Pranav M Koundinya

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Education

National Institute of Technology Karnataka, Surathkal   Dec. 2020 – April 2024
Bachelor of Technology in Electronics and Communication Engineering   *CGPA : 8.77*

Technical Interests

Signal Processing, Image Processing, Deep Learning, Inverse Problems, Generative Modeling, Computer Vision

Experience

Spectrum Lab, Indian Institute of Science   Jan 2024 – June 2024
Project Intern   *Bengaluru, Karnataka*
- Working on Adversarial Regularization(AR) for solving inverse imaging problems.
- Implementing data-driven approaches such as AR for biomedical imaging applications including CT and MRI reconstructions, denoising, deblurring, inpainting.
- Deploying the Euler-Lagrange Analysis to AR to solve for the regularizer in analytical closed-form.

Spectrum Lab, Indian Institute of Science   May 2023 – July 2023
Summer Research Intern   *Bengaluru, Karnataka*
- Worked on the analysis and applications of state-of-the-art anomaly detection algorithms for industrial and biomedical applications.
- Applied unsupervised feature-embedding-based algorithms, including PaDiM and PatchCore, and fine-tuned SAM for classification and segmentation of anomalies in industrial and biomedical images.
- Worked on implementing the CLIP embedding backbone as a feature extractor for the Patch Distribution Modeling(PaDiM) algorithm.

Technical Skills

Relevant Coursework: Digital Signal Processing, Digital Image Processing, Deep Learning, Linear Algebra, Pattern Recognition
Languages: Python, C++, C, Verilog, MATLAB
Technologies/Frameworks: PyTorch, TensorFlow, SciPy, OpenCV, DeepInverse

Projects

Low Light Image Enhancement using MIRNet | *Python, Tensorflow, TensorFlow Lite* **November 2022 - April 2023**
- Implemented a deep learning model to enhance images taken in low-light conditions.
- The model is based on the MIRNet architecture by Zamir. et. al(2019).
- Attempted to implement the trained model on an embedded device, the Arduino Nano 33 BLE Sense for real-time image enhancement.

Image Restoration without Denoised Priors | *Python, Tensorflow*   **August 2022 - November 2022**
- Implemented a deep learning model to denoise images as formulated in the paper 'Noise2Noise' by MIT-CSAIL, nVIDIA and Aalto University.
- Trained the model of noisy data pairs instead of clean images for the ground truth values. This approach has claimed to work when the noise follows a certain distribution.
- Implemented the algorithm for two architectures- REDNet and UNet, and trained the models to denoise Gaussian and Poisson noise.

Brain Image Analysis | *Python, Tensorflow*   **November 2021 - April 2022**
- Explored the various techniques, and classification and segmentation algorithms that can be used for early detection of Alzheimer's Disease and Brain Tumour Segmentation
- Used MRI images of the brain to classify Alzheimer's Disease into early, mid and late stages using CNN architectures such as DenseNet, ResNet, InceptionNet and MobileNet.
- Segmented tumored parts of the brain to predict its severity using the UNet architecture.

Audio Fingerprinting System | *Python, Jupyter Notebook, MySQL*   **Jan 2021 - June 2021**
- Developed software to recognize a song from a piece of recording of audio file
- Incorporated audio processing techniques such as FFT and STFT to generate spectrograms of the audio files
- Implemented the algorithm developed by Shazam Inc. for song recognition by making use of audio fingerprints of the spectrogram peaks.

Leadership / Extracurricular

IEEE NITK   **April 2023 − March 2024**
Chairperson   *Signal Processing Society*
- Headed the organizing team for Impulse 2024 - a 24-hour signal processing hackathon.
- Organized expert talks and knowledge sharing sessions as part of SPS activities 2023-24.

IEEE NITK   **April 2022 − April 2023**
Secretary   *Signal Processing Society*
- Coordinated a team in organizing Impulse 2023 - a 24-hour signal processing hackathon.
- Participated in organizing Dishaspoorthi - an outreach event to teach the basics of electronics to school children at the NITK Kannada Medium School.

IEEE NITK   **September 2021 − March 2022**
Executive Member
- Co-organized a summer mentorship programme on "Image Processing and Computer Vision" to the 2025 Batch of IEEE-NITK

Achievements

- Successfully presented a project proposal for the launch of Atal Tinkering Laboratory in school, and was granted a funding of INR 25 Lakh by the Govt. of India in the year 2016-17
- Ranked 6854 in JEE Advanced-2020, and 8311(99.26 percentile) in JEE Main-2020