# Mohammad Afzal

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## Summary

Experienced **Machine Learning Engineer** with 9+ years of success in designing and deploying AI-driven systems at scale. Specialized in **LLM orchestration** using **LangChain** and **LangGraph**, building **RAG pipelines** with FAISS, and deploying production-grade applications on **AWS**, **Docker**, and **Kubernetes**. Strong command of **MLOps workflows**, including model lifecycle management with **MLflow**, pipeline orchestration with **Kedro**, and model serving via **SageMaker**. Proven ability to lead cross-functional engineering teams, optimize cloud infrastructure, and deliver intelligent solutions that drive measurable business impact.

## Technical Proficiencies

**Programming Languages**: Python, Java, JavaScript, SQL, Bash

**Machine Learning & MLOps**: LangChain, LangGraph, MLflow, AWS SageMaker, Kedro, Scikit-learn, TensorFlow, Hugging Face Transformers, PyTorch (basic), JupyterLab, XGBoost, LightGBM

**Data Engineering & Processing**: Pandas, NumPy, Apache Kafka, Airflow, Snowflake, PostgreSQL, MongoDB, Redis, S3

**Backend Development**: FastAPI, Flask, Spring Boot, Node.js, SQLAlchemy, REST APIs

**Frontend Technologies**: ReactJS, AngularJS, Bootstrap

**Cloud Platforms**: AWS (EC2, Lambda, RDS, SageMaker, S3, CloudWatch), Databricks, Google Colabs

**DevOps & Deployment**: Docker, Kubernetes, Jenkins, GitHub Actions, Terraform (intro), CI/CD Pipelines

**Testing & Automation**: PyTest, JUnit, Selenium, BDD (Behave, Cucumber)

**Tools & Utilities**: VS Code, Postman, Git, Linux CLI, Streamlit, ELK Stack, SQLite

## Experience

### Lead Cloud Engineer, Technumen | 2024 - Present

* Spearheaded development of a *voice-activated* ***One Rule*** in production, building on concepts prototyped in the open-source [VoiceChain Template](https://github.com/afzalex/voicechain-template" \t "_new).
* Engineered a robust multi-modal system combining Whisper for speech-to-text, **LangChain + LangGraph** for contextual agent reasoning, and ElevenLabs for speech synthesis, enabling dynamic, real-time conversations.
* Designed agent workflows using LangGraph to support stateful interactions, intent switching, and fallback handling across tasks like FAQ resolution, scheduling, and document summarization.
* Integrated RAG-based pipelines with vector search (FAISS) to answer user queries grounded in enterprise knowledge bases.
* Deployed the solution using Docker, AWS Lambda, and CloudFront to ensure scalability, low latency, and secure API exposure.
* Collaborated with product teams to refine UX and voice flow, optimizing turn-taking and naturalness of responses.
* Developed an LLM-powered resume screening system utilizing **LangGraph** **+ LangChain**, enhancing the recruitment process by dynamically retrieving and processing resumes using RAG.
* Implemented a multi-agent orchestration framework to evaluate resumes against job descriptions, providing a rating system and feedback mechanism.

### Product Development Engineer, Calibo | 2020 - 2023

* Designed and deployed scalable, data-driven microservices using Python(FastAPI) and SQLAlchemy, focusing on ML model lifecycle, real-time analytics, and inference delivery.
* Engineered **streaming data pipelines** using **Apache Kafka** and **Spark Structured Streaming** to support low-latency event ingestion, feature generation, and model serving at scale.
* Implemented modular ML workflows using **Kedro**, enabling reproducibility and collaboration across cross-functional teams.
* Managed end-to-end MLOps pipelines with **MLflow** for tracking experiments, managing model versions, and deploying to **AWS SageMaker** for training and batch/real-time inference.
* Developed automated model retraining jobs triggered by data drift signals, and integrated performance monitoring dashboards using ELK Stack.
* Leveraged **Snowflake** for scalable analytics and feature storage, ensuring efficient retrieval and transformation of large datasets in production environments.
* Led deployment automation using **Docker**, **Kubernetes**, and **Jenkins**, orchestrating CI/CD pipelines and environment provisioning across staging and production clusters.

### Senior Associate, Nagarro | 2019 - 2020

* Led the digital transformation of project development by developing web applications using FastAPI, RabbitMQ, Angular 8, and Postgresql.
* Built microservices using **Spring Boot**, **RabbitMQ**, and **Angular 8** for scalable, event-driven applications.
* Optimized PostgreSQL queries and backend performance for real-time dashboards.
* Contributed to Agile delivery, TDD with JUnit, and API integration across distributed systems.
* Gained foundational experience in backend systems and asynchronous workflows, later extended into ML and data engineering roles.

### Senior Software Engineer, Enbraun | 2015 - 2019

* data not available

### Freelancer | Before 2015

data not available

## Project Profile

### OneRule – Liberty Mutual

An enterprise-grade, real-time voice assistant platform designed to enable natural, speech-driven interactions for internal knowledge access, scheduling, and operational support. Built with a multi-modal architecture combining automatic speech recognition (ASR), large language models (LLMs), and text-to-speech (TTS) synthesis.

Key Contributions:

* Architected the assistant’s core pipeline using **Whisper** (ASR), **LangChain + LangGraph** (agent orchestration), and **ElevenLabs** (TTS), ensuring seamless, low-latency interactions.
* Designed modular, stateful agent workflows in **LangGraph**, allowing for complex task switching, context retention, and recovery in long-running conversations.
* Integrated **Retrieval-Augmented Generation (RAG)** with **FAISS** to ground responses in real-time against private knowledge bases, enhancing factual reliability and compliance.
* Deployed the solution in a fully serverless, production-grade environment using **Docker**, **AWS Lambda**, **API Gateway**, and **CloudFront**, ensuring horizontal scalability and global availability.
* Tuned the voice flow and user experience in collaboration with UX teams, resulting in a highly responsive, human-like interface for enterprise users.
* The system was built upon core concepts initially prototyped in the open-source project: [VoiceChain Template – GitHub](https://github.com/afzalex/voicechain-template" \t "_new)

### LAZSA – Product Platform-as-a-Service

Industry-first Product Platform-as-a-Service (pPaaS) to redefine digital innovation and drive competitive advantage through digital business. The platform provides a comprehensive set of tools and technology stack to efficiently manage, define, design, develop, and deploy phases of product development.

Key Contributions:

* Led architecture and development of core platform modules using **Java 8, Spring Boot** and **ReactJS** ensuring high cohesion and extensibility across services.
* Integrated **AWS Services** (S3, Lambda, SageMaker) and **Kafka** to support event-driven workflows and real-time communication between loosely coupled services.
* Implemented modular ML pipelines using **Kedro**, tracked experiments and deployments with **MLflow**, and used **SageMaker** for model training and inference workflows.
* Deployed the platform using **Docker** and **Kubernetes**, with CI/CD pipelines orchestrated through **Jenkins**, enabling seamless rollouts and rollbacks.
* Developed telemetry and observability dashboards using **ELK Stack**, ensuring operational transparency and system health monitoring.
* Collaborated with stakeholders to ensure scalability, compliance, and performance optimization, enabling rapid feature delivery and consistent product quality.

### Passbook – Northern Trust

Enterprise-grade modernization initiative aimed at decoupling legacy systems into secure, maintainable microservices while integrating robust DevOps and identity management practices across the financial services infrastructure.

**Key Contributions**:

* Led the development and optimization of core services using **Spring Boot** and **FastAPI**, ensuring modularity, fault isolation, and consistent API governance.
* Implemented centralized service discovery and configuration using **Eureka Server** and **Spring Cloud Config**, improving system visibility and deployment agility.
* Integrated **Azure Active Directory (AD)** for secure, federated authentication and enforced SSO across internal applications.
* Built CI/CD pipelines using **GitHub Actions** and **Jenkins**, enabling automated builds, test execution, and production-grade deployments.
* Performed performance benchmarking using **JMeter**, and wrote behavior-driven test suites in **Behave** and **PyTest**, ensuring system reliability and adherence to business logic.
* Coordinated with cross-functional teams to align platform capabilities with enterprise compliance standards and SLAs.

### DiPEC (Digitalized Project Execution)

data not available

### eResource Scheduler

data not available

### Abho Costing Sheet

data not available

## Education Detail

data not available