Sumit Jain
Computer Science & Engineering
Indian Institute of Technology Bombay

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UG Second Year
Male
DOB: 07/11/2000

Examination	University	Institute	Year	CPI / %
Graduation	IIT Bombay	IIT Bombay	2021	8.79
Intermediate/+2	CBSE	Rajeev Gandhi Hr. Sec. School	2019	96.00
Matriculation	CBSE	St. Michael's Hr. Sec. School	2017	10.00

Scholastic Achievements

- Achieved **All India Rank 455** in JEE Advanced among 1.73 lakh eligible candidates *[2019]*
- Achieved **99.926 percentile** in JEE Mains out of a total of 9.35 lakh eligible candidates *[2019]*
- Awarded **Certificate of Merit** for being among the **Top 0.1 percent** of successful candidates in Mathematics in **All India Senior School Certificate Examination (AISSCE)** *[2019]*
- Awarded **Certificate of Merit** for obtaining Grade 'A1' in all five subjects in **AISSE** *[2017]*

Key Projects

Distributed Deep Learning
[April '20 - June '20]

Institute Technical Summer Project | *Institute Technical Council* — *IIT Bombay*

- Developed a **Hierarchically Distributed Deep Convolutional Neural Network** in order to parallelize workload across nodes, which is easily deployable over a distributed system architecture
- Utilized the model to achieve better training on **Super High-Resolution Datasets** via **Spatial Segmentation** of each sample, and observed an increase in training speeds with lesser memory utilization per node
- Analyzed the performances of **VGG16**, **ResNet**, and **AlexNet** when used as the underlying Neural Networks
- Verified the approach by using Retinal OCT datasets and analyzed information loss due to spatial segmentation

Red Plag: A Source Code Plagiarism Checker
[Ongoing]

Course Project | *Prof. Amitabha Sanyal* — *IIT Bombay*

- Developing a **plagiarism checker** to measure pairwise similarity between a collection of source code in **Python**
- Implementing a self-developed algorithm for correlation analysis of programs using tokenization, removal of whitespaces, **Karp-Rabin string matching**, and **winnowing** of vectors made from **hashed k-grams**
- Creating a web front-end for it in **Javascript** for visualization of results in a graphical manner using **CanvaJS**
- Working on adding a subroutine for authentication of clients through a passcode using **Auth0** library

Generative Adversarial Networks (GANs)
[April '20 - May '20]

Seasons of Code | *Web and Coding Club* — *IIT Bombay*

- Investigated **10+ publications** to learn about general AI algorithms in supervised and unsupervised learning
- Programmed a DL based **generative network** that maps a latent space to the data distribution of interest
- Executed **Deep Convolutional GAN** for the generation of images with similar statistics as the training set
- Developed **CycleGAN** for unpaired **Image to Image Translation** and **Neural Style Transfer** in **Keras**

Junior Design Engineer | Software Subsystem
[August '20 - Present]

Team Rakshak — *IIT Bombay*

An IIT Bombay student initiative to develop a fleet of robust Unmanned Aerial Vehicles (UAVs).

- Designing a **Deep Learning based Image Super-Resolution** model to recover high-resolution (HR) images from the low-resolution (LR) images obtained from aerial shots by UAVs, to improve object detection tasks
- Developing an algorithm to **generate maps** of a region from a temporally distributed series of pictures taken from UAV, by **Image Stitching** and creating **Web Mercator Projection**

Learning Project: Data Structures and Algorithms
[April '20 - June '20]

Summer of Science | *Maths and Physics Club* — *IIT Bombay*

- Covered concepts related to basic data structures and algorithms analyzed their space and time complexity
- Implemented primary data structures such as **queues**, **lists**, **stacks**, **heaps**, **trees**, and algorithms for **searching**, **sorting**, **order statistics**, and **graphs** in C++ and studied their applications

Other Projects

Online Courses | *Online Guided Project* | *Coursera* *[April '20 - September '20]*

- **Sentiment Analysis**: Examined the use of **Word Embeddings** for inferring context in **NLP** tasks. Developed an **LSTM** network for predicting sentiment of text and selecting appropriate **emoji** to compliment it

- **Neural Machine Translation**: Used **bidirectional LSTM** with **attention** mechanism for reading dates
- **Debiasing Word Vectors**: Measured **cosine similarity** and distance between **GloVe vectors** of words to analyze meaning for **neutralizing** non-gender specific words and **equalizing** gender specific words
- **Object Detection for Autonomous Driving**: Implemented the **YOLOV2** algorithm with non-max suppression and filtering for detecting objects from **80 different classes** in real time **video** feed in Keras
- **Facial Recognition**: Built a **Support Vector Machine** (SVM) using **Scikit-learn** for **facial recognition**
- **Sentiment Analysis using BERT**: Preprocessed data, and fine-tuned a pre-trained PyTorch **Bidirectional Encoder Representations from Transformers** model for sentiment analysis of the given dataset

Data Structures and Algorithms | *Course Project* | *Prof. Ajit A. Diwan* *[September '20]*

- Constructed a **class** to store **permutation** of numbers and used extended **euclidean algorithm** with **Chinese remainder** theorem to calculate logarithm and **disjoint cycles** to compute its square root in linear time
- Developed a class to perform operations on **Fibonacci morphism** and **Thue-Morse morphism** and made function to find shortest prefix and pattern in linear time using the **Knuth-Morris-Pratt algorithm**

Courses Undertaken

Computer Science	**Data Structures and Algorithms including Lab***, **Data Analysis and Interpretation***, **Discrete Structures***, Abstractions and Paradigms in Programming including Lab, Software Systems Lab*, Computer Programming and Utilization, Computer Networks including Lab**, Logic for Computer Science**, Design and Analysis of Algorithms**, DLD and its Lab**
Online Courses	**Deep Learning Specialization** (Neural Networks and Deep Learning, Improving Deep Neural Networks: Hyperparameter tuning, Regularization and Optimization, Structuring ML Projects, Convolutional Neural Networks, Sequence Models) by deeplearning.ai on Coursera
Other Courses	Calculus, Linear Algebra, Engineering Graphics and Drawings, Introduction to Electrical and Electronics Circuits*, Physical Chemistry, Mathematical Structures for Systems and Control, Quantum Physics and its applications, Innovation by Design*

** to be completed by December 2020*
*** to be completed by April 2021*

Technical Skills

Programming Languages	C, C++, Python, Java, Bash, Sed, Awk, Arduino
Web Development	JavaScript, JQuery, AngularJS, CSS, Bootstrap, PHP, HTML5, Django
Libraries and Frameworks	Keras, Tensorflow, PyTorch, OpenCV, NumPy, SciPy, Pandas, Qiskit
Softwares	MATLAB, Android Studio, Doxygen, Docker, LaTeX, Git, Make, CMake, AutoCAD, SolidWorks, Adobe Illustrator, Adobe Photoshop, Emacs

Positions of Responsibility

Design Nominee *[July '20 - Present]*
Computer Science and Engineering Association *IIT Bombay*

- Designed a creative and artistic **new logo** for the association by working as a team with fellow council members
- Designed elaborative **posters** and implemented strategic digital promotion ideas to promote organized events
- Designing the **cover page** of the **BitStream Newsletter** and Working to improve CSE's T-shirt design

Organizer, Marketing *[October '19 - January '20]*
Techfest, Asia's Largest Science and Technology Festival *IIT Bombay*

- Created and managed databases of 100+ corporates, startups, and organizations in various sectors, and worked actively with the team responsible for invitation and negotiation of sponsorship deals with them
- Assisted delegates of the sponsors in successfully conducting their seminars and events with 10,000+ audience

Extracurriculars

- Completed a year-long course in **Yoga** under **National Sports Organization** (NSO) *[2019]*
- Participated in **Remote-Controlled Plane competition** organized by the **Aeromodelling Club IITB** and made a plane with a foam body integrated with BLDC Motors, Servo Motors, and receivers *[2019]*
- Worked as an **Organizer** in **Corporate Relations** at E-Summit 2020 by **E-Cell**, IIT Bombay *[2020]*
- Awarded **Certificate of Appreciation** for being **Most Curious Participant** in the **Soft Skills** Development Seminars organized by Break The Barrier Club, Macro Vision Academy, Burhanpur (M.P.) *[2017]*
- Represented Athena House in **Inter-House Hindi Debate** organized by St. Michael's School, Satna *[2016]*