

Mukesh Arambakam

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Personal Summary

Staff AI/ML Engineer with with **7+ years** of Software Development experience, including **5+ years** specializing in **Natural Language Processing, Neural Machine Translation, and Generative AI**, backed by a Master's in Data Science. Skilled in designing and delivering end-to-end ML solutions, including Data Preprocessing, Model Training, Evaluation and Optimization. Experience in **Agent Orchestration**, Multi-Agent Systems, **Model-Stitching**, fine-tuning LLMs with PEFT methods, building, and developing scalable, production-ready ML applications. Strong background in **Machine Learning, Artificial Intelligence, Statistical Modeling, and Data Analytics**.

Skills

Programming Languages: Python, Java, R, JavaScript, C++, SQL, PL/SQL

Machine Learning Libraries: HuggingFace, PyTorch, Mergekit, NLTK, spaCy, transformers, OpenNMT, scikit-learn, TensorFlow, fasttext

Generative AI & LLM Technologies: LangChain, LangGraph, FastMCP, Agentic AI, Tool Calling, Prompt Engineering, RAG, LLM-as-a-Judge

LLM Fine-Tuning & Optimization: PEFT, LoRA (Low-Rank Adaptation), QLoRA (Quantized LoRA), In-Context Learning, ONNX

Other Python Libraries: NumPy, SciPy, Pandas, FastAPI, matplotlib, elasticsearch, fastalign

Cloud Technologies: AWS SageMaker AI, AWS Bedrock, AWS Nova Forge, OCI GenAI

Infrastructure & DevOps: Docker, Docker Compose, Jenkins, git, JIRA, Oracle DB, Shell

Work Experience

Genesys Cloud Services

Galway, Ireland (Remote)

STAFF AI/ML ENGINEER

Jan. 2026 - current

- Currently working on building a Domain Agnostic Agentic Orchestration System which orchestrates a multiple agents and connects with various tools to decide on the Next Best Action.
- Working on State-of-the-Art Model development using Model Merging Techniques working with low level model architecture features like tesnor parameter values.
- Leading a team of 4 and conducting daily scrum meetings, sprint plannings, retrospective and delivering weekly updates to the stake holder and the Director of Technology.

Oracle Corporation

Dublin, Ireland

SENIOR MACHINE LEARNING ENGINEER

Nov. 2020 - Dec. 2025

LLMs & Agentic AI Systems:

- Launched an agentic AI system with LangGraph, supporting 10k+ LLM calls to Translation & LangDetect MCP servers.
- Implemented 2 RAG systems with vector databases for domain-specific data extraction and translation enhancement.
- Engineered 5+ prompt engineering solutions for back-translation, domain classification, post-editing, and data generation with sophisticated tool calling mechanisms.
- Used prompt chaining techniques for multi-step LLM workflows including translation evaluation, iterative improvement, pivot-translation and post-editing.

Data Processing & Analysis

- Developed a dataset analysis framework from scratch for MT training data statistics, working across 40+ language pairs.
- Built a monolingual data generator for low-resource languages increasing synthetic data coverage by 30–40%.
- Designed a cross-lingual vocabulary gap detection tool leveraging n-gram and embeddings, improving coverage by 20%.
- Enhanced data-cleaning by reducing noise by 10% using alignment models, length ratios, and toxicity checks.
- Used in-context learning methods: zero-shot and few-shot learning for domain classification & data categorization tasks.

Engine Training, Fine-Tuning & Optimization:

- Updated the Training pipeline to generate word alignment, length ratio models for data cleaning and evaluations.
- Developed a Monolingual Engine Training pipeline and de-prioritized the tagged monolingual data during training.
- Fine-tuned translation models using PEFT techniques for efficient adaptation to domain-specific tasks.
- Applied quantization strategies (QLoRA) for LLM deployment, cutting resource usage by 40% in production.

Advanced Evaluation & Quality Assurance

- Re-engineered translation evaluation repository with modern architectures, boosting performance by 25%.
- Designed custom translation quality rubrics with linguists and applied LLM-as-a-Judge via direct assessment.
- Integrated G-Eval metric and LLM-as-a-Judge framework for comprehensive LLM-based translation assessment.
- Created visualization for evaluation scores using custom-built tools.
- Expanded evaluation framework with 5 new metrics: Comet, XComet, BERTScore, CometQE, and length-ratio checks.
- Assessed LLM translation consistency with Translate-then-Evaluate and LLM-as-a-Judge, raising accuracy by 20%.

Language Detection Enhancements:

- Expanded language detection coverage from 45 to 192 languages.
- Introduced a 3-stage hierarchical language detection architecture to differentiate sub-cultural languages.
- Improved language detection accuracy by 90% for very short strings (<12 characters).
- Refactored the codebase using robust system design patterns and FastAPI to significantly boost performance by 3x times.
- Packaged and published ONNX models with architecture-aware configurations for cross-compatibility.
- Used architecture-specific optimizations and model quantization to reduce memory footprint by 50%.

Oracle Corporation

Bangalore, India

APPLICATIONS ENGINEER - JAVA/BACKEND

June 2019 - Aug. 2019

- Lead developer in overhauling the project security flow of the Product and introduced 2 new features.

APPLICATIONS DEVELOPER - JAVA/BACKEND

July 2017 - May 2019

- **Certificate of Appreciation:** For *outstanding contribution* to the Product's Development.

Education

Trinity College of Dublin

1:1

M.SC. IN DATA SCIENCE

2019 - 2020

Thesis: **Federated Meta-Learning:** A Novel Approach for Algorithm Selection.

FMLearn, an application that allows the exchange of meta-data via APIs about machine learning models and data for the purpose of meta-learned algorithm selection and configuration.

Amrita School of Engineering

CGPA: 8.37/10.0

B.TECH. IN COMPUTER SCIENCE AND ENGINEERING

2013 - 2017

Publication

Jun 2020 **7th ICML Workshop on Automated Machine Learning (AutoML)**,

Federated Meta-Learning: Democratizing Algorithm Selection Across Disciplines and Software Libraries

Certifications

2025 **OCI - Generative AI Professional**, Oracle

Certified

2025 **Oracle Cloud Infrastructure - Foundations Associate**, Oracle

Certified

2025 **OCI - AI Foundations Associate**, Oracle

Certified

Personal Projects

Conversational AI

- Built multi-agent LangGraph workflow for routing, intent classification, and slot-filling to process conversational queries.
- Developed FastAPI based tool-calling agents with dynamic SQL generation from natural language understanding.
- Implemented LLM provider abstraction supporting Ollama and OpenAI
- Created NLP pipeline using LangChain agents for semantic query understanding
- Designed SQLite + SQLAlchemy ORM for efficient data persistence.
- Integrated ChromaDB-based RAG system to answer queries against stored PDF documents.

Home Lab Infrastructure

- Built complex home lab environment using Proxmox virtualization platform with Docker LXC's.
- Self-host comprehensive ecosystem supporting 10+ applications (Home Assistant, Nextcloud, Immich, Jellyfin, etc.)
- Implemented enterprise-grade authentication using Authelia SSO solution.
- Manage network infrastructure with custom DNS and DHCP servers.
- Secured remote access through Tailscale VPN and Funnels for all critical services.
- Developed complex home automation using Home Assistant for smart home integration.