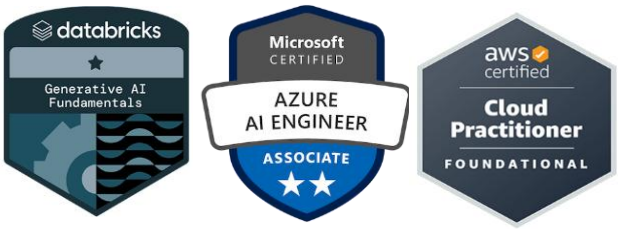
SAI THOTA

Senior AI/Machine Learning Engineer

tsai58997@gmail.com | +1 (469) 573-2313 | LinkedIn | GitHub



AI/ML | multi-Agent AI | RAG | Generative AI | LangChain | LangFlow | vLLM | OpenAI | PyTorch |TensorFlow | NLP | Computer Vision | Time Series | Prompt Engineering | MLOps (Azure, AWS, CI/CD) | Vector DBs | Secure AI Deployment | Docker | Kubernetes | Databricks | Statistics

PROFESSIONAL SUMMARY

- **Over 8 years** of experience delivering production-grade **AI/ML solutions** across Insurance, Cybersecurity, Healthcare, Environmental, and Manufacturing domains using Python, LangChain, Docker, and Databricks.
- Spearheaded design and deployment of **multi-agent AI systems** using **OpenAI GPT-4** and private **LLaMA 3 LLM** stacks with **LoRA/QLoRA** optimization, enabling scalable and efficient generative AI workflows.
- Leveraged **RAG pipelines**, prompt engineering, **agent** evaluation & monitoring, and **HITL** mechanisms with **ChromaDB** to ensure reliability, accuracy, and compliance in AI decision-making.
- Engineered secure, **multimodal** AI pipelines for **threat detection** using **PyTorch**, OpenCV and **Weaviate**, integrated with **LangChain-powered RAG** pipelines and **self-hosted LLMs** for real-time semantic analysis.
- Proficient in **fine-tuning** and deploying **transformer-based and deep learning models** (ResNeXt-LSTM, WaveNet, GANs), and adversarial training for robust detection in multilingual and low-resolution environments.
- Delivered **impactful AI solutions** that accelerated claims processing, underwriting decisions, fraud detection, and patient satisfaction while reducing operational costs and manual review efforts.
- Applied ensemble learning, **time-series forecasting, and graph-based models** (LSTM, GNN, SARIMA) to optimize predictions and improve decision-making in high-volume, dynamic data environments.
- Led large-scale **data engineering** programs, including ingestion, streaming, batch processing, ETL/ELT, and **warehousing** using **AWS** (S3, Lambda, SageMaker, Glue), **Databricks** (PySpark, Delta Lake), **Kafka**, and Airflow.
- Built enterprise-grade **MLOps workflows** using **Azure ML**, **AKS**, **MLflow**, **Docker, Kubernetes**, FastAPI, and CI/CD automation, integrating telemetry, drift detection, and PHI/PII-safe governance for audit-ready deployments.
- Directed **end-to-end data analytics and transformation** workflows, turning raw datasets into actionable insights using SQL, Python, and visualization tools, and dashboards for reporting and to improve operational efficiency.
- **Strong foundation** in statistical modeling, probability, and **mathematical** optimization to boost AI/ML model performance and reliability.

SKILLS

Category	Technologies
Languages & Scripting	Python, SQL, R, PySpark, Bash, PowerShell
ML & AI Frameworks	Scikit-learn, TensorFlow, PyTorch, XGBoost, LightGBM, pandas, NumPy, SciPy, SHAP, LIME
Frameworks & Orchestration (Gen AI & LLMs)	LangChain, LangGraph, LangFlow, LangSmith, AutoGen, OpenAI, RAG, PEFT, Prompt Engineering, Agent Evaluation & Monitoring
Models & Fine-tuning (Gen AI & LLMs)	GPT-3.5, GPT-4, Claude, Amazon Titan, LLaMA 3, vLLM, Mistral, BERT, DeBERTa, SentenceTransformers, LoRA/QLoRA
NLP & Reasoning	TF-IDF, VADER, Semantic Routing, In-context Learning (zero-shot, one-shot)
Vector Databases	ChromaDB, FAISS, Qdrant, Pinecone, Weaviate

Time Series & Forecasting	Random Forest Regressor (RFR), Seasonal Decomposition, Graph Neural Networks (GNN), Prophet, ARIMA, SARIMA, LSTM, BiLSTM
Cloud Platforms	AWS (S3, Lambda, EC2, SageMaker, Step Functions, Glue, API Gateway, CloudWatch, IAM), Azure ML, Azure Kubernetes Service (AKS), Azure DevOps, Azure Monitor, OpenTelemetry
MLOps and DevOps Tools	MLflow, Docker, Kubernetes, FastAPI, OAuth2/JWT, Flask, DVC, Terraform, GitHub Actions, GitLab, Jenkins, Bitbucket, CI/CD, Drift Detection
Data Engineering & ETL	Databricks, PySpark, Apache Kafka, Airflow, SQLAlchemy, AWS (Glue, Lambda), Redis, MongoDB, Delta Lake, SQL Server, Cosmos DB, SSRS, SSIS, SSAS
Data Acquisition & Web Scraping	BeautifulSoup, urllib, requests, Selenium, APIs (Google Maps, USBR, USGS, SNOTEL)
Visualization & BI	Power BI, Tableau, Plotly, Matplotlib, Seaborn, Streamlit, MS Excel (Power Query, DAX)
Tools & Collaboration	Jupyter, VS Code, PyCharm, Git, Confluence, JIRA, Agile/Scrum
Domain Expertise	Healthcare Analytics, Cybersecurity & Threat Detection, Regulatory Knowledge Bases, Insurance Claims & Underwriting, Water Resource Forecasting, Risk & Fraud Analytics

PROFESSIONAL EXPERIENCE

Client: Allied World Assurance Company (AWAC) | New York, NY **October 2024 – Present**

Role: Senior AI/ML Engineer

Description: Built secure, agentic AI systems to automate claims processing, fraud detection, and underwriting risk assessment. Prototyped agentic AI workflows using OpenAI APIs for rapid development. Migrated production deployments to a private LLaMA 3 stack on Azure, ensuring secure, scalable, and cost-efficient inference. Leveraged RAG pipelines, and human-in-the-loop mechanisms to improve decision accuracy and reduce manual review.

Key Contributions:

- Designed and deployed **OpenAI GPT-4–powered conversational agents** and **private LLaMA 3 stacks** with **LoRA/QLoRA optimization** for policy lookups, fraud detection, and claims triage, reducing manual processing time by **38%.**
- Developed an **underwriting risk intelligence assistant** using **DeBERTa embeddings** in LangChain RAG pipelines with **ChromaDB** and regulatory knowledge bases, improving decision turnaround by **35%** and quote accuracy.
- Built **multi-agent AI systems** leveraging **RAG pipelines, LangChain, and LangFlow** orchestration, **prompt engineering**, and agent evaluation & monitoring to ensure reliable, real-time generative AI workflows.
- Introduced human-in-the-loop (**HITL**) mechanisms and fallback flows to mitigate risk from hallucinations or high-uncertain outputs, implemented safeguards for compliant decision-making.
- Migrated prototypes to **private LLaMA 3 inference** on AKS using vLLM, enabling secure, scalable ChatGPT-style deployment and reducing inference costs by 23% via quantization and LoRA/QLoRA optimizations.
- Implemented **LangFlow orchestration** to streamline multi-turn dialogs, document ingestion, and workflow automation.
- Established **agent evaluation & monitoring** pipelines inspired by **Arize/LLM-as-Judge** techniques, boosting reliability scores and ensuring prompt traceability**.**
- Engineered **secure CI/CD pipelines** with Azure ML, Azure DevOps, Docker, Kubernetes, and FastAPI microservices, feature stores, and automated drift detection.
- Defined observability and telemetry requirements and collaborated with deployment teams to integrate **Azure Monitor and OpenTelemetry** for real-time monitoring and drift detection

Technical Stack: LangChain, LangGraph, LangFlow, AutoGen, Hugging Face Transformers (DeBERTa), LLaMA 3, vLLM, OpenAI, GPT-4, LoRA/QLoRA, ChromaDB, HITL, Azure ML, AKS, Azure DevOps, MLflow, Docker, Kubernetes, SQL Server, Cosmos DB, Prompt Engineering, Agent Evaluation & Monitoring, RAG, MLOps, Agile, and Secure AI Deployment.

Client: McAfee | Frisco, TX **May 2023 – October 2024**
Role: Data Scientist – LLMs & Generative AI

Description: Developed a secure AI-driven threat detection platform to identify deepfake media, voice cloning, and emerging cyber threats in real time. Fine-tuned multimodal AI models, and integrated private LLMs for multilingual threat analysis, achieving high detection accuracy, reduced false negatives, and rapid incident response.

Key Contributions:

- **Integrated self-hosted Mistral LLM endpoints via LangChain-powered RAG pipelines** with **Weaviate** VectorDB for real-time semantic threat analysis of multimodal data (video/audio).
- **Reduced LLM hallucinations by 17%** using LangSmith prompt optimization, improving multilingual threat narrative accuracy and achieving 87%+ detection accuracy with an 18% reduction in false negatives.
- **Fine-tuned and deployed transformer-based and deep learning models** (ResNeXt-LSTM, WaveNet, CNN-BiLSTM) for forgery detection, video temporal consistency, voice cloning, and speech anomaly detection.
- Enhanced model robustness and generalization with **GAN-generated** adversarial samples across multilingual and low-resolution datasets.
- Preprocessed **multimodal** (video/audio) data with **PyTorch** and **OpenCV**, performing frame stabilization, voice isolation, and **feature extraction** (MFCC, FFT, DCT).
- Designed secure data ingestion pipelines using **AWS VPC Peering, Kafka streaming, Delta Lake**, and **Databricks** (PySpark, notebooks, jobs, MLflow experiments) to process petabyte-scale telemetry under strict **AWS RBAC** controls.
- Automated alerting and incident response workflows through **Databricks jobs, AWS Lambda,** and secure orchestration, maintaining real-time threat mitigation within McAfee's compliance perimeter.
- Ensured **GDPR and HIPAA** compliant handling of PHI/PII data via IAM-based access control, encrypted data transit, audit logging, and FastAPI microservices secured with **OAuth2/JWT.**
- Partnered with claims operations, underwriting SMEs, and compliance teams through **agile sprints,** iteratively refining POCs, addressing edge cases, and delivering **production-ready data engineering** and AI/ML pipelines.

Technical Stack: Python, PyTorch, LangSmith, LangChain, Deep Learning Models, Attention, GAN, Databricks, PySpark, MLflow, Weaviate (self-hosted), Mistral (self-hosted LLM), OpenCV, AWS Lambda, Kafka, Delta Lake, OAuth2/JWT, GenAI, RAG, Multimodal Threat Detection, Secure AI Inference, DFDC, Hallucination Detection, GDPR, HIPAA, PHI, PII.

Client: GE HealthCare | Chicago, IL, USA **July 2019 - August 2022**
Role: Senior Data Engineer

Description: Delivered scalable data pipelines and predictive models to optimize healthcare event logistics, reducing costs and improving patient satisfaction. Built HIPAA-compliant analytics services for scheduling, feedback analysis, and operational reporting, integrating them seamlessly into core systems.

Key Contributions:

- Crafted a scalable patient feedback analytics pipeline using **spaCy, NLTK, VADER**, and **Logistic Regression** for sentiment analysis, applied **K-Means** clustering, **Apriori rule mining**, and collaborative filtering on provider-patient interaction data, improving satisfaction scores by **0.3 in 6 months.**
- Engineered data pipelines to replace static aerial-distance calculations with dynamic route estimation using **Google Maps APIs**, reduced data latency and enabled **$120K/month cost savings** in planning for mobile healthcare events.
- Trained **LightGBM** models (benchmarked with **XGBoost**) using 7 months of route data to predict real-world travel distances with over **95% accuracy**, reducing third-party API reliance and improving scheduling efficiency.
- Supported model interpretability using **SHAP/LIME** for LightGBM/XGBoost predictions in patient feedback and logistics pipelines.

- Developed robust **ETL pipelines** and **batch jobs** in Python, SSRS, and SQL to automate data ingestion, transformation, and reporting across patient feedback, logistics, and revenue systems.
- Deployed analytics microservices and model endpoints using **FastAPI and AWS** (Lambda, EC2, S3), containerized pipelines integrated into scheduling systems via **REST APIs**.
- Collaborated with stakeholders, logistics, revenue, and onsite data collection teams to translate business logic into scalable pipelines, following **Agile methodology** and **HIPAA-compliant** development standards.

Technical Stack: Python (pandas, NumPy, scikit-learn, spaCy, NLTK, openpyxl, SQLAlchemy), SQL Server, SSRS, LightGBM, XGBoost, VADER, Logistic Regression, K-Means, Apriori, Collaborative Filtering, AWS (Lambda, EC2, S3), FastAPI, Git, Jenkins, Excel, REST APIs, Data Pipelines, ETL, Microservices, Agile, HIPAA Compliance, SHAP, LIME, PHI, PII.

Client: N-iX | Bengaluru, Karnataka, India **April 2017 - June 2019**
Role: Python Developer

Description: Built an IoT-enabled agriculture analytics system by combining field surveys with LoRa-based sensor telemetry for real-time monitoring. Applied Python-driven preprocessing, EDA, and modeling to reveal socioeconomic trends and digital infrastructure gaps. Delivered insights via Excel dashboards and interactive web apps to stakeholders, enabling data-informed strategies for improving agricultural productivity and rural connectivity.

Key Contributions:

- Designed and executed field surveys in rural Indian villages to evaluate the impact of **IoT in agriculture**, collected and stored 1,000+ farmers records in **MS SQL Server** using custom schemas, tables, and stored procedures.
- Worked with **device manufacturing teams** to define sensor requirements, test prototypes, and validate signal reliability under varying environmental and terrain conditions.
- Developed calibration scripts and automated quality checks for LoRa-based sensors before deployment.
- Built Excel **dashboards** and pivot tables to report key agricultural, socioeconomic, and other insights to stakeholders.
- Preprocessed data in **Python** using pandas, NumPy, and scikit-learn, applied **StandardScaler**, outlier handling, and conducted exploratory data analysis (**EDA**) to uncover rural infrastructure gaps.
- Developed a **Flask-based web app** integrated with LoRa modules for real-time sensor data visualization and transmission over 0.5–1.9 miles in varied terrain mainly in agricultural fields.
- Modeled relational data using **SQLAlchemy**, improving query efficiency and ensuring data integrity across the pipeline.

Technical Stack: Questionnaire Design, Survey Execution, IoT Sensor Manufacturing Collaboration, Data Collection & Processing, Python (pandas, NumPy, scikit-learn, matplotlib, Flask), SQL (SQL Server, SQLAlchemy, Window Functions), Excel (Power Query, Pivot Tables, XLOOKUP), Jupyter Notebook, EDA, GitHub, Stakeholder Communication, LoRa IoT Devices.

CERTIFICATIONS(Link)

- Databricks Generative AI Fundamentals
- Microsoft Azure AI Engineer Associate
- AWS Cloud Practitioner

EDUCATION

- **Master of Science in Computer Science** and **Data Science Graduate** at **Utah State University**, Logan, Utah