

Chinmay Appa Rane

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EDUCATION

University of Texas at Arlington | Doctor of Philosophy, *Deep Neural Networks* | Dept – EE (Spring 2021)
Dissertation - Shallow Convolutional Neural Networks with Adaptive Activations and Shift Invariance

University of Texas at Arlington | Master of Science, *Neural Networks* | Dept – EE (Spring 2016)
Thesis - Multilayer Perceptron with Adaptive activations

WORK EXPERIENCE

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

Leading the development and deployment of innovative AI solutions by combining expertise in **Generative AI, multimodal AI/ML** across **LLMs, vision-LLMs, computer vision**, and medical imaging with strategic leadership and project management. Driving impactful results in both small- and large-scale enterprise deployments across industries.

- **LLM & RAG for Aviation** – Led development of **vision-language models** and **retrieval-augmented generation (RAG)** for an **aircraft workload**, optimizing performance and accuracy.
- **AI for Cardiac MRI** – Designed and managed an **end-to-end self-supervised learning pipeline** for cardiac MRI segmentation, optimizing model inference with **TensorRT & AWS deployment**.
- **MONAI & Active Learning** – Developed **reproducible AI workflows** for radiology, pathology, and **animal-free testing**, integrating **active learning, TensorRT, and Triton inference server**.
- **Optimizing LLM Inference** – Built **parameter-efficient fine-tuning (PEFT)** and **FFT-based pipelines** for training and inference using the **Mistral model**.
- **Object Detection Acceleration** – Created **optimized inference pipelines** using **ONNX Graph Surgeon** and multiple frameworks, improving efficiency and scalability.
- **Rail Safety AI** – Architected and deployed **object detection & instance segmentation pipelines** with **CI/CD automation**, enhancing model performance and reliability.
- **Single-Cell Protein Prediction** – Led research on **predictive modeling** for cellular proteins, advancing **biomedical AI** applications.
- **Federated Learning Framework** – Designed and implemented **privacy-preserving federated learning** in a **TensorFlow Lite environment** for edge AI applications.
- **Drug Discovery AI** – Explored and developed **pretraining pipelines** for proteins and **SMILES sequences**, accelerating **computational drug discovery**.

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

Conducted research and developed **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 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

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- **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/APIs - Matlab toolbox, TensorFlow, Keras, PyTorch, Dlib, numpy, scikit-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.