Nirbhay Sharma | +91 9369630713 | sharma.59@iitj.ac.in | Github | Portfolio | LinkedIn

Education - B.Tech, CSE | Indian Institute of Technology (IIT) Jodhpur | CGPA: 8.97/10 Aug'19-May'23

Technical Skills

Languages: Python, C/C++, HTML/CSS, Javascript, Haskell, Prolog

Tools and Frameworks: Pytorch, Flask, Django, Regex, Heroku, Git, Github, Firebase, MongoDB, MySql

Publications

Nirbhay Sharma, *Gautam Kumar*, *Dr. Angshuman Paul*, "**An Extremely Lightweight CNN Model For the Diagnosis of Chest Radiographs in Resource-constrained Environments**". "**International Journal of Medical Physics**" 2023

Research / Industry Experience

Print Generation | Pytorch, GAN, Diffusion | **Full Time** (ML Engineer) | **Faaya Astu** India Jun'23-Present

- Analyzed **Text To Image** models for print/pattern generation using Text prompts
- FineTuned **GALIP**, a **GAN** based model for **Text to Pattern generation** on **AWS** instance
- FineTuned **Latent Diffusion Model (LDM)** for **Text to Pattern generation** on **Vastai** instance
- Containerized **GALIP** and **LDM** by setting up **Docker** images

Split Neural Networks | Pytorch, Jetson Nano, PySyft | **Intern** (ML Engineer) | **ExaWizards** India Jun'22-July'22

- Splitted **Mask-RCNN, FCN_Resnet50, YOLOv5** for **Instance segmentation, segmentation, face detection** tasks
- Utilized **Pysyft** and **Jetson Nano** for feature transfer from one device to another
- Implemented **Encoder-Decoder** architecture for **tensor compression**
- Reduced **inference time** on Jetson nano device while preserving **data privacy**

Noise Engineered Federated Distillation for Heterogeneous Settings | Pytorch, Federated Learning, Data-Free KD

Research Project | Supervisor: **Dr. Deepak Mishra** | IIT Jodhpur Aug'22-May'23

- **Proposed** a **novel** Federated Learning (FL) Framework to handle **model and data heterogeneity**
- Implemented **data-free KD** using **Gaussian Noise** at the **Server**, eliminating need of **proxy dataset**
- Compared and **analyzed** our algorithm with SOTA FL algorithms for **model heterogeneity**
- **Outperformed** all **baselines** in terms of **test accuracy** by a considerable margin on multiple datasets

Light Weight CNN Model for Chest Radiographs Classification | Pytorch, Light Weight CNN Models

Research Project | Supervisor: **Dr. Angshuman Paul** | IIT Jodhpur Jun'21-Mar'22

- Designed a **Lightweight CNN model (ExLNet)** for the abnormal detection of **Chest Radiographs**
- Fused the concepts from **Squeezenet** and **Mobilenet** into a single architecture to make it lightweight
- **ExLNet** outperforms SOTA models like **MobileNet**, **ShuffleNet** on various datasets
- Our **research paper** got accepted at **International Journal of Medical Physics**

Projects

Image Captioning using Detection Transformer (DeTR) | Github | Pytorch, DeTR, Transformer

- Implemented **DeTR** from **scratch** using **Pytorch** and modified it for **image captioning** task
- Trained **DeTR** on **Flickr30k** dataset for **500** epochs and evaluated on **Flickr8k** dataset using **BLEU** score
- Achieved a **BLEU** score of **57.36** on **Flickr8k** dataset

Regularizing Federated Learning (FL) via Adversarial Model Perturbations (AMP) | Github | Report | Pytorch, FL

- Analyzed the effect of **Adversarial Model Perturbations (AMP)** on **4** SOTA Federated Learning (FL) algorithms
- Implemented **FedAvg**, **FedProx**, **FedNTD**, **SCAFFOLD** from **scratch** and integrated **AMP** module at the **client**
- Observed a boost of **2-3%** accuracy on CIFAR10/100 dataset after integrating AMP in each of the algorithm

CNN Algorithms Comparison | Github | Report | Pytorch, Numpy, Matplotlib, PIL, Python

- Compared **7** deep **CNN** architectures on **Retinal Eye disease dataset**
- Implemented **Squeezenet**, **Mobilenet**, **Inceptionnet**, **Shufflenet**, **Googlenet**, **Resnet**, **Efficientnet** from **scratch**
- Performed a comparison study among the state-of-the-art deep CNN architectures