Nirvan Patil

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BITS Pilani K.K. Birla Goa Campus - E.C.E '26 - CGPA: 8.20

Coursework

**Ongoing **Audited from YouTube*

On-Campus Foundations of Data Science*, Machine Learning*, Biostatistics and Computers in Public Health*, Object Oriented Programming, Microprocessors and Interfacing & C-Programming.

Online Coursera: Supervised and Unsupervised ML, Coursera: Neural Networks and Deep Learning & Stanford CS213n**.

Technical skills

Programming Languages/Tools Deep Learning, PyTorch, Python, Matplotlib, NumPy, C/C++, Java, Verilog, x86 Assembly, LaTeX.

Experience

ML Intern - DeepTek Medical Imaging Pvt Ltd

March 2024 - July 2024 | Pune

CNN Classification and Segmentation Models

- DeepTek, a leading **health tech** company in the **AI radiology domain**, has over 200 employees and serves clients globally across India, APAC, ME and the USA. Company's products specialize in thoracic pathology detection.
- Optimized Convolutional Neural Networks (CNNs) for **Pneumonia Classification and Localization** through iterative techniques leveraging **Grad-CAMs** for CNN Model ROI Identification with U-Net for Lung Segmentation.
- Researched **few-shot and zero-shot** classification techniques and **U-Nets** for medical imaging applications.

Project Work

Improving CNN performance using GradCAMs & U-Nets

Links

Pneumonia Localisation in contexts of lack of data and compute

- Developed a **recursive optimization cycle** for CNN models: GradCAM generation → Enhanced data-set construction by overlaying GradCAMs on input → U-Net Lung Segmentation → Model tuning on enhanced data-set.
- Proposed cycle tackles self-imposed challenges of limited data and suboptimal localization by **iteratively augmenting and re-utilizing the original dataset**, thereby refining the model's focus on pneumonia-specific features.
- The initial cycle resulted in an **~15% improvement in the localization of pneumonia**, accompanied by only a marginal ~2% decrease in test accuracy with the optimized ResNet-101 model on the original dataset.
- PyTorch, Python3, NumPy, Matplotlib, Transfer Learning.

Pneumonia Chest X-Ray Classification using CNNs

Link

Binary classification of Pneumonia vs Normal

- Optimized CNN models through research on LR Schedulers, Optimizers, Cross Validation. Implemented custom Test and Train Engines and Check-pointing functionality auto-synced with Google Drive storage.
- PyTorch, Python3, NumPy, Matplotlib.

Project Kratos

Link

BITS Goa's Mars Rover Team

- Working on optimizing the **rock and soil sample classification models** as part of the Life Detection Subsystem.
- Helped the team stand **6th out of 22 teams globally** in the **International Rover Challenge** (IRC'24) held at Coimbatore, as part of the mechanical vertical under the Arm subsystem.

Extracurricular activities

AlgoManiaX - Link

Apr. 2024 - Jun. 2024

Competitive Programming

- Participated in International Collegiate Programming Contest (**ICPC '23**), 4th in BITS Goa. **Pupil** at Codeforces.