AJAY KANNAN

Santa Clara, CA | +1 (602) 748-9642 | ajaykannan1606@gmail.com | LinkedIn | GitHub | Portfolio

Summary

Senior software engineer with strong data engineering and machine-learning background. Delivered a production data platform for a major utility, boosting processing throughput by 20% and cutting system errors by 15% through automated pipelines and monitoring. Built image-analysis models achieving 94% accuracy for medical data, demonstrating expertise in Python, PyTorch, and scalable backend services. Seeking to apply this blend of data-platform and AI experience to drive reliable, high-performance solutions for the organization.

TECHNICAL SKILLS

- **Programming Languages**: Python, C++, Java, C#, JavaScript, SQL, Bash
- **ML/DL Frameworks**: PyTorch, TensorFlow, Huggingface, Keras, NumPy, Scikit-learn, Pandas
- **LLM & AI Tools**: LangChain, LLM Integration, Prompt Engineering, RAG Pipelines
- **Backend Development**: REST APIs, FastAPI, Node.js, Express.js, Spring Boot, Microservices, GraphQL
- **Databases**: PostgreSQL, MongoDB, MySQL, Cassandra, NoSQL
- **Cloud & DevOps**: AWS, EC2, S3, Lambda, Azure, Docker, Kubernetes, Git, CI/CD
- **Computer Science**: Data Structures, Algorithms, System Design, Distributed Systems, Object-Oriented Programming
- **Currently Learning**: JAX, AWS Bedrock, Vector Databases (Pinecone), CUDA Programming

PROFESSIONAL EXPERIENCE

Pacific Gas & Electric **Jul 2023 - Present**
Senior Software Engineer *Santa Clara, CA*

- Designed and deployed a production data platform (Electric Productivity Tracker) processing large-scale utility datasets, improving data processing throughput by 20% and reducing system errors by 15% through backend automation, monitoring, and reliability engineering
- Engineered scalable, fault-tolerant data pipelines integrating heterogeneous sources (GIS, PostgreSQL, internal services), ensuring consistent data flow and low-latency access across distributed systems
- Built automated backend validation and testing infrastructure using Python and REST APIs, reducing deployment verification time by 50% through unit tests, integration tests, and end-to-end validation
- Implemented end-to-end data engineering workflows (ETL, validation, transformation), improving data integrity and reducing manual operational overhead through automated pipeline orchestration
- Automated extraction and processing of the Distribution Operations Toolset (DOT)-a daily-updated, macro-enabled Excel system containing nested map creation data-using Python and JavaScript to filter new maps, extract relevant information, and feed it into the map creation pipeline, eliminating manual data entry and reducing processing errors
- Unified three separate map creation processes into a single streamlined workflow, consolidating fragmented operations and improving overall efficiency, consistency, and maintainability across the team
- Applied ML techniques to improve anomaly detection in production systems, reducing false positives by 30% through model-assisted signal validation and statistical analysis
- Developed observability and monitoring systems (health checks, dashboards, alerting), reducing issue detection and resolution time by 50% through proactive alerting and centralized logging
- Collaborated with cross-functional teams in design and code reviews and produced technical documentation-including architecture diagrams, API specifications, and runbooks-in Confluence, which accelerated feature rollout and reduced onboarding time

Sigtuple Inc. **Jul 2021 - Dec 2021**
Data Scientist *Bangalore, India*

- Applied image processing techniques to biological data using PyTorch, implementing Siamese Networks, GANs, and Neural Style Transfer, which enabled more accurate medical image analysis of cellular structures
- Utilized alpha blending techniques to recreate histology slide images, accurately representing biological particles and membranes
- Achieved 94% accuracy in image blending efficiency through innovative generative architectures
- Built production software in Python with object-oriented design and comprehensive unit and integration tests, resulting in a stable system that reduced deployment errors

Microsoft **2017 - 2018**
Software Engineering *Hyderabad, India*

- Utilised ML algorithms for the FarmBeats agricultural platform using Python and PyTorch, identifying sensor data patterns to enhance crop yield predictions
- Built GIS-based heat-map generation system for FarmBeats, designing algorithms for real-time spatial visualization of multi-sensor data (soil moisture, temperature, humidity)
- Contributed to the Shopping on Cortana project, integrating Cortana with a shopping platform to improve user experience
- Developed backend services with Cassandra DB and C# as part of the Foundry Team in MS-IDC, building RESTful APIs for distributed data storage

PUBLICATIONS

- Few Shot Learning for TCR-Epitope Binding Affinity Prediction.*MORE Symposium, ASU, 2023*
- A. Kannan et al..Low-cost static gesture recognition system using MEMS accelerometers.*IEEE Global IoT Summit, 2017*
- G. K. Gudur et al..A Generic Multi-modal Dynamic Gesture Recognition System using Machine Learning.*ArXiv, abs/1809.05839, 2018*

PROJECTS AND RESEARCH

Few-Shot Learning Research **Aug 2022 - May 2023**

Arizona State University

- Developed contrastive loss for Few Shot Learning in TCR-Epitope affinity prediction using PyTorch, improving accuracy by 30% through novel architectural improvements
- Implemented Siamese network architecture to evaluate efficiency of different K-values in few-shot learning, conducting comprehensive experiments and statistical analysis
- Presented research findings at ASU MORE symposium, demonstrating technical communication and quantitative reasoning skills

Gesture Recognition Systems **Aug 2015 - Dec 2018**

Solarillion Foundation

- Designed and developed both static and dynamic American Sign Language Gesture Recognition Systems achieving 94–97% accuracy using ML algorithms (Extra Trees, Random Forest, Ridge Classifier)
- Implemented advanced distance metric techniques to enhance recognition performance, contributing to accessible technology development for hearing-impaired users
- Built complete Python pipeline integrating sensor data acquisition, feature processing, model training, and real-time inference
- Led IoT research group, managing R&D projects and mentoring junior researchers as teaching assistant
- Published research in IEEE Global Internet of Things Summit 2017 and ArXiv

On-Device LLM Chatbot

- Built a voice-enabled LLM assistant using LM Studio and DeepSeek for local inference, exploring privacy-preserving conversational AI without cloud dependency
- Designed pipeline architecture handling speech-to-text, LLM inference, and text-to-speech components with error handling

Banking Chatbot with LangChain

- Built an LLM-powered banking chatbot using GPT models and LangChain, designing prompt workflows and intent handling for context-aware responses
- Implemented basic RAG pipeline to ground LLM responses in banking documentation, exploring vector embedding techniques
- Optimized NLP pipelines to handle diverse financial queries and improve response relevance

Twitter Data Analysis

- Built ML retrieval system using ANN and SVR achieving 98% accuracy in context-aware data retrieval
- Integrated streaming data pipelines with backend services and developed web application interface for real-time data visualization

EDUCATION

Arizona State University **Jan 2021 - May 2023**

Master of Science, Computer Science *Tempe*

- **Coursework:** Machine Learning, Deep Learning, Distributed Systems, Data Structures and Algorithms

Anna University **Aug 2014 - May 2019**

Bachelor of Science, Computer Science *Chennai*