Nirbhay Sharma | 9369630713 | sharma.59@iitj.ac.in | @nirbhay-design | @nirbhay-sharma |

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

Familiar with: Tensorflow, Java, React, Nodejs, ejs, Google Colab, OpenCV

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

Split Neural Networks | Pytorch, Python, 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 transferring features 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, FL, Python

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** for **knowledge transfer** between Clients' and Server model using **Gaussian Noise**
- Solved and eliminate the requirement of **generator or proxy dataset** at server for KD
- Compared and **analyzed** our algorithm with SOTA FL algorithms for **model heterogeneity**
- **Outperformed** all **baselines** in terms of **test accuracy** by a considerable margin

Light Weight CNN Model for Chest Radiographs Classification | Pytorch, Python, Torchvision, Numpy

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

- Designed a **Lightweight CNN model** for the abnormal detection of **Chest Radiographs**
- Combined the ideas from **Squeezenet** and **Mobilenet** to prepare a Light weight model
- Our Model Outperforms various light weight CNN architectures like **Squeezenet**, **Shufflenet**, **Mobilenet** on NIH dataset both on binary and multiclass classification
- Our **research paper** got accepted at **Internation Journal of Medical Physics**

Projects

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

Course Project | Supervisor: **Dr. Richa Singh** | IIT Jodhpur

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

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

Course Project | Supervisor: **Dr. Mayank Vatsa** | IIT Jodhpur

- 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