Chinmay Appa Rane

Austin, Texas 76015 | (682) 583-1880 | drchinmayrane@outllook.com | https://www.linkedin.com/in/ranechinmay

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)*
   - Technical architect for *vision language models* and *RAG* based application for an aircraft workload.
   - Lead technical architect for end to end training and deployment pipeline for Cardiac MRI segmentation using *self supervised learning.*
   - Developed a *PEFT, FFT* based training, inference pipeline for LLMs using Mistral model.
   - Created an optimized solution for custom object detection inference pipeline using different frameworks and graph surgeon.
   - Lead Technical Architect for several end to end *object detection and instance segmentation* training and deployment pipeline along with CI/CD pipeline for a rail safety organization.
   - Lead the efforts on protein prediction in single cells prediction.
   - Lead research efforts on establishing a federating learning framework in tensorflow lite environment.
   - Explored and created drug discovery pipelines for pre-training protein, smiles sequences.

▪ **Image Processing and Neural Networks Lab**, **UTA**– *Graduate Research and Teaching Assistant*   *(2017- 2021)*
   - Design and implementation of custom algorithms for shallow and deep neural network approximation and classification models including second order training algorithms.
   - Implemented custom algorithms for *eye care organization* to analyze and predict refractive errors for patients to replace natural lenses with artificial lenses.
   - Analyzed sound wave data to locate natural resources at various depths using fast fourier transform, power signal, and removing interference in the signal for *Geophysics International.*
   - Implemented various algorithms published in machine learning research journals/papers.

▪ **Unique Software Development** - *Data Scientist Intern*   *(Jan 2018 – Dec 2018)*
   - Developed python production code to implement basic *Natural language processing* using *Amazon comprehend* along with custom machine learning for analyzing, cleaning, and processing complex user data using advanced querying, visualization, analytic and predictive tools for *Mode Transportation.*
   - Implemented a structure for a python executable file that runs *object detection algorithm, YOLO* algorithm, along with *face detection* on Inmoov 3D robot project as an independent hobby project at USD.
   - Extended the object detection algorithm by implementing pretrain algorithms such as *Single Shot Multibox Detector, Faster RCNN* on *Raspberry pi* using *TensorFlow Lite.*

PROJECTS

- **MONAI end to end solution for cardiac MRI segmentation using self supervised learning -** Lead technical architect to create end to end pipeline which involved AI assisted annotation, Custom self supervised learning algorithms for cardiac MRI. Inference optimization using tensorRT and triton inference server. Finally creating a dockerized solution to run on AWS.
- **Inference optimization for a custom object detection pipeline using tensorRT, Triton inference server and graph surgeon**
   This project involved optimizing a customers custom tensorflow object detection pipeline. The customer wanted to improve their inference pipeline with tensorRT and triton inference server. We use Netron, ONXX graph

surgeon and optimized individual graphs based on speed and also included DALI to speed up the data loading process.

- **Custom federated learning training pipeline with tensorflow federated and tensorflow lite**
Worked on creating a custom pipeline for tensorflow federated learning using tensorflow light training so as to avoid sending data over cloud.

- **Technical Lead for Computer vision application for rail safety organization(Ongoing)**
Working as a technical lead for an ongoing project with multiple use cases. Duties involve setting a timeline to deliver each use case, assisting in the clients annotation team, setting initial technical path, working with the team to complete the task on time and finally, involvement in the technical document delivery. Also, involved in redesigning and proposing   new improved techniques for the inference pipeline by including active learning, drift detection, AI assisted annotation and self supervised learning

- **Multimodal Single-Cell Integration- Kaggle project**

  This project involved two separate training algorithms, first is the prediction of DNA to RNA and second is RNA to Proteins. Traditional dimension reduction models such as SVD, PCA along with more advanced diffusion and latent diffusion models with various downstream tasks were experimented.

- **Analysis and Prediction of Refractive Indexes of an Eye for Lasik Surgeries for *ALCON* (Funded project).**
Implemented various machine learning algorithms to find the right replacement for a natural lens inside an eye with an artificial lens for *lasik* surgery. Multiple custom outlier removal techniques, feature selection, dimension reduction, clustering and various custom machine learning algorithms were implemented for each of the data clusters. The final production code was submitted in *C++*.

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.