Richeek Das
Computer Science & Engineering
Indian Institute of Technology Bombay

190260036
UG Second Year
Male
DOB: 05/02/2001

Examination	University	Institute	Year	CPI / %
Graduation	IIT Bombay	IIT Bombay	2021	0.00
Intermediate/+2	ISC	Methodist School, Dankuni	2019	98.00
Matriculation	ICSE	Methodist School, Dankuni	2017	98.80

Pursuing a **Minor** in **Physics**

Scholastic Achievements

- Among the **13 out of 1148** students to be awarded a Branch Change to the department of **Computer Science & Engineering**, **IIT Bombay** based on the CPI at the end of first year. (2020)
- Secured an **All India Rank of 544** in JEE Advanced 2019 out of **245k** candidates (2019)
- Achieved an **All India Rank of 497** in JEE Main 2019 out of **1.15 million** candidates. (2019)
- Attained an **All India Rank of 4** and a **State(West Bengal) Rank of 2** in the **ICSE**(Indian Certificate of Secondary Education) Examination out of **180k+** students, with a score of **98.8%**. (2017)
- Received an **Advanced Performer(AP)** grade for exceptional performance in Calculus**(MA105)**. (2019)
- Received an invitation to the felicitation ceremony for **ICSE** rankholders and a letter of appreciation for **ISC** from the **Chief Minister of West Bengal**. (2017 & 2019)
- Secured **10/10** grade in all courses in Autumn semester of freshman year. (2019)

Olympiads and Scholarships

- Awarded a fellowship for securing an **All India Rank of 77** in Kishore Vaigyanik Protsahan Yojana**(KVPY SX 2018)** conducted by **(IISc)** Bangalore, out of **50k+** candidates nationwide. (2018)
- Recipient of the **INSPIRE** scholarship under **DST**(Department of Science & Technology, India), which was awarded to **top 1%** of the **80k+** students appearing for the **ISC** Examination. (2019)
- Awarded Certificate of Merit for being in Statewise **Top 1%** in **NSEC**(National Standard Examination in Chemistry) and **NSEP**(National Standard Examination in Physics) conducted by **IAPT**. (2019)
- Among the **top 300** out of over **40k** participants to qualify for **INPhO, INChO**, and **INAO**. (2019)
- Received the **Mamraj Agarwal Rashtriya Puraskar** at Raj Bhawan, Kolkata from the **Governor of West Bengal** for being in the state-merit list of **ICSE Board** exams. (2017)

Key Projects

X-Ray Anomaly Detection Using CNNs *(Summer '20)*

Institute Technical Summer Project | **Ranked among the Top 3 projects**

- **Led a team** of **4** to build an open-source **Web-App** and an **Open-API** endpoint to automate the process of examining Chest X-Rays**(CXRs)** and to minimize **False Negative** cases among radiologists.
- Built a **5** model **ensemble** which accurately classifies and localizes upto **5** common **thoracic** diseases from **CXRs** with an average **AUC** of **0.915** which is quite close to the present **SOTA** of **0.94**.
- Implemented Class Activation Maps**(CAMs)** in **PyTorch** to localize the anomaly in a **heat map** overlay.
- Integrated a **DRF** backend and an **Angular** frontend with secure server-side **session** authentication.

Gestures for 3D Space *(Summer '20)*

Guide: WnCC Club IIT Bombay | Seasons of Code

- Built an image based hand gesture recognition module and integrated it to a **Django** backend **REST API**.
- Implemented **Transfer Learning** based **CNN** models, for multi-label classification of upto **5** different **hand gestures**, based on a self-created dataset consisting of **2750 samples**, with a **F1 Score** of **0.9959**.
- Built and trained **Siamese Neural Networks** to study the effect of dataset size on the accuracy of **One-Shot Learning** while dealing with the **American Sign Language(ASL)** dataset.
- Applied the model on a **background subtracted continuous** webcam feed and used **PyAutoGUI** to perform customizable tasks using a combination of different **hand gestures**.

Permutations and Morphisms *(Sept '20)*

Prof: Ajit A Diwan | DSA Course project

- Implemented efficient algorithms to extract **length**, **substring** and **subsequence** based properties of generalized **compositions** of **Thue-Morse** and **Fibonacci Morphism** objects.
- Devised efficient **linear** and **linearithmic** time algorithms for computing the **square root** and **logarithm** of abstract **bijective Permutations** using permutable **cycles** and the **extended euclidean** algorithm.

Red Plag *(Autumn '20)*

Prof: Amitabha Sanyal | Software Systems Lab Course project

- Working in a **team of 3** to build an effective **web**-based **plagiarism checker** for multiple source code files.
- Implementing the **Bag of Words** strategy to create and compare normalized **signature vectors** for each file using metrics like **Cosine Similarity Index** and **Jaccard Similarity Index**.
- Integrating the computational model with a **Django REST Framework** backend and an **Angular 10** frontend with secure client-side **token**-based **HTTP Authentication**.
- Building a robust **terminal client** to encapsulate features of the web-app in an authenticated **CLI**.

Neural Networks And Deep Learning *(Summer '20)*

Guide: MnP Club IIT Bombay | Summer of Science

- Reviewed and wrote a **systematic report** about the mathematical implementations surrounding **Machine Learning Algorithms** and **Neural Networks**(especially **CNNs**).
- Implemented a **Deep Learning Library** from scratch, for building and training **CNN** models.
- Reviewed papers on **De-Convolutional** Networks, to visualize the learning patterns of intermediate layers.

Other Projects

Angular DRF Socket.IO Based Cross Platform Messenger *(Apr '20)*

Guide : Self-project | Hobby-dev

- Developed a light-weight chatting application built on a **Django REST Framework** Backend, **Angular** Frontend and a **SOCKET.IO** websocket server, for real time communication.
- Used a relational **PostgreSQL** as the database backend and integrated **Ionic** and **Cordova** to make the **Angular** frontend base, cross-platform over web, **android** and **iOS**.

Image Enhancer using SRGANs *(May '20 - Ongoing)*

Guide : Self-project | Hobby-dev

- Developed an **Open-Source**, **PyQt5** based Desktop application for **up-scaling** and enhancing images using Super Resolution Generative Adversarial Networks**(SRGANs)**.
- Used the Bicubic **x4** downscaled **DIV2K** dataset for model training and executed **Keras** based implementations of **x2** and **x4** up-scaling algorithms like **WDSR**, **EDSR** and **SRGAN** from the **NTIRE** challenge.

Technical Skills

Programming Languages	**C++, Python,** Java, Bash, sed, AWK, Typescript
Web Development	**Django, Django Rest Framework, Angular 9,** Bootstrap, PHP, JS
Software Skills	**AutoCAD, SolidWorks, MATLAB**, GIT, LaTeX, Heroku, AWS, Android Studio, Make, CMake, Doxygen, Tikz, Beamer
ML & DL Skills	Keras, TensorFlow, Pandas, PyTorch, Scikit-Learn

Key Courses Undertaken

Core Courses	**Data Structures and algorithms (+ Lab)**, **Discrete Structures**, **Data Analysis & Interpretation**, **Software Systems Lab**, Design and Analysis of Algorithms**, Digital Logic Design + Lab**, Logic for Computer Science**, Computer Networks + Lab**, Abstractions and Paradigms in Programming + Lab**, Computer Programming & Utilisation, Introduction to Electronics
Mathematics & Physics	Linear Algebra, Calculus, Quantum Physics and Application, Basics of Electricity & Magnetism, **Classical Mechanics**

**Courses mentioned in bold will be over by December '20.*

***Marked courses will be over by April '21.*

Extra Curriculars

- Completed **80 hours** of **community** work and received special mention for **exemplary volunteering** under the **NSS Green Campus**, aimed for promoting and maintaining biodiversity in the campus. (2020)
- Awarded **2nd** position in **Ad-making** division of **Freshiezza 2k19** under **SilverScreen IITB**. (2019)
- Received the **Certificate of Honour** from **Methodist School, Dankuni**. (2019)
- Participated in the **FOSS Hack 2020**, an online hackathon under the **FOSS United Foundation** and built an **Email Tracker** for easy bulk follow-up management based on the status of the receiver. (2020)
- Participated in the **Quantum Computing Workshop 2020** held by **MnP Club IIT Bombay**,which dealt with the basics of quantum computing and its implementation using **Qiskit IBM**. (2020)