

KEY PROJECTS UNDERTAKEN

ChordIt — Chord Sequence Extraction using Machine Learning

Summer '18

Institute Technical Summer Project | Web and Coding Club, IIT Bombay

- Read literature on the use of machine learning in **Chord Sequence Extraction** problem
- Researched **Convex Optimization Methods** and selected **Stochastic Gradient Descent**
- Processed the music data to extract \mathbb{R}^{12} **Pitch Class Profile** vectors using optimized routines
- Achieved **95% train** and **86% test accuracy** on **2000** chords of different instruments
- Incorporated minibatches in SGD Optimizer for **Out-of-Core Learning** on online data

Machine Learning Models — Course Project

Autumn '18

Prof. Sunita Sarawagi | Dept. of Computer Science & Engineering, IIT Bombay

- Implemented a regression tree using **Modified CART Algorithm** and tested the accuracy for different heuristic loss functions on different datasets
- Incorporated various pruning criteria to maximize the accuracy on different loss functions.
- Classified data using **Logistic, Hinge, and Perceptron** loss functions and **L², L⁴ Regulariser**

Effect of Reviews & Responses on Consumer Decision — Web Scraping

Summer '18

Prof. Arti Kalro | Shailesh J. Mehta School of Management, IIT Bombay

- **Scraped Zomato** for a list of restaurants at different price points in Mumbai
- For each restaurants, scraped reviews, no. of likes, comments, no. of photos added, management responses using **Selenium** for **Automated Web Scraping**
- For each reviewer, extracted no. of reviews, followers, images posted, etc
- Used **Dynamic Programming** techniques to **reduce runtime** of web scraper

InstiApp — Open Source App Development

Autumn '18

IITB Developer Community

- Part of a team of **10+ developers** in making an **Open Source Android App** for the students, professors, student bodies and visitors of IIT Bombay
- Solved many **UI/UX** as well as **Core Bugs** and also implemented new features
- Actively involved in testing, reviewing new features and reporting bugs for the app
- The app currently has **5000+ downloads** and a **4.9 ★ rating** on Google Play

OTHER PROJECTS

Competitive Coding — Reading Project

Summer '18

WnCC Seasons of Code 2018, IIT Bombay

- Studied the essential **Data Structures & Algorithms** and their underlying theory
- Researched different **Programming Paradigms** and their uses in various problems
- Practically applied all the concepts in **Competitive Coding** on various online judges
- Covered topics like Dynamic Programming, Graph Algorithms, BackTracking & more

Crypt Hunt Bot — Concurrent Programming, ChatBot

Autumn '18

Web and Coding Club | Institute Technical Council, IIT Bombay

- Developed a **Python** Chatbot for **Discord** for conducting **CryptHunt**: a QnA Competition
- Wrote **Asynchronous tasks** using **async** library for parallelly handling multiple requests
- Incorporated a **Fail-safe** in case of server side crash by **Actively Logging** all information

Line Follower — Robotics, Control Theory

Spring '18

Electronics and Robotics Club | Institute Technical Council, IIT Bombay

- Assembled a sensor-array using **IR Tx-Rx** pair to detect white line on black background
- Calculated the distance of line from the center using **optimized threshold** value for sensors
- Implemented **Path Integral Derivative** algorithm to ensure smooth motion in correct direction

Walking Stick for the Blind — Social Innovation

Autumn '17 - Spring 18

National Innovation Cell | National Service Scheme, IIT Bombay

- Designed and manufactured a walking stick which detects obstacles using **Ultrasonic Sensors**
- Programmed **Arduino** to simultaneously handle **3 sensors** and soldered the ancillary circuit
- Researched the market and chose **cost-effective components** to make the product affordable

ACHIEVEMENTS

- Secured All India Rank **457** in **JEE Advanced 2017** out of 0.2 million Aspirants
- Achieved a **Percentile of 99.88%** in **JEE Main 2017** out of 1.2 million Aspirants
- Placed Statewise **Top 1%** in **NSEA** (Astronomy Olympiad) and selected for **INAO**
- **Winner** of **TechFest IITB's** National Coding Challenge: **Enigma** from 10,000+ teams
- **Won** Scratch Day, coding competition organized by **Web and Coding Club, IIT Bombay**
- **National Winner**, IPL Auction Competition '18 by **Entrepreneurship Cell, IIT Bombay**
- Secured **3rd** place in annual **Jigyasa: Science Quiz 2017** held by **University of Mumbai**
- **City Winner** of **Vodafone Derek's** Faster Smarter Better Challenge **Twice** in '14, '15

POSITIONS OF RESPONSIBILITY

Convener — Web and Coding Club

Apr '18 - Present

Institute Technical Council, IIT Bombay

- Responsible for conducting boot-camps, events, competitions and managing the club's resources with a long term goal of creating a thriving programming community in the institute
- Organized bootcamps on **Python/Libraries, Machine Learning, Git & GitHub**
- Ideated & Conducted a **Coding Crypt Hunt** for Freshmen via a self-made **Chatbot**
- Organized an introductory session on **Web Scraping** for Management Post-Grad Students

Coordinator, Competitions & LYP — Mood Indigo, IIT Bombay

Apr '18 - Present

- Conceptualized and organized 7 Multicity Competitions pan India thus increasing outreach
- Revamped the governing rules and regulations of 50+ competitions in various cultural genres

TECHNICAL SKILLS

- **Programming:** C/C++, Python, Java, R, MATLAB, Django, Bash, HTML5, CSS3
- **Libraries:** PyTorch, Keras, MLpack, Tensorflow, Sklearn, OpenCV, Scipy, Kivy
- **Software:** Git, Github, Android Studio, L^AT_EX, Adobe Photoshop, GNUplot, Jupyter
- **Robotics:** Arduino, Raspberry Pi, Robot Operating System

KEY COURSES UNDERTAKEN

- **Electrical:** Introduction to Electronics, Electronic Devices & Circuits*, Introduction to Electrical Systems, Network Theory*, Microelectronics*, Signals & Systems**, Digital Systems**, Analog Systems**, Electrical machines & Power Electronics**
- **Mathematics and Statistics:** Calculus, Linear Algebra, Differential Equations 1 & 2*, Complex Analysis, Data Interpretation & Analysis*
- **Other Courses:** Computer Programming & Utilization, Quantum Physics & Applications, Physical Chemistry, Economics*, Biology, Basis of Electricity & Magnetism

(* to be completed by Nov '18)

(** to be completed by May '19)

EXTRA-CURRICULAR ACTIVITIES

- **Active Player** in Indian Rainbow Six Siege Community
- Mentored a team for **XLR8 2018 Robotics Competition** who then won the **2nd prize**
- Active **Quizzer** in many intra-school quiz competitions.
- Active delegate in debates and **Dynamic Speaker** at many public speaking events in school