

# Ramesh Babu G

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## Education

### Indian Institute Of Science, Bangalore

*Master of Technology (M.Tech), Artificial Intelligence(AI)*

Aug 2022 – Present

GPA: 8.30/10

### Indian Institute of Technology, Kharagpur

*Bachelor of Technology (B.Tech), Electrical Engineering(EE)*

July 2012 - July 2016

GPA: 6.62/10

## Relevant Coursework

- Stochastic Models And Applications
- Computational Methods of Optimization
- Linear Algebra and Applications
- Data Structures and Algorithms
- Data Analytics
- Pattern Recognition and Neural Networks
- Advanced Deep Representation Learning
- Reinforcement Learning
- Computer Vision
- Advanced Image Processing

## Projects

### Efficient Sampling in Score-Based and Diffusion Models | *Thesis Project*

- Developed a novel sampling scheme to enhance the efficiency of score-based generative models inspired by momentum-based accelerated gradient descent techniques from convex optimization.
- Accelerated sampling by 2-5x when integrated with pre-trained score-based generative models.
- Validated the method on CIFAR-10 and CelebA datasets and achieved superior results in terms of Fréchet Inception Distance (FID) compared to existing methods. Experimented with similar techniques in DDPM and DDIM networks.

### Generating Synthetic Images Using $\beta$ -Variational Autoencoder | *PyTorch, Generative Models*

Sep 2023

- Implemented a  $\beta$ -VAE with different beta values, generating and reconstructing images, observing varying image quality and latent space disentanglement as beta changes on the Animal Faces dataset.
- Conducted posterior inference on VAE, generating images by interpolating latent space for 10 pairs of inputs, illustrating smooth transitions between representations.

### Deep Learning Models for Computer Vision: | *PyTorch, CNNs*

Feb 2023

- Built and trained a CNN model for Image Classification and compared the results with a pre-trained ResNet18 model after finetuning and quantified results using accuracy, precision and recall
- Trained two deep learning models: a ResNet50-based FCN and a fine-tuned MobileNetv2-based FCN on PASCAL VOC dataset for Image Segmentation and quantified using meanIOU, resulting in 92.10% for the ResNet-based FCN and 81.14% for the MobileNetv2-based FCN.
- Finetuned a pre-trained YOLO model with a dataset containing various door types and computed the mean average precision(mAP)

## Mini Projects

### Deep Learning Models for NLP: | *PyTorch, RNN, LSTM, Transformers, Seq2Seq*

July 2023

- Trained LSTM and Transformer models to classify sentiments from tweets and assessed their comparative performance and quantified results using classification performance metrics
- Compared the performance of an RNN encoder-decoder with attention to a Transformer model for English-to-German translation tasks and observed an improvisation in BLEU score from 28.45 to 29.3

### Recommendation system using Graph Neural Networks: | *PyTorch, GNNs, Recommendation Systems*

July 2023

- Used Graph Neural Networks to create a recommendation system
- Trained a GNN based model to predict the rating of an item(movie) by a user by computing a graph of movie similarities.

## Technical Skills

**Languages:** Python, C, L<sup>A</sup>T<sub>E</sub>X

**Frameworks/Libraries:** Pytorch, Numpy, Pandas, Scipy, Scikit-Learn, Matplotlib

## Experience

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### Indian Oil Corporation

Vadodara, Gujarat

*Senior Electrical Engineer*

*Nov 2018 – Mar 2021*

- Worked in a team of 6 in Gas Turbine Operations and Substation Operations, ensuring a stable 120 MW power supply to Gujarat Refinery. Managed scheduled operations such as Synchronizing Generators with the grid, GT startup, shutdown, and day-to-day troubleshooting.

## Other Activities

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### Teaching Assistant

IISc Bangalore

*UE-101 Algorithms and Programming*

*Aug 2023– present*

- Served as a Teaching Assistant for the UE-101 course (Algorithms and Programming)
- Conducted weekly sessions to assist undergraduate students with their laboratory assignments and coursework

## Achievements

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- All India Rank **83** in GATE 2022(EE) out of **70,000** candidates
- All India Rank **267** in GATE 2018(EE) out of **121,500** candidates
- All India Rank **2533** in JEE 2012 out of **4,80,000** candidates