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 08/2019-05/2023

Technical Skills

Programming Languages: Python, C/C++ | **Skills:** Machine Learning, Deep Learning, Computer Vision

Tools and Frameworks: Pytorch, Django, Flask, Docker, AWS Lambda, Regex, Git, Github, Firebase, MySql

Publications

- **An Extremely Lightweight CNN Model For the Diagnosis of Chest Radiographs in Resource-constrained Environments** | *International Journal of Medical Physics* 2023 | **Paper**
- **Aggregation-Assisted Proxyless Distillation: A Novel Approach for Handling System Heterogeneity in Federated Learning** | *International Joint Conference on Neural Networks (IJCNN)* 2024

Research and Work Experience

Faaya Astu India | **Full Time** (ML Engineer) 06/2023-Present

- Trained **Stable Diffusion ControlNet** models on **Lineart** and **Colorbox** control on **VastAI** GPU instance and deployed them on **RunPod** for more flexibility and control on print generation
- Trained **Low Rank Adaptation (LoRA)** models using **Kohya_SS** for custom **face** and **background** generation
- Experimented with custom **ComfyUI** workflows with integrated **ControlNet**, **LoRA**, **InstantID** models
- Containerised ComfyUI with **Docker** and deployed them as **Serverless Endpoints** on **RunPod** and exposed endpoint APIs to **AWS Lambda** to create **APIs for APP** using **AWS API gateway**

ExaWizards India | **Intern** (ML Engineer) 06/2022-07/2022

- Worked on **Split Neural Network** ML paradigm and Splitted **Mask-RCNN, FCN_Resnet50, YOLOv5** models for **Instance segmentation, segmentation, face detection** tasks
- Implemented **Autoencoder** model for efficient **image compression to latent space** and setup **Pysyft** to communicate latents from **Jetson Nano** to GPU server, **preserving data privacy** at Jetson Nano

FedAgPD: Aggregation-Assisted Proxyless Distillation | IIT Jodhpur 08/2022-05/2023

- **Proposed** a **novel** FL Framework **FedAgPD** to simultaneously handle **model and data heterogeneity**
- Leveraged **Deep Mutual Learning** at **Client** and **Aggregation** followed by **Gaussian Noise based data free distillation** at the **Server**, eliminating need of **proxy dataset** or **GAN's**
- FedAgPD achieved **2x** better performance compared to SOTA FL algorithms like **FedDF**, **FedMD**, **Kt-pfl**

ExLNet: Extremely Lightweight CNN Model for Chest X-Ray Diagnosis | IIT Jodhpur | **Paper** 06/2021-03/2022

- Designed a novel **Lightweight CNN model (ExLNet)** for the abnormal detection of **Chest Radiographs**
- Fused **Squeeze and Excitation** blocks with **Depth-wise convolution** to create **DCISE** layer as a component of **ExLNet**, which outperforms SOTA models like **Mobilenet**, **Shufflenet** on medical datasets like **NIH**, **VinBig**

Projects

Regularizing Federated Learning (FL) via Adversarial Model Perturbations (AMP) | **Github**

- Analyzed the effect of integrating **AMP** on SOTA FL algorithms like **FedAvg**, **FedProx**, **FedNTD**, **SCAFFOLD**. Observed a boost of **2-3%** accuracy on CIFAR10/100 dataset with AMP integrated FL algorithms

Image Captioning using Detection Transformer (DeTR) | **Github**

- Implemented modified **DeTR** from **scratch** in **Pytorch** for **image captioning** task. Trained **DeTR** on **Flickr30k** dataset for **500** epochs and achieved a **BLEU** score of **57.36** on **Flickr8k** dataset

Transformers-Implementation | **Github**

- Implemented **11** SOTA research papers on **vision transformers** variants like **Swin Transformer**, **Pyramid ViT**, **Convolution ViT** etc. for **Image Classification** from scratch in **Pytorch**