Himanshu

9406587493 himanshu2022@iisc.ac.in/himanshusawla786@gmail.com /Himanshu-sawla/

Education

Degree	Institute	Board/University	CGPA/Percentage	Year
M.Tech Signal Processing	IISc Bangalore	-	7.60	2022-24
B.Tech Electrical Engg.	Samrat Ashok Techological Institute, Vidisha	-	8.51/10	2017-2021
Senior Secondary	RASS-JB Public School, Datia	CBSE	70%	2016 – 2017
Secondary	Kendriya Vidhayalaya, Datia	CBSE	8.8	2014 – 2015

Relevant Coursework

- Pattern Recognition and Neural Network
- Random Processes
- Linear and Non-Linear Optimization
- Digital signal Processing
- Speech information processing
- Advanced Image Processing
- Linear Algebra and its application.

M.tech Projects

Audio-driven Talking-head video Generation — Prof. Prasanta Kumar Ghosh **August'23 - Present**

- Proposed Two-Step Approach Audio-Landmark model and Landmark to Image Model.
- Applied CycleGAN-based techniques to generate facial images from predicted landmarks and successfully disentangled speaker identity and context embeddings from input speech.
- Leveraged 2D landmark predictions from varying speech time frames for an effective approach.

Course Projects

Encoder-Decoder with Atrous separable convolution for semantic Image Segmentation

- Developed a DeepLabV3+ model in Keras, extending DeepLabV3 with an encoder-decoder structure. Utilized a ResNet50 pretrained on ImageNet as the backbone, extracting features from the conv4_block6_2_relu layer.
- Conducted instance-level human parsing segmentation on a crowd dataset, employing sparse categorical cross-entropy as the loss function and achieving a commendable 85% accuracy after 25 training epochs.

Object Detection and Image Classification with Vision Transformer.

- Developed a custom Vision Transformer model from scratch in Keras and achieved an impressive 80% top-5 accuracy for image classification on CIFAR-100, using sparse categorical entropy as the loss function.
- Excelled in object detection by employing Mean Squared Error (MSE) as the loss function, attaining a substantial 87% mean Intersection over Union (IoU) on the Caltech 101 dataset.

Optical Character Recognition(OCR) model for reading Captchas

- Developed a custom OCR model by combining CNN and RNN architectures to enhance text recognition, achieving a validation loss of 2.9697 after 100 iterations.
- Developed an "Endpoint layer" for precise Connectionist Temporal Classification (CTC) loss computation, utilizing a dataset of 1024 PNG images with filenames as corresponding labels.

Friend Recommendation system using features generated from a directed graph.

- Features: Jaccard distance, Page Ranking, Shortest Path, ADAR index, Katz Score, weight features, SVD features.
- Trained model using XGBOOST, Random Forest to predict whether two users can be friends or not and using SVM, Logistic Regression to predict probability score to find top 10 friend suggestions .
- Achieved a best accuracy and F1 score of 0.919 and 0.927 respectively using XGBOOST model

Abstractive text summarizer using sequence to sequence model

- Designed an abstractive text summarization system from scratch, utilizing a Seq2Seq model with LSTM architecture, trained on the WikiHow Dataset.
- Implemented sparse categorical crossentropy as the loss function and RMSprop as the optimizer.

English-to-spanish Translation using Transformer-based Sequence-to-Sequence Model

- Developed an English-to-Spanish translation system with a custom sequence-to-sequence model implemented in Keras, including the creation of TransformerEncoder, TransformerDecoder, and Positional Embedding classes from scratch.
- Employed BLEU score as a performance metric, achieving a commendable score of 26.4 in the English-to-Spanish translation project.

Technical Skills

Languages: Python, MATLAB, LaTeX
Tools/Frameworks: Machine Learning, Deep Learning, Image Processing, Speech Processing, TensorFlow, Keras, PyTorch, OpenCV, Scikit-Learn, Cv2, Os, Numpy, Pandas, Matplotlib, seaborn, Natural language toolkit.

Achievements and position of responsibility

- Secured AIR 611 in GATE EE 2022 and AIR 3186 in GATE EE 2021
- Electrical Engineering expert at Chegg India Pvt. Ltd
- Placement Coordinator at Indian Institue of Science, Bangalore.
- Served as a committee member for the "EE Summer School" at the esteemed Indian Institute of Science, Bengaluru.