Aditya Vavre

Computer Science & Engineering

Indian Institute of Technology Bombay
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UG Third Year (B.Tech.)

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Examination	University	Institute	Year	CPI
Graduation (ongoing)	IIT Bombay	IIT Bombay	2019	9.06
Intermediate(+2)	Central Board of Secondary Education	Maharishi Vidya Mandir S.S.S.	2017	98.40%
Matriculation	Central Board of Secondary Education	Maharishi Vidya Mandir S.S.S.	2015	10.00

Academic Achievements

- Awarded **Certificate of Merit** for being among the **Top 0.1 percent** of successful candidates in ***Computer Science, Chemistry and Physics*** in **All India Senior School Certificate Examination** — 2017
- Awarded **Smt.Delhi Rani Thulasi Award** for being the topper in **Computer Science** in **AISSCE** — 2017
- Awarded **Certificate of Merit** for outstanding performance and for obtaining **Grade 'A1'** in all five subjects in **AISSE** — 2015
- Secured an **All India Rank of 97** in **JEE-Main** among 1.4 million candidates — 2017
- Secured an **All India Rank of 421** in **JEE-Advanced** among 160,000 candidates — 2017
- Recommended for the **KVPY fellowship** through the *Kishore Vaigyanik Protsahan Yojana* (2015) SA Stream Exam organized under the Dept. of Science and Technology, Govt. of India — 2016
- Awarded **School Topper** for outstanding performance in Class-12 Board Exam conducted by the CBSE — 2017
- Awarded **Certificate of Merit** for being placed in **Statewise Top 1%** in **National Standard Examination in Chemistry(NSEC)** conducted by IAPT — 2016-17

Internships and Research Projects

BikeShare OD Prediction *Summer 2019*
Guide: Prof. Edward Chung *The Hong Kong Polytechnic University*

- Trained and optimized a **predictive CNN model** on time-series OD cluster data in **PyTorch**
- Used **K-means** and **DBSCAN** to cluster stations based on locations and **Spectral clustering (with SSIM metric)** on **temporal OD graphs** to find correlations
- Trained a **neural network** to predict the demand given the station and time

Medical AI Assistant *Winter 2018*
Praktice AI *Bengaluru, India*

- Worked on a medical **AI driven** autonomous workforce for handling hospital operations
- Implemented various Python functions to handle the functionality of the AI assistant on **Amazon AWS**
- Worked on improving and debugging the **NLP engine** of the AI assistant
- Worked on setting up an automated appointment booking system through the AI assistant on **Jenkins**

Notifications System *Winter 2019*
Epifi *Bengaluru, India*

- Worked on a **scalable and efficient notifications delivery system** from scratch by exploring various designs
- Implemented various modules to handle SMS and Email delivery using **gRPC** and **Amazon SQS** in **GoLang**
- Implemented a storage module to keep track of messages using **Cockroach DB**

Key Projects

Explainable VQA *Autumn 2019*
Prof. Ganesh Ramakrishnan | Artificial Intelligence and Machine Learning *Course Project*

- Conducted a literature review on **Explainable Visual Question Answering** methods
- Designed and Implemented a general training procedure to improve the **Time Complexity of Training Modular Networks**, as modularity is often used to achieve explanability and interpretability
- Validated the above procedure on **Transparency by Design: Closing the Gap Between Performance and Interpretability in Visual Reasoning** with more than 2x faster training and no loss in accuracy

Sound Localization and Separation *Autumn 2019*
Prof. Preethi Jyothi | Automatic Speech Recognition *Course Project*

- Proposed and Implemented a **General Framework for Self Supervised Sound Localization and Separation**
- Validated the above idea by performing both Sound Localization and Separation on the network architecture described in **Looking to Listen at the Cocktail Party: A Speaker-Independent Audio-Visual Model for Speech Separation**

Machine Learning and Data Visualization Toolkit *Spring 2018*
Prof. Amitabha Sanyal | Abstractions and Paradigms for Programming *Course Project*

- Created an implementation of Python **Orange** Toolkit in **Racket**
- Implemented state of the art Supervised and Unsupervised ML algorithms in Racket following a purely functional paradigm
- Used **Lambda Calculus** Techniques of Functional Programming to create **Machine Learning Pipelines**
- Used **Racket GUI** to provide a Drag and Drop Interface to use functions as objects along with an option to **Save Workflow**

Other Projects

SAT Solver *Spring 2018*
Prof. Amitabha Sanyal | Abstractions and Paradigms for Programming *Course Project*

- Implemented a **SAT-Solving Algorithm** in Racket using the **Davis-Putnam-Logemann-Loveland (DPLL)** procedure to determine if a formula is satisfiable or unsatisfiable

Matching Regular Expressions *Spring 2018*
Prof. Amitabha Sanyal | Abstractions and Paradigms for Programming *Course Project*

- Implemented a **Regex Matching Algorithm** in Racket by constructing a **Deterministic Finite Automata (DFA)** of the Regular Expression

Email Protocol *Spring 2019*
Prof. Kameswari Chebrolu | Computer Networks *Course Project*

- Implemented a **Post Office Protocol (PoP3)** supporting multiple clients logging in, viewing, synchronizing, and downloading their mail with attachments using **socket programming on C++**

Mini Telecom System *Spring 2019*
Prof. Kameswari Chebrolu | Computer Networks *Course Project*

- Implemented a fully **automatic reliable communication system** on top of an unreliable channel using **QR Codes** for transmission and **Reed Solomon** for correction

Battelship *Autumn 2018*
Prof. Soumen Chakrabarti | Software Systems Lab *Course Project*

- Implemented the game logic of the classic arcade game **Battleship**, chat service and interaction between the players through a server with **Real-Time Pairing** and a simple Graphical User Interface(GUI) based on a **Multi-Client Server** Mechanism using **Socket Programming**

Technical Skills

Programming :	C/C++, Python, Racket(Scheme), Java, Bash, SQL, SWI-Prolog, ASP and VHDL
Development :	HTML, CSS, JavaScript, NodeJS, ReactJS, Bootstrap, jQuery and PHP
Software :	LaTeX, MATLAB, Git, GNU Make, Jenkins, Android Studio and Octave

Key Courses Undertaken

Computer Science	Abstractions and Paradigms for Programming, Software Systems Lab, Data Analysis and Interpretation, Computer Networks and Lab, Design and Analysis of Algorithms, Operating Systems and Lab, Computer Architecture and Lab, Artificial Intelligence and Machine Learning and Lab, Database Systems and Lab*
Mathematics	Calculus, Linear Algebra, Differential Equations, Numerical Analysis*
Others	Introduction to Number Theory and Cryptography, Automatic Speech Recognition, Virtualization and Cloud Computing*

**to be completed by July 2020*

Extracurricular Activities

- Successfully completed a year long training program in **Swimming** under **National Sports Organization(NSO)** 2017-18
- Attended the **Vijyoshi Camp**, held at the **Indian Institute of Science (IISc), Bangalore** for facilitating interactions between bright young students and leading researchers in various branches of Science and Mathematics 2016
- Attended a **French** Basic Language Course offered by the **International Relations Office, IIT Bombay** to establish cross-cultural relations and to widen opportunities in foreign countries 2018
- Participated in a 12 hour long **Swimathon** in IIT Bombay. 2018
- Participated in RC-Plane, a remote-controlled airplane building competition conducted by the Aeromodelling Club, IIT Bombay 2017