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, Django, Flask, Docker, AWS Lambda, Regex, Heroku, Git, Github, Firebase, 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 | Paper

Research / Industry Experience

Faaya Astu India | **Full Time** (ML Engineer) | Pytorch, Diffusion, ControlNet, LoRA   *Jun'23-Present*
- Worked on **SOTA Stable Diffusion**, **ControlNet** and **LoRA** models for text to print, and content generation
- Trained **Stable Diffusion ControlNet** architecture on **Lineart** and **Colorbox** control on **VastAI** GPU instance to provide more flexibility and control on print generation
- Trained **Low Rank Adaptation (LoRA)** models in **Kohya_SS** for controlled background and face generation
- Containerized **Stable Diffusion WebUI** and **ControlNet** using **Docker** and deployed them as **Serverless Endpoints** on **RunPod** for **inference**
- Exposed the serverless endpoint APIs to **AWS Lambda** and used **AWS API Gateway** to create **APIs for APP**

ExaWizards India | **Intern** (ML Engineer) | **Split Neural Networks** | Pytorch, Jetson Nano, PySyft   *Jun'22-July'22*
- Splitted **Mask-RCNN, FCN_Resnet50, YOLOv5** for **Instance segmentation, segmentation, face detection** tasks
- Used **Pysyft** for latent feature transfer from **Jetson Nano** edge device to GPU server
- Implemented **Encoder-Decoder** architecture with **MSE Loss** for efficient **image compression to latent space**
- Reduced considerable **inference time** using **split learning** and **latent image compression**

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** or **GAN's**
- Compared our algorithm with SOTA FL algorithms for **model heterogeneity** like **FedDF, FedMD, Kt-pfl**
- **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 | Paper   *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 medical datasets like **NIH, VINBIG**

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 test 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