

# Aneesh Mukkamala

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## TECHNICAL SKILLS

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**Languages** : Java, Python, JavaScript, TypeScript, SQL, HTML, CSS

**Libraries / Frameworks** : Pytorch, Tensorflow, HuggingFace, Transformers, XLA, ReactJS, NodeJS, ExpressJS, Bootstrap, NumPy, SciPy, OpenCV, Roboflow, SimpleITK

**Cloud / Microservices** : AWS ( EC2, DynamoDB, Lambda, Kinesis , Route53 ), Docker, Firebase , MongoDB, Git

## WORK EXPERIENCE

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**RKIL limited, Hyderabad**

**July 2024–Present**

Full Stack Web Developer

*\*\*Ongoing projects*

- 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 multiple non responsive company websites including the company homepage.

## RESEARCH & PROJECT WORK

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**Multilingual Gemma: Cross-Lingual LLM Adaptation**

*\*\* Ongoing project*

- 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 tokenization pipelines for Hindi-specific character sets, Devanagari script and Spanish 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

**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 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

## Multi-Dimensional Turing Neural Network

- Architected a novel Neural Turing Machine with multi-dimensional memory with diverse attention mechanisms for abstract reasoning tasks
- Implemented 3D and 4D memory tensors with cross-dimensional attention for enhanced reading and writing operations without using any accelerated hardware
- Achieved superior accuracy on ARC AGI benchmark tests compared to conventional sequence models and LLMs with reduced computational overhead and training time significantly versus traditional deep learning architectures

## 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 with 5 levels of slides stacked in TIF, TIFF files
- 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

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**National Institute of Technology**, Andhra Pradesh

Nov' 22–April '26

Bachelor of Technology – Metallurgical and Materials Engineering

CGPA 8.57

## ACHIEVEMENTS AND CERTIFICATIONS

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- **AWS (Amazon Web Services)** Certified Cloud Practitioner
- **AWS (Amazon Web Services)** Certified Solutions Architect
- 400<sup>th</sup> 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

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### • 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