Aneesh Mukkamala

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TECHNICAL SKILLS

Languages : Java, Python, JavaScript, TypeScript, SQL, HTML, CSS
Libraries / Frameworks : Pytorch, Tensorflow, ReactJS, NodeJS, ExpressJS, Bootstrap, NumPy, SciPy
Cloud / Microservices : AWS (EC2, DynamoDB, Lambda, Kinesis , Route53), Docker, Kafka, Firebase , MongoDB

WORK EXPERIENCE

RKIL limited, Hyderabad ***July 2024–Present***
Full Stack Web Developer

- Architected and deployed a full-stack enterprise scale WebRTC, RTM platform using React.js, Node.js, Firebase, Agora SDK and powered by AWS (Lambda, CloudFront, DynamoDB, RDS)
- Core functionalities include secure user authentication, dynamic group management, virtual lobby system, and ultra-low latency audio/video streaming with on-demand room creation
- Designed elastic infrastructure with auto-scaling and load balancing, achieving 99.9% uptime through distributed architecture and redundant failover mechanisms
- Integrated comprehensive monitoring and logging using AWS CloudWatch and CloudTrail for real-time performance metrics and system health monitoring
- Developed and maintained multiple non responsive company websites including the company homepage, focusing on clean UI design and brand consistency ***Ongoing project*

RESEARCH & PROJECT WORK

Multi-Dimensional Turing Neural Network

- Architected a novel Neural Turing Machine with multi-dimensional attention mechanisms for abstract reasoning tasks
- Implemented 3D and 4D memory tensors with cross-dimensional attention for enhanced reading/writing operations.
- Achieved superior accuracy on ARC AGI benchmark tests compared to conventional sequence models and LLMs with computational overhead and training time significantly versus traditional deep learning architectures

Binary Encoded Multi Label 3d Segmentation *MICCAI 2024 - PENGWIN GC*

- Developed 2.5D, 2D segmentation methods with voting mechanisms to process 3D volumes efficiently, achieving exceptional metrics (99.79% accuracy, 98.47 IOU, 1-5 HD95) during inference
- Additionally implemented an ensemble of 5x U-Nets for binary-encoded X-ray segmentation, processing 50,000+ images with superior performance (97.31% IOU, 3.5 HD95) on validation datasets
- Developed a computationally efficient voting method to bridge 2D model predictions with 3D volumetric data, reducing processing overhead while maintaining high accuracy

Multi-Modal Product Attribute Prediction Pipeline *Amazon ML hackathon 2024*

- Engineered a hybrid NLP-CV pipeline leveraging BERT variants (BERT, GPT-2, RoBERTa, Distill-BERT) alongside BLIP & OCR models to extract comprehensive product attributes from text and visual data across 150,000+ images

Multilingual Gemma: Cross-Lingual LLM Adaptation

***** Ongoing project***

- Developed a hybrid ML pipeline achieving 100 ppm prediction accuracy for exoplanetary chemical spectrum analysis using AIRS and FGS sensor data from 670 exoplanets
- Successfully adapted and trained Google's Gemma models (2B & 9B parameters) for Spanish and Hindi languages, using LoRA-based efficient fine-tuning to maintain model architecture integrity
- Achieved competitive performance metrics against larger multilingual models (70-75B params) while using only 2-9B parameters through targeted fine-tuning and efficient adaptation strategies
- Engineered custom tokenization pipelines for Hindi-specific character sets, Devanagari script and Spanish specific linguistic patterns, optimizing context window utilization and reducing token fragmentation by 47%.
- Designed specialized prompt templates, instruction tuning datasets comprising 2 million + samples across diverse text categories in Hindi and Spanish for enhanced performance during evaluation

Temporal Bio- Cancer Recurrence Prediction

MICCAI 2024 (LEOPARD GC)

- Developed deep learning models predicting prostate cancer recurrence time frames using 800GB of Whole Slide Images
- Engineered custom patch-filtering algorithms to models to identify high-density cancer cell clusters, enhancing prediction confidence to optimize computational efficiency in WSI processing
- Designed feature extraction pipeline for quantifying cellular characteristics from WSI data

Exoplanetary Atmospheric Spectral Analysis

Ariel challenge - NeurIPS 2024

- Developed a hybrid ML pipeline achieving 100 ppm prediction accuracy for exoplanetary chemical spectrum analysis using AIRS and FGS sensor data from 670 exoplanets
- Engineered an innovative feature extraction pipeline combining higher-order derivatives, temporal binning, and interpolation techniques for ground truth spectrum vectorization
- Implemented a dual-stream ensemble architecture integrating CNN-LSTM networks for spatio-temporal analysis and custom residual networks for error correction.

EDUCATION

National Institute of Technology, Andhra Pradesh — *Nov' 22 – April '26*

Bachelor of Technology — Metallurgical and Materials Engineering — *CGPA 8.57*

ACHIEVEMENTS AND CERTIFICATIONS

- **AWS (Amazon Web Services)** Certified Cloud Practitioner
- **AWS (Amazon Web Services)** Certified Solutions Architect
- 400th position **Amazon ML challenge 2024** (Top 2% out 18,000+ teams)
- 93.69 percentile **JEE-MAINS 2022** (Top 6% out of 9 lakh candidates)

RELEVANT COURSEWORK

- **Machine Learning Specialization**

  Supervised Learning | Advanced Learning Algorithms |

  Unsupervised Learning, Recommenders, Reinforcement Learning
- **Deep Learning Specialization**

  Sequence Models | Convolutional Neural Networks | Neural Networks and Deep Learning