Mithilesh **Vaidya**

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Education

Indian Institute of Technology, Bombay
Mumbai, India

B.Tech + M.Tech, Electrical Engineering
July 2017 - Present

- GPA: 9.15/10 (after 4 semesters)
- Pursuing Minor in Computer Science and Engineering

PACE Junior Science College (HSC)
Mumbai, India

Intermediate/+2
May 2017

- Percentage: 88.5%

Projects

Keyword Spotting
Audio Processing

Research project under Prof. Preeti Rao
June'19 - Present

- Implemented a variant of sliding Dynamic Time Warping (**DTW**) to detect a pre-defined keyword in an audio file
- Used traditional **MFCC** features as input to DTW for baseline comparison
- Trained a deep neural network on the TIMIT dataset to predict **phones** and used it as a feature extractor
- Used grid search to find the optimal parameters which maximise the **F-Score** on the Google Speech Commands dataset

Findit
Audio Fingerprinting

Self project
June'19

- Developed a Python program which can identify a song given a **short segment** of the audio, similar to the popular music-discovery app Shazam
- An **audio fingerprint** is generated for each song in the local database and the major **constellations** of time-frequency pairs are stored in a **hash table**
- An efficient hash table search predicts the confidence scores for each song in the local database

Handwriting Recognition Pen
Machine Learning

Institute Technical Summer Project, IIT Bombay
May '18 - July '18

- Built a pen which could instantly convert **handwriting strokes** into text. Can be used on ordinary paper
- Designed the pen from scratch in AutoCAD and **3D printed** it
- Generated own training data for each letter using a custom OpenCV script
- Wrote a Convolution Neural Network in Keras to recognise the letters

RISC
Computer Architecture

EE224 course project under Prof. Virendra Singh
April '19

- Designed, implemented and simulated (in VHDL) a Reduced Instruction Set Computer based on the **IIT-B RISC** instruction set, containing **14** basic general purpose instructions
- Wrote a custom test file to iterate over each instruction and verify the output

Duelling Bandits
Bandit Algorithms

IE613 course project under Prof. Manjesh Hanawal
April '19

- Carried out a **survey** of various algorithms for the Duelling Bandit setting
- Implemented various state-of-the-art algorithms such as Beat-The-Mean, SAVAGE and Doubler
- Analysed their performance on two synthetic and two real world datasets (MSLR and car preference) and reported the algorithm with the **least regret** for each environment

Furniture Classification
Machine Learning

Self Project
May '18

- Participated in the iMaterialist Challenge organised by Malong Technologies and CVPR 2018
- Implemented **ResNet in PyTorch** for classification of furniture images into **128 classes**, each class containing around 1500 training images with low inter-class variation
- Achieved an accuracy of 87.4% and ranked **30** among 428 teams across the globe

Indian Premier League analysis

Data Analysis

Self Project

May '18

- Completed the 'Python for Data Science' course by UC San Diego on edX.org
- Used popular data analysis libraries such as Pandas and Matplotlib to explore **10 years** of ball-by-ball data of the popular cricket tournament held every year in India
- Developed **new statistics** to gain more insight into the data

Technical Skills

- **Programming Languages:** Proficient in C++, Python. Familiar with Objective-C, HDL
- **Libraries** PyTorch, TensorFlow, Pandas, Matplotlib, OpenCV
- **Softwares:** MATLAB, AutoCAD, LaTeX, gnuplot, ngspice, Git, OpenCV, Solidworks, Android Studio

Courses Undertaken

- **Electrical:** Introduction to Electrical Systems, Electronic Devices and Circuits, Network Theory, Introduction to Microelectronics, Data Analysis and Interpretation, Semiconductor Device Fundamentals, Electronic Devices Lab, Analog Circuits, Power Electronics, Digital Logic, Signals and Systems
- **Maths:** Calculus, Linear Algebra, Differential Equations I, Complex Analysis, Differential Equations II
- **Computer Science:** Computer Programming and Utilization, Data Structures and Algorithms, Operating Systems
- **Other:** Biology, Economics, Quantum Mechanics, Engineering Drawing, Physical Chemistry, Organic and Inorganic Chemistry, Basics of Electricity and Magnetism, Bandit Algorithms
- **Online**
  - **Machine Learning** taught by Prof. Andrew Ng, Stanford University on Coursera
  - **nand2tetris** by Hebrew University of Jerusalem on Coursera
    Course outline: Build a **Modern Computer** from **First Principles**
  - **Python for Data Science** by UC San Diego on edX

Scholastic Achievements

- Secured an **All India Rank of 388** in JEE Advanced 2017 among 0.2 million candidates
- Awarded Certificate of Merit for being among the state **top 1%** in **NSEA** and **NSEP**, organised by Indian Association of Physics Teachers
- Awarded the **Kishore Vaigyanik Protsahan Yojana (KVPY)** Fellowship by Govt. of India
- Recipient of the prestigious **National Talent Search Examination (NTSE)** scholarship by National Council of Educational Research and Training (NCERT), Government of India
- **Silver medal** in Homi Bhabha Young Scientist Examination

Extracurricular Activities

- National-level quarter-finalist at Bournvita Quiz Contest. Appeared on National TV for the same
- **Won 2nd prize** in Android app development competition 'AndroNG' organised by Web and Coding Club
- Solved more than **130** problems in the **Algorithms** track on HackerRank
- Successfully completed a 12-month course on Lawn Tennis coaching under National Sports Organisation
- Awarded **Best Outgoing Student** of the year 2014-15 by Nirmala Convent High School