Rhitvik Sinha

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Coursework

** indicates provisional / ongoing coursework*
(_) indicates grade received

New York University,
Graduate Level Coursework
09/2022 – present
CSCI-GA 1170: *Fundamental Algorithms**, **CSCI-GA 2565:** *Machine Learning**, **DS-GA 1014:** *Optimization and Computational Linear Algebra**

IIT Kharagpur,
Graduate Level Coursework
01/2021 – 04/2022
AI60004: *Big Data Processing (9/10)*, **AI61002:** *Deep Learning (9/10)*, **CD66001:** *Accelerated Data Science (10/10)*, **AI61005:** *Artificial Intelligence (8/10)*, **CS61061:** *Data Analytics (9/10)*, **CS66010:** *Security & Privacy in Online Social Networks (8/10)*

IIT Kharagpur, *Undergraduate Level Coursework*
08/2018 – 04/2022
CS10001: *Programming & Data Structures (8/10)*, **MA20101:** *Transform Calculus (8/10)*, **MA20106:** *Probability & Stochastic Processes (9/10)*, **CS31702:** *Computer Architecture & Operating Systems (8/10)*, **AI42001:** *Machine Learning (9/10)*

Skill

Programming Languages
C, C++, C#, JavaScript, Python, R, MATLAB, Java, Scala

Python Data Science Frameworks
Tensorflow 2.x, PyTorch, Scikit-Learn, Numpy, Matplotlib, Pandas, OpenCV

Cloud Compute Tools
Amazon Web Services (AWS): S3, EC2, SageMaker

Education

Courant Institute of Mathematical Sciences, New York University, *Master of Science*
2022 – 2024 | New York City, USA
Major: *Computer Science (Incoming, Fall '22)*

Indian Institute of Technology, Kharagpur, *Bachelor of Technology (Hons.)*
2018 – 2022 | Kharagpur, India
Major: *Electrical Engineering*

Delhi Public School (DPS), RK Puram, *High School*
2016 – 2018 | New Delhi, India
English, Mathematics, Computer Science, Physics, Chemistry

Experience

Ministry of Electronics and Information Technology, Govt. of India,
Transformational AI Intern
08/2021 – 10/2021 | (Virtual) New Delhi, India
Working on Transformational AI projects in the Health Sector, as part of Ministry of Electronics and Information Technology's **Digital India Internship Scheme** (2021). Responsible for the landscaping and the subsequent review of the ecosystem and policies operating at the intersection of AI and Healthcare in India.

Centre of Excellence in Artificial Intelligence, IIT Kharagpur

> *Bachelor's Thesis Project*
> 08/2021 – 11/2021 | (Virtual) Kharagpur, India
> ***Forecasting of Extreme-Causing Weather Patterns Using Deep Learning***
> Supervised by **Dr. Adway Mitra**, compare effectiveness and accuracies of Capsule Neural Networks compared to Convolutional Networks at the task of "Forecasting Extreme Weather Patterns".
>
> *Undergraduate Research Project*
> 01/2021 – 04/2021 | (Virtual) Kharagpur, India
> - Dataset Used: **NCAR CESM-LENS** (stored on AWS S3)
> - **Python**-based implementation, **PyTorch** used as Deep Learning framework of choice to implement *"Dynamic Routing Between Capsules" (2017, Hinton et al.)* from scratch.
> - Recreate findings from *"Analog Forecasting of Extreme-Causing Weather Patterns Using Deep Learning" (2020, Chattopadhyay et al.)*

Kabuni Ventures Ltd., *Deep Learning Intern*
05/2021 – 07/2021 | (Virtual) London, England
Apply pre-trained Deep Learning models for the Human Pose Estimation task. Use extracted Pose Information to suggest improvements in a Cricket (Sport) Learner's technique, preventing inefficiency and injuries.
- **Python** based implementation, with Deep Learning framework of choice being **PyTorch**.
- Torchvision's **KeypointRCNN** class finetuned for best accuracy used for the **Human Pose Estimation** (HPE) task. Used to generate time series pose data from video clips.
- **Recurrent Neural Net** used for maximizing accuracy at detection of potential errors in technique from gathered time series pose data.

Ottonomy IO, *Autonomous Robotics & AI Intern*
06/2020 – 08/2020 | (Virtual) Delaware, USA
- Automate last mile delivery through self-driving rovers that operate on sidewalks
- Setting up of cloud-based training and deployment pipelines for Deep Learning models utilizing **AWS** services, including but not limited to: **S3**, **EC2**, **SageMaker**
- Pipelines for the following frameworks were setup: **TensorFlow**, **PyTorch**

Projects

Interpretable Convolutional Neural Networks, *Term Project, CS60021* 08/2021 – 11/2021

- Guided by the instructor, **Prof. Sourangshu Bhattacharya**, and research scholar Soumi Das.
- For the class *CS60021, Scalable Data Mining*, taken in Fall 2021 at IIT Kharagpur.
- Implement *"Convolutional Dynamic Alignment Networks for Interpretable Classifications"* (2021, Böhle et al.) using **PyTorch** as Deep Learning framework of choice.

NumpyNet, *Self Project* 05/2021 – 06/2021

Building a Neural Network with nothing but ***NumPy***.

- *Layers implemented*: Dense, Sigmoid, ReLU, Tanh
- *Error functions implemented*: Binary Cross Entropy, Mean Absolute Error, Mean Squared Error
- *Optimizers implemented*: Stochastic Gradient Descent

Boolean Algebra Solver, *Term Project, EC31003* 08/2020 – 11/2020

- Guided by **Prof. Goutam Saha**.
- For the class *EC31003, Digital Electronic Circuits*, taken in Fall 2020, at IIT Kharagpur.
- Design and presented the software "***Boolean Algebra Solver***" that solves many modern day Boolean Algebra problems like *K-Map*, *Quine-McCluskey Algorithm*, *Hazard Detection and Removal*, *Hamming Code Generation*, etc.
- **C#** based implementation.

Practical Auto-Encoders, *Self Project* 04/2020

- Auto-Encoders for *Image Super Resolution* **Github**
- Auto-Encoders for *Image De-Noising* **Github**
- Implemented in **Python** using **Keras** with **TensorFlow 2** backend.

parkMyCar, *Microsoft presents Innovation Hackathon, an initiative of IncubateIND* 12/2019

- Developed in 24 hours at Microsoft presents **Innovation Hackathon**, an initiative of IncubateIND, powered by Microsoft Azure.
- Provides real-time car park availability, also enables you to list personal land for parking.
- Developed using **MapMyIndia API**s and hosted on **Microsoft Azure** servers. Tools used: **HTML**, **CSS**, **JavaScript**, **Python** (*Flask*).

Achievements and Test Scores

Graduate Record Examination (GRE), *ETS* 10/2021

Quant: **169**/170 | Verbal: **163**/170 | AWA: **4**/6
Total: **332**/340

Test Of English as a Foreign Language (TOEFL), *ETS* 10/2021

Reading: **30**/30 | Listening: **28**/30 | Speaking: **26**/30 | Writing: **28**/30
Total: **112**/120

Animal Breed Classification AI Challenge, *Dockship* 07/2021

Classify images of Cats and Dogs into **37 given breeds**. Achieved **Global Rank 40** in the challenge. Use **PyTorch** as framework to build based classifier (with **ResNet-152** backbone). Implement Learning Rate Decay. Achieved a test accuracy of **~93%** and a 94.1 F1 score on public leaderboard.

Data Sprint #41: Fruits Recognition, *DPhi* 07/2021

Classify images of Fruits into **131 given classes**. Achieved joint **Global Rank 2** in the challenge. Use **PyTorch** as the framework to build classifier with **ResNeXt-101** backbone. Implement Learning Rate Decay. Achieved a test score of **99.9951** on public leaderboard.

Joint Entrance Examination (JEE) Advanced, *IIT Kanpur* 05/2018

All India Rank: **1098** | **Top 0.1%** in 1,100,000+ JEE (Mains) applicants | **Top 0.5%** in 230,000+ JEE (Mains) qualifiers

Joint Entrance Examination (JEE) Mains, *Central Board of Secondary Education* 04/2018

All India Rank: **3264** | **Top 0.3%** in 1,100,000+ applicants | Qualified for JEE (Advanced)

KVPY Fellowship, *Department of Science and Technology, Government of India* 01/2017

Kishore Vaigyanik Protsahan Yojana fellowship awarded in high school with national rank 854