Arpit Aggarwal

◇ *Mail* ◇ *Github* ◇ *Linkedin* ◇ *Webpage*

Education

Indian Institute of Technology, IIT Bombay
Bachelor of Technology

- Major : Computer Science and Engineering
- Minor : Systems and Control Engineering
- CGPA : 9.32

Jayshree Periwal High School

- Intermediate/+2 : 94.2%
- Matriculation : 95%

Key Projects

Facial Emotion Detector — *Computer Vision* *Autumn 2018*
Self Project

- Detected bounding box of the face from a human image using the **Viola Jones Algorithm**
- Used **Principal Component Analysis** for dimensionality reduction and deployed a **CNN** based model for training on seven different human facial expressions

Chord Extractor — *Machine Learning, Audio Processing* *Summer 2018*
Project Under Web and Coding Club, IIT Bombay

- Detected chords of an audio file using Neural Networks and performed out of core learning on online data using convex optimization methods like **Stochastic Gradient Descent**
- Extracted 12 dimensional **Pitch Class Profile** using optimized routines of **Fourier Transform**
- Achieved 95% training accuracy and 86% test accuracy with Neural Networks on a dataset of 2000 chords containing 1000 chords in noise free and 1000 chords in noisy environment

Air Hockey — *Artificial Intelligence* *Spring 2018*
Course Project under Prof. Amitabha Sanyal

- Developed an **Air Hockey Bot** that plays the game at different difficulty levels
- Simulated real gaming experience by implementing smooth collisions between objects
- Implemented a vector-based decision-making algorithm that enables the CPU to decide whether to attack or defend based on puck's velocity and current position on board

End-to-End Encrypted Chat Platform — *Cryptography, Server-Client Modelling* *Spring 2018*
Project under Prof. Amitabha Sanyal

- Developed a chat platform that can be used to send messages from one user to another using a server-client model that decrypts messages only at the user end
- The server receives the messages in encrypted form and the messages are encrypted using **Hill Encryption Method** involving matrices for encryption and decryption keys
- Developed an inbox so the user can keep a track of his chat while interacting with other users

Movie Reviewer — *Machine Learning, Semantic Analysis* *Winter 2017*
Self Project

- Developed a machine learning model to rate movie based on comments of a person
- Used **Textblob** library in python for Semantic Classification and obtained subjectivity and polarity of commments to use them as features
- Designed heuristics for regulating these values to feed on neural networks

Secure Personal Cloud — *Web Development, Server-Client Modelling* *Ongoing*
Project under Prof. Soumen Chakrabarti

- Implementing a **Cloud Storage** where multiple clients can upload and share files
- Using **Socket Programming** to support multiple clients simultaneously
- Implementing block level file encryption and synchronization to ensure user data privacy

Awards and Achievements

- Secured All India Rank 21 in **JEE Advanced** 2017 out of 200,000 candidates
- Secured All India Rank 267 in **JEE Main** 2017 out of 1.2 million candidates
- Received Gold Medal and Certificate of Merit for being placed in the top 35 candidates at **INChO** 2017 and for being among the national top 1% in **NSEP** and **NSEA** 2016
- Recipient of the prestigious **KVPY** Fellowship by Dept. of Science and Technology, India
- National Winner among 10,000 candidates in coding contest conducted by **Techfest**, IITB
- Secured the position of Term Champion at a National Competition conducted by **UCMAS**
- Secured 2nd position in StrataZenith conducted by Indian Game Theory Society

Technical Skills

- **Programming Languages** : C++, Python, Bash, Java, Lua, R, Lisp, Prolog
- **Softwares and Utilities** : MATLAB, Gnuplot, Git, LaTeX, AutoCAD, SolidWorks
- **Libraries** : Numpy, Matplotlib, NLTK, Pytorch, TensorFlow
- **Development** : HTML, CSS, JavaScript, Android Studio, SQL, Django

Teaching and Mentorship

- Teaching Assistant for the course Quantum Physics and Application. Currently tutoring and evaluating performance of a batch of 50 first year students
- Conducted machine learning and python workshops during summers, attended by more than 100 students, It consisted of two sessions where topics like linear regression, neural networks, support vector machines, k-means clustering, convolution neural networks were covered and implemented using python libraries like scikit-learn and keras
- Mentored students preparing for JEE and Board Exams and conducting an offline crash course for the same during winters to assist them with their preparation.

Positions of Responsibility

- **Web Secretary** of CSE department, responsible for maintaining **CSE department website**. Currently working on developing an online library portal for students of the department
- **Volunteer** of **Web and Coding Club** and part of Institute Technical Council. Conducted events like Crypt Hunt, Git session, Scratch Day for freshmen
- **Education Volunteer** for **National Service Scheme**, IIT Bombay. Conducted science workshops and exhibitions for students from various NGOs

Courses Undertaken

- **Computer Science** : Data Structures and Algorithms+Lab*, Discrete Structures*, Data Analysis and 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
- **Other** : Calculus, Linear Algebra, Differential Equations, Mathematical Structures for Systems and Control*, Introduction to Electrical and Electronics Circuits*, Quantum Physics and Application, Basics of Electricity and Magnetism, Engineering Graphics and Drawing, Physical Chemistry, Biology, Signals and Feedback Systems**

** to be completed by November 2018* *** to be completed by April 2019*

Extracurriculars

- Runner Up in CSE Department Football Tournament among 16 teams that participated
- Won 1st prize in a strategy making competition conducted by ECell, IIT Bombay
- Built bluetooth controlled car, and used Arduino to convert it to a Line Follower and Maze Runner using Infrared and Ultrasonic Distance Measuring Sensors
- Worked as an organizer during Techfest 2017 and organized talk show of **Sophia** and **RoboWars**