RAKSHEKA RAJAKUMAR

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Summary: Software Engineer skilled in managing code lifecycles, streamlining workflows, and collaborating with cross-functional teams. Thrives in dynamic environments, presenting ideas, and adapting to feedback for scalable solutions

EDUCATION

University of Southern California — **Los Angeles, CA**
Master of Science in Electrical & Computer Engineering- Machine Learning & Data Science — August 2023-May 2025

- **Courses**: Data structures and algorithms, Information Retrieval, Cloud Computing, Deep learning systems, Probability and Statistics
- **Certification**: AWS AI Practitioner- https://www.credly.com/badges/df3a3caa-075c-4d53-a212-da49fe37a62a/public_url

Anna University - Coimbatore Institute of Technology — **Coimbatore, India**
Bachelor of Engineering in Electronics and Communication – GPA: 9.1/10 — July 2019-May 2023

- **Courses**: Database management systems, Machine learning, Probability, Stochastic processes, Digital Signal Processing

EXPERIENCE

WorkUp — **Los Angeles, CA**
Machine learning Engineer — May 2024-July 2024

- Developed a two-tower retrieval model with NVIDIA Merlin for job matching in a state-of-the-art recommender system
- Optimized item-query towers leveraging encoder and MLP blocks on AWS SageMaker
- Improved embedding quality by 15% and prevented overfitting using different regularization techniques & negative sampling
- Enhanced database querying by indexing, automated checks and streamlined workflows to ensure high data quality

Kanini software solutions — **Chennai, India**
Full Stack Developer Intern — February 2023-June 2023

- Designed scalable web applications utilizing Python (FastAPI), React, Node.js, and PostgreSQL
- Implemented CI/CD and Kubernetes for efficient deployment, reliability, and optimal user experience
- Led a team of four to build banking application with ETL pipeline for real-time analytics & visualization, securing 70% customer traffic. Simulated user workflows to test system performance under different loads

MITACS — **Waterloo, Canada**
Globalink Research Intern – Software Development and ML — June 2022-October 2022

- Researched Dynamic Key-Value Memory Networks (DKVMN) to model knowledge retention dynamics, capturing forgetting and relearning patterns to enhance AI proficiency assessment in educators and personalize curriculum
- Managed events and conducted seminars explaining a rover prototype, for a project sponsored by Canadian Space Agency
- Worked in a team (Under Dr. Julie Mueller and InkSmith Technologies) to program K8 rovers for object detection

TECHNICAL SKILLS

Languages: Python, C++, C, C#, SQL, HTML, CSS, JavaScript
Frameworks & MLOps: TensorFlow, Keras, PyTorch, Pyspark, Scikit Learn, NumPy, Matplotlib, Langchain, LlamaIndex, ML Flow, Hadoop
Web Technologies: React, Node, SpringBoot, FastAPI, Flask, Streamlit, MySQL, Postgres, MongoDB, LAMP, WebAPIs
Cloud & DevOps: LINUX, AWS SageMaker, S3, Bedrock, Docker, Kubernetes, Kubeflow, Git, Jenkins, JIRA, Agile (Scrum), GCP Data Lake
Domains: Web development, Cloud computing, Database management systems, Neural Networks
Hobbies: Music production, Singing, Songwriting, Graphic design

PROJECTS

Federated Learning in 3D Brain-tumor segmentation | Python, Pytorch, ResUNet, TransUNet, UNet, MLOps, MongoDB

- Pioneered research on federated learning aggregation algorithms for multimodal 3D brain tumor segmentation, training ResUNet and Transformer-encoded UNet models to achieve performance comparable to centralized learning approaches

Recommendation Applications | Python, Node.js, Flask, SQL, Deep learning, Docker

- Devised a full-stack Spotify song recommendation web app with neomorphic UI and RESTful Node.js backend using the Spotify Web API
- Built a Flask-based movie recommender system using RBMs, outperforming K-means on IMDB data for personalized recommendations

EDQty- Multimodal learning tool | Flask, React, MongoDB Atlas, AWS EC2

- Developed and deployed a multilingual learning companion using React and Flask, hosting on AWS EC2 for accessibility & inclusivity
- Enabled real-time translation, Q&A, adaptive summarization, and captioning in a conversational AI interface

Wildfire Aftermath Analysis using Satellite Imagery | Erdas, Detectron2, Mask R-CNN, SQL, Python

- Built segmentation pipeline with Detectron2 & Mask R-CNN for wildfire damage assessment, using Hadoop for distributed storage
- Extracted RGB & NIR values (through a virtual electromagnetic shift) from satellite imagery via ERDAS to assess fire intensity

AI Driven Interactive Applications | React, Node, Ollama, Huggingface, OpenAI GPT

- Enhanced an AI-driven gesture recognition system for real-time control of cursors, pens, and navigation
- Created a portfolio chatbot adopting LLaMa 2 & compared it to OpenAI GPT in terms of text generation quality and accuracy

Empathy-Driven Conversational AI (LLMs) | Python, Hugging face, SpaCy, NLTK, TextBlob

- Customized an emotionally adaptive chatbot having custom state-of-mind class to analyze user conversation styles
- Ongoing: Customizing adaptation layer to guide users toward an optimal emotional state

PUBLICATIONS

- Performance Analysis of CNN Architectures in Multi-label Image classification, Proceedings **IJCA** 184(48):14-18, February 2023
- Assessment of ML Algorithms for Predicting Campus Placements, Proceedings of **ICMCSI** 2023 (pp. 221-231 Springer)