RAKSHEKA RAJAKUMAR - www.raksheka.me

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Versatile problem-solver blending expertise in software development, cloud computing and machine learning to craft diverse and multi-disciplinary creative solutions.

EDUCATION

University of Southern California (Master of science in Electrical and Computer Engineering- Machine Learning & Data Science) **Los Angeles, USA**
Deep Learning systems, Information retrieval and web search engines, Computation principles, Machine Learning-I, Digital signal processing August 2023-June 2025

Anna University - Coimbatore Institute of Technology (CGPA: 9.1/10) (Bachelor of Engineering in Electronics and Communication) **Coimbatore, India**
Machine Learning, Web Development, Data analysis and Networking July 2019-May 2023

SKILLS

Programming languages: Python | C++ | C# | Javascript | HTML | CSS | MATLAB
Frameworks and Libraries: PyTorch | TensorFlow | NumPy | Pandas | Matplotlib | Scikit-learn |LLaMa2 | OpenAI GPT |Selenium | React.js | Node.js | Bootstrap | Tailwind | BERT |
Databases: MySQL | SQL | MongoDB
Tools and Technologies: Docker | Kubernetes | AWS | GitHub | Hypervisors | Visual Studio | VSCode | Atom | XCode | Jupyter Notebook | Google Colab
Domains: Artificial Intelligence | Deep Learning | Computer Vision | Natural Language Processing | Generative AI | Cloud Native Platforms | Web Development
Languages known: English | Tamil | Hindi | Telugu | Bahasa Indonesia

EXPERIENCE

WorkUp **Los Angeles, USA**
Machine Learning Engineer May 2024-July 2024
- Leveraged deep learning models to develop a SOTA recommender system for a TikTok-style application for employment using Nvidia Merlin for pipeline creation and AWS for Cloud deployment. Personal contribution: Candidate retrieval system and model development (Merlin with Two tower architecture)

KANINI software solutions **Chennai, USA**
Associate Trainee Intern February 2023- June 2023
- Developed and deployed web applications using ReactJS, Node.js, and .NET Framework; designed and implemented front-end interfaces
- Managed and optimized databases using DBMS tools; collaborated on software integration and deployment on AWS, utilizing C# for backend development

MSAII **Ohio, USA**
Machine Learning- Artificial Intelligence Intern (remote) November 2022-February 2023
- Collaborated with a group of engineers to optimize GPU utilization to ensure 99% model up-time while reducing costs by almost 20%
- Enhanced a classification model for customer emotion analysis, achieving 2-checkpoint reductions in error metric. Major focus: Faster R-CNN architecture.

Teach Digital Lab **Waterloo, Canada**
Machine Learning Research intern June 2022-October 2022
- Conducted predictive modelling to assess digital fluency among Ontario's education professionals (Project 1)
- Collaborated on the development of object detection for space rovers, while designing a smaller prototype for K-12 education. Worked with a team under Dr. Julie Mueller, in partnership with InkSmith Technologies, on a project funded by the Canadian Space Agency. Personal contributions included implementing the Mask R-CNN pipeline and delivering seminar presentations on the rover prototype to PhD students.

Zebo.AI **Bengaluru, India**
Machine Learning Intern (remote) October 2021-January 2022
- Pioneered development of advanced fraud detection models, leveraging anomaly detection and pattern recognition for financial transactions, reduced false positives and improved precision by 17%

PROJECTS

Wildfire Aftermath Analysis using Satellite Imagery
Developed a comprehensive object detection and segmentation pipeline to assess wildfire damage from satellite images using advanced computer vision techniques.
- Extracted RGB and Near-Infrared (NIR) values (using virtual electromagnetic shift) from satellite imagery using ERDAS software.
- Formulated a dataset of 16,000 entries to quantify the impact of wildfires across different regions.
- Leveraged Detectron2 and Mask R-CNN for object detection and segmentation, accurately identifying burnt areas.
- Applied the Burnt Index Ratio to assess fire damage intensity, providing a more suitable metric for wildfire-affected areas.

Federated Learning in 3D Brain-tumor segmentation
- Developing a federated learning model for 3D brain MRI segmentation using the multimodal BraTS dataset, with a UNet architecture and FedPer to address client data variability by centralizing the encoder and personalizing each client's decoder.
- Ongoing model performance comparisons with centralized algorithms and TransUnet, refining for high segmentation accuracy and adaptability across varied client environments.

Deep Learning | Multi-Label Classification (Image and numerics)
- Compared deployment of multiple classification models (ANN, XGBoost, Gradient boosting, Support vector machines and nearest means classifier) on a 13,600 sized dataset that contained geometric and shape based factors of 7 types of beans, with respect to speed and accuracy. The XGB classifier helped obtain the highest 94.09% accuracy. Major libraries used were Scikit-learn and TensorFlow

Optimization for Empathy-Driven Conversational AI
- Engineered an adaptive chatbot with a custom state-of-mind (SoM) analysis class to assess and classify user conversation styles across formality, emotion, frustration, and rush. Leveraged LLMs with a final adaptation layer to generate responses that guide users toward an optimal emotional state.
- Created a portfolio chatbot using LLaMa 2 & compared the same using OpenAI GPT in terms of text generation quality, response accuracy, and user engagement

Movie recommender system
- Built a movie recommendation system using Restricted Boltzmann Machines (RBMs) for content-based filtering, compared with K-means.

Intelligent Sensory assistive glove
- Worked with a team to design a computer vision and IoT-based wearable glove system to detect and identify obstacles(types-32) via an ultra-sonic sensor, providing real-time speech output through optical character recognition to aid visually impaired people

PUBLICATIONS

- An Analytical Assessment of Machine Learning Algorithms for Predicting Campus Placements. In Mobile Computing and Sustainable Informatics: Proceedings of ICMCSI 2023 (pp. 221-231 Springer)
- Performance Analysis of Convolutional Neural network Architectures in Multi-label Image classification - International Journal of Computer Applications 184(48):14-18, February 2023

ACHIEVEMENTS

Executive Director - Women Empowerment Cell, CIT (2021-23), Board Member - IEI (Institute of Engineers, India) Students' Chapter (2022-23)