Chinmay Appa Rane

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SUMMARY

Innovative and results-driven Senior Machine Learning Engineer with 3+ years of experience leading AI solutions across industries, also serving as a Technical Architect and Technical Program Manager. Expertise in Generative AI, multimodal AI/ML, and computer vision, with a strong track record in end-to-end AI development and deploying scalable models. Passionate about leveraging leadership and technical acumen to build cutting-edge AI solutions that drive real-world impact.

EDUCATION

University of Texas at Arlington | Doctor of Philosophy, *Deep Neural Networks* | Dept – EE   *(Spring 2021)*
University of Texas at Arlington | Master of Science, *Neural Networks* | Dept – EE   *(Spring 2016)*

WORK EXPERIENCE

� **Quantiphi Inc-** *Senior Machine Learning Engineer*   *(September 2021- Current)*

Leading AI development and deployment by combining expertise in **Generative AI, multimodal AI/ML (LLMs, vision-LLMs, computer vision, and medical imaging)** with strategic leadership and project management. Delivering **scalable AI solutions** across industries, from research to production.

- **Vision-Language AI & RAG** – Optimized aviation workloads by developing vision-language models and retrieval-augmented generation.
- **Cardiac MRI Segmentation** – Led a self-supervised MONAI-based pipeline with TensorRT acceleration and Triton inference deployment on AWS.
- **LLM Optimization** – Built parameter-efficient fine-tuning (PEFT) and FFT-based pipelines for Mistral model training & inference.
- **Object Detection Acceleration** – Developed ONNX Graph Surgeon pipelines across frameworks for enhanced efficiency.
- **Rail Safety AI** – Architected CI/CD-driven object detection & instance segmentation for reliability improvements.
- **Biomedical AI** – Led single-cell protein prediction research, advancing predictive modeling in biomedical applications.
- **Federated Learning** – Designed privacy-preserving AI framework using TensorFlow Lite for edge AI.
- **Computational Drug Discovery** – Developed pretraining pipelines for proteins & SMILES sequences to accelerate drug discovery.

➤ **Image Processing and Neural Networks Lab**, **UTA**– *Graduate Research and Teaching Assistant*   *(2017- 2021)*

Conducted research and developed **custom neural network algorithms** for **image processing**, **signal processing**, and AI applications. Worked on industry-funded projects, applying AI techniques to solve real-world challenges in eye care and geophysics, blending pure research with practical implementation.

➤ **Unique Software Development** - *Data Scientist Intern*   *(Jan 2018 – Dec 2018)*

Developed Python-based **production grade code** for **NLP** using Amazon Comprehend, custom ML models, and **object detection** algorithms to process complex user data. Integrated advanced querying, analytics, and predictive tools for Mode Transportation. Additionally, implemented **YOLO** and **face detection** algorithms for the **Inmoov 3D robot** and optimized object detection on a **Raspberry Pi** using **TensorFlow Lite**.

PROJECTS

- **LLM-Powered Semantic Search Pipeline** – Built a generative AI-driven search system using Milvus DB, a reranker, and RAG for contextual retrieval across medical and baby book domains.
- **End-to-End MONAI Solution for Cardiac MRI** – Led the development of an AI-assisted pipeline for cardiac MRI segmentation using self-supervised learning, TensorRT, and AWS deployment.
- **Optimized Object Detection Inference** – Improved a TensorFlow-based detection pipeline with TensorRT, Triton Inference Server, and ONNX Graph Surgeon for speed and efficiency.

- **Federated Learning Pipeline** – Developed a TensorFlow Federated pipeline with on-device training using TensorFlow Lite to enable privacy-preserving ML without cloud data transfer.
- **Technical Lead – Rail Safety using Computer Vision** – Leading multiple use cases involving AI-assisted annotation, active learning, drift detection, and inference pipeline improvements.
- **Multimodal Single-Cell Integration** – Experimented with SVD, PCA, and latent diffusion models for predicting DNA-to-RNA and RNA-to-Proteins in a Kaggle competition.
- **AI for Lasik Surgery (Funded by ALCON)** – Built ML models in C++ to optimize artificial lens selection using outlier removal, feature selection, and clustering techniques.
    - 💡 *For detailed project descriptions and additional work, visit* https://chinmayrane.com/.

TECHNICAL SKILLS

Programming Languages and Scripts - Python, MATLAB, C, C++, R.

Database and Languages - SQL, MongoDB, MYSQL.

Machine Learning Algorithms – Linear Regression, Logistic regression, Random forest, Decision trees, Clustering algorithms, Gradient Boosting, Neural networks, Autoencoders, Principal component analysis, Support vector machines, XGBoost, Convolution neural networks, LSTMs, Docker, Gitlab, AWS, GCP, LLMs, VLMs, RAG

Deep Neural Networks/Machine Learning Packages/API's - Matlab toolbox, TensorFlow, Keras, PyTorch, Dlib, numpy, sckit-learn, Pandas, Numpy, Opencv, AWS, Amazon comprehend for NLP.

PUBLICATIONS

- Kanishka Tyagi, Chinmay Rane, Bito Irie, Michael Manry, "*Multistage Newton's approach for training radial basis function neural network*", *SN Computer Science*, Publish date - June 2021.
- Kanishka Tyagi, Chinmay Rane, Michael Manry "*Regression analysis, Artificial Intelligence and Machine Learning for Edge Computing*" to be published by *Elsevier*, Accepted, Publish date - late 2021.
- Kanishka Tyagi, Chinmay Rane, Michael Manry "*Supervised Learning, Artificial Intelligence and Machine Learning for Edge Computing*" to be published by *Elsevier*, Accepted, Publish date - late 2021.
- Kanishka Tyagi, Chinmay Rane, Michael Manry "*Unsupervised Learning, Artificial Intelligence and Machine Learning for Edge Computing*" to be published by *Elsevier*, Accepted, Publish date - late 2021.
- Chinmay Rane, Sanjeev Mallur, Yash Shinge, Kanishka Tyagi, Michael Manry, "*Optimal Input Gain: All You Need to Supercharge a Feed-Forward Neural Network*", *ArXiv*, Publish date -April 2023.
- Chinmay Rane, Michael Manry, "Dynamic Activations for Neural Net Training", The Second Tiny Papers Track at ICLR 2024 .
- Kanishka Tyagi, Xun, Chinmay Rane, Michael Manry, "Automated Sizing and Training of Efficient Deep Autoencoders using Second Order Algorithms", arXiv preprint arXiv:2308.06221.