Ariharasudhan

https://arihara-sudhan.github.io

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Education

Einstein College of Engineering — Tirunelveli, India
B.E., Computer Science and Engineering (CGPA: 8.83) — *2019 - 2023*

Government Hr. Sec. School — Tenkasi, India
Higher Secondary School Examination (Score: 87%) — *2019*

Programming Skills

Deep Learning Frameworks: PyTorch, NumPy

Languages: Python, Java, JavaScript, C

Databases: MySQL, MongoDB

Web Development Frameworks: FastAPI, ReactJS, NodeJS, Express.js

Operating Systems: Windows, macOS, Linux (mainly Ubuntu)

Version Control Systems: Git

Work Experience

Zoho Corporation — Tenkasi, India
Member Technical Staff, Zoho Desk — *April 2024 - Present*

- Developing UI and AI systems for Zoho Desk.
- *Currently working on a Retrieval-Augmented Generation (RAG) system using FAISS for document retrieval and a HuggingFace LLM for improved responses. Also developing production-grade JavaScript and ReactJS features.*

Zoho Corporation — Trichy, India
Member Technical Staff, ZLabs Speech Profiling — *Jan 2024 - April 2024*

- Learned about Audio Feature Extraction
- *I conducted audio classification using CNNs, achieving peak accuracy. I addressed challenges with varying sampling rates and gained valuable insights into audio engineering and feature extraction.*

Zoho Corporation — Tripur, India
Member Technical Staff, ZLabs Intelligent Document Processing — *Jun 2023 - Dec 2023*

- Developed A Fewshot Doc2Vec Model
- *I began my research with ResNet-50 and then transitioned to DiT, a vision transformer pretrained on a document dataset. We extracted document embeddings and performed few-shot training using Triplet Loss. With well-labeled data, we achieved a similarity search accuracy of 100%. Later, in my research, I discovered interesting insights, such as classification models sometimes performing like few-shot models and vice versa. Finally, I conducted multimodal training by combining visual features from ResNet and textual features from BERT, resulting in strong generalization.*

Zoho Corporation — Coimbatore, India
Project Trainee, ZLabs Intelligent Document Processing — *Jan 2023 - Jun 2023*

- Learned Deep Learning Computer Hardwares, Backend Frameworks and Revised Python
- *I meticulously learned deep learning, which sparked my interest in creating small books (https://arihara-sudhan.github.io/books). I successfully trained small neural networks and tackled a few-shot classification task, which I resolved using contrastive loss.*

Projects

AI Powered MediKit

- Revolutionizes healthcare diagnostics by leveraging Vision Transformers (ViTs) for precise medical image analysis.
- Overcomes CNN limitations by capturing fine-grained medical features with superior accuracy.
- Features Heartbeat Analysis using Mel-Frequency Cepstral Coefficients (MFCC) to classify heartbeats and detect abnormalities.
- Supports few-shot classification for tablet identification, minimizing retraining needs and improving adaptability.
- Includes a Herbal Solution feature that bridges modern AI with traditional medicine by suggesting natural remedies.
- Combines precision, innovation, and accessibility to set a new benchmark in AI-driven medical solutions.

MindKural - RAG System

- Developed a conversational AI bot using LangChain to answer queries based on Thirukkural, the timeless Tamil literary masterpiece.
- Utilized FAISS for vector embeddings and similarity search to enable efficient retrieval.
- Enhanced responses using Retrieval-Augmented Generation (RAG) with Falcon LLM.
- Transformed Thirukkural's wisdom into a knowledge framework that informs and heals.

Grouped Detection of Objects

- Utilized the YOLO algorithm to detect objects in images accurately.
- Cropped regions of interest and applied a Swin Transformer-based few-shot network for classification.
- Implemented K-means clustering with the Elbow Method to optimize object grouping.
- Deployed a scalable real-time prediction microservice using FastAPI.

Fewshot Classify Anything Model

- Performs similarity searches on stored embeddings of images.
- Uses a Swin Transformer as the backbone and employs triplet loss for training embeddings.
- Efficiently classifies new inputs by referencing a few saved embeddings in an index.

Next-Word Prediction using Bigram Model

- Implemented a probabilistic language model that predicts the next word based on the previous word using a bigram approach.
- Utilized joint probability and conditional probability to compute word sequences.
- Demonstrated real-world text generation applications by starting with seed words and generating coherent sentences.

Dialect Classification using Naïve Bayes

- Built a text classification model for dialect detection using the Naive Bayes algorithm.
- Employed the Bag of Words approach to store word frequencies for classification.
- Used Laplace Smoothing to handle zero probabilities and prevent model breakdown.
- Optimized for efficiency by working in log-space to prevent underflow when multiplying small probabilities.

Achievements/Activities

- Educating Peers at Zoho Desk on Client Technology *I mentor my team on JavaScript internals, the functional programming paradigm, ReactJS, and TypeScript.* (SEP 2024)
- Learning NLP and Speech Processing nightly at a study group meet (DAILY)
- Taught Basic Machine Learning to Students *Guided expert students from Coimbatore, Tirunelveli, and Madurai on Multi-Layer Perceptron and CNN via Google Meet.* (OCT 2024)
- Taught MERN Stack Development to Students *Conducted weekend sessions at Einstein College of Engineering on MERN Stack Development.* (DEC 2024)
- Session on "Meet AI" at Kamaraj College of Engineering and Technology, Virudhunagar *Taught AI fundamentals, fostering curiosity and learning to inspire an AI-powered South.* (JAN 2025)
- Session on "On Technology and Rural Development" at AKY Polytechnic College, Nellai *Discussed technology's role in rural development, education, societal changes, and self-improvement.* (SEP 2024)
- Qualified for the final round of Medecro.ai's Hackathon *Developed AI-powered MediKit, a bundle of AI solutions for medical problems such as heartbeat analysis, tumor detection, and cell classification.* (AUG 2024)
- Qualified for the final round of the Atheneum Hackathon, IGDTUW, New Delhi *Proposed Smart Education System with OCR-based test evaluation, virtual pen, virtual quiz, and face recognition-based attendance.* (AUG 2022)
- Talent Search Examination, JP College of Engineering, Tenkasi *Secured 1st Prize for excellence in Mathematics and Science.* (FEB 2017)
- Yuva Shri Kala Bharathi Award, Bharathi Yuva Kenthra, Madurai *Recognized for outstanding performance in proficiency and arts.* (JAN 2018)
- Thirukkural Literature Explanations *Dedicating my evenings to writing detailed explanations for each Thirukkural.* (OCT 2024)
- Aladi Aruna Merit Scholarship, Einstein College of Engineering, Tirunelveli *Awarded a scholarship for securing a top rank in academics.* (FEB 2017)
- 1st Prizes in Paper Presentation, Web Designing, Code Debugging *Rohini College of Engineering, Kanyakumari - National Level Technical Symposium.* (MAR 2022)
- 1st Prizes in Paper Presentation and Web Designing Competitions *PSN College of Engineering, Tirunelveli - National Level Technical Symposium.* (APR 2022)
- 1st Prizes in Paper Presentation, Web Designing, and Technical Quiz *Thamirabarani Engineering College, Tirunelveli - National Level Technical Symposium.* (MAY 2022)
- Best Project Presentation in Mini Project Expo for III-year students *Developed an AI-Based Student Service System at Einstein College of Engineering.*