;**  
Developed multiple RAG chatbots using gen-AI to assist in searching through a vast number of internal documents related to policies, contracts, and HR knowledge base that internal departments currently use.  
*Tech stack: LlamaIndex, LangChain, ChromaDB, Azure AI-Search, Flask, Dash.*
- **AI Text-to-SQL Interface for Database Access;**  
Engineered a text-to-SQL agent enabling non-technical stakeholders to query internal databases through natural language commands. Implemented result summarization and interactive follow-up capabilities, increasing data accessibility across departments. *Tech stack LangChain, OpenAI.*
- **Finetuning LLM on survey reports in Docker;**  
For the internal POC on summarizing survey reports, created a Docker container and fine-tuned models using PyTorch and HuggingFace on an on-prem system with RTX6000 GPU. Created a demo Streamlit application with drag-and-drop functionality to receive summaries.  
*Tech Stack: CUDA, Transformers, HuggingFace, Docker*
- **Customer churn predictive model;**  
Built **data pipelines and feature store** for vessel churn prediction. Collaborated with the data engineering team to implement complex SQL queries and Azure Synapse ETL pipelines. Followed Medallion Architecture to ingest and process internal data sources to predict the probability of vessels leaving the ABS fleet with less than 20% False Positive Rate. *Tech Stack: Dataiku, SQL, Streamlit*
- **Survey workload forecasting;**  
Developed a time-series forecasting product for surveying workload, revenue, and expense prediction using RNN models across ABS operating ports worldwide. The product improved operational planning by providing 12-month workload predictions with 15% to 20% MAPE accuracy, featuring an integrated model monitoring dashboard and automated reporting capabilities. *Tech Stack: Dataiku, SQL, Streamlit*

**Staff Transportation Engineer**, Arcadis U.S. Inc. – Houston, TX

Dec 2019 – Oct 2022

- **Dashboard development in PowerBI and tableau for sub-regional planning study in Houston, TX;**  
Tableau dashboard visualization and result exploration, trip pattern analysis, Connected-Automated Vehicles (CAV), based on the mesoscopic simulation results of the Houston Eight-County network.

**Research Scientist**, University of Kansas – Lawrence, KS

Aug 2016 – Dec 2019

- **Macroscopic freeway Flow simulation and calibration using meta-heuristic optimization algorithms;**  
Coded a macroscopic simulation network in MATLAB to simulate freeway congestion. This proposed simulation model accommodates the impact of lane changes in the traffic flow analysis.
- **Real-time bus-holding control strategy to reduce passenger waiting time;**  
Developed a mixed-integer non-linear model to obtain the optimum holding time of a bus at a station to minimize passenger wait time using a heuristic approach based on a gradient descent algorithm in MATLAB.

## Technical Skills

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- **Generative AI and Conversational Intelligence;** Develop RAGs and agentic chatbots leveraging OpenAI, Anthropic, and open source models from Hugging Face orchestrated through frameworks like LangChain. Utilize vector databases for efficient knowledge retrieval, implementing advanced prompt engineering techniques and MCP to provide context-aware responses that scale across diverse enterprise use cases.
- **MLOps and ML Workflow;** Skilled in implementing MLOps strategies to deploy, monitor, and manage machine learning models, ensuring robust lifecycle management and data-driven business decision-making.
- **Comprehensive Azure Resource Utilization** Skilled in leveraging Azure resources, including AI Search Service, Container Storage, OpenAI, Virtual Machines, App Service, Synapse Analytics, Key Vault, and Data Lake for comprehensive data solutions.
- **Agile Project Management Expertise** Proficient in Agile methodologies using Azure DevOps, managing backlogs with Azure Boards, integrating CI/CD pipelines, and facilitating Agile ceremonies to enhance project management and team collaboration.
- **Machine Learning and Neural Network Implementation;** Utilize PyTorch to develop and implement traditional machine learning models for regression and classification, alongside advanced neural network architectures such as RNN, CNN, and ANN, enabling robust data analysis and predictive modeling across diverse applications, including sequential data processing and image classification.
- **Containerization and Application Deployment;** Use Docker to create and manage containerized applications, ensuring consistent environments and simplifying deployment across development and production.
- **Advanced SQL Data Analysis and Retrieval;** Expertise in advanced SQL queries, including complex joins, subqueries, window functions, and CTEs (Common Table Expressions) for efficient data retrieval and analysis.

## Education

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**University of Kansas**, Ph.D. in Civil Engineering, Transportation – Lawrence, KS

Aug 2016 – Dec 2019

- GPA: 3.98/4.0

## Tech Stack

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- **Open-Source Programming:** Python, R, SQL, bash.
- **Gen-AI:** Langchain, LlamaIndex, HuggingFace, MCP, Vector stores (Azure AI-Search, Pinecone)
- **Dashboard Development Tools:** Tableau, Dash (Plotly), PowerBI, Streamlit.
- **Web Application Development Tools:** Flask, FastAPI, React.
- **Data Science and ML Platforms:** Dataiku, Azure Synapse Analytics.
- **Agile Project Management Tools:** Agile, Scrum, Azure DevOps, Jira.
- **Optimization:** Linear, Non-Linear, Integer Programming with CPLEX, Pyomo, GAMS.
- **Continuous Integration and Deployment (CI/CD):** Git, GitHub, Azure DevOps.