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## 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

- Splitting **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 **International Journal of Medical Physics**

## Projects

**Regularizing Federated Learning (FL) via Adversarial Model Perturbations (AMP)** | [Github](https://github.com/nirbhay-design) | 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](https://github.com/nirbhay-design) | 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