

Aryan Agal

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| CONTACT INFORMATION | 173, Hostel 6 Indian Institute of Technology - Bombay Mumbai 400 076, India | Phone: (+91) 9757482451 E-mail: aryanagal@iitb.ac.in Website: https://grubdragon.github.io |
| RESEARCH INTERESTS | Optimization, Applied Mathematics, Computer Vision, Reinforcement Learning, Scheduling, Image Processing | |
| EDUCATION | Indian Institute of Technology - Bombay, India Senior Undergraduate (4th Year) in 5 year program B.Tech.+MTech. in Energy Science and Engineering (July '16 - Present) CPI (Overall) 8.25/10.0 after 6 semesters Completed a minor in the Department of Computer Science and Engineering . Started another minor in Industrial Engineering and Operations Research . | |
| ACADEMIC HONORS | <ul style="list-style-type: none">Awarded AP(Advanced Performer) grade for exceptional performance in Computer Programming and Utilization and First Course in Optimization. (Spring '17 & Fall '18)Secured All India Rank 1960 in JEE Advanced '16 among 150 thousand candidates (2016)Achieved 99.69 percentile in JEE Main among 1.5 million candidates (2016)Qualified for the Certificate of Merit in the All India Open Mathematics Scholarship Examination twice, for grabbing 61st and 186th place (AIR). (2011, 2013) <i>Institute for Promotion of Mathematics - IPM</i> | |
| WORK EXPERIENCE | Standard Chartered <i>Risk Internship - Collections Strategy Team</i> | Summer '19 |
| | Personal Loans(X) <ul style="list-style-type: none">Studied and monitored the performance of the Collections & Recoveries Framework of Personal Loans - X accounts, working with multiple teams, situated in 3 different cities.Fixed implementation issues in the CRF. Shifted the focus of intensity towards the intention of the CRF, improving the targeted value by 20%.Reduced 600 redundant calls being made by calling officers wasting time and money. Personal Loans(Pre-X) <ul style="list-style-type: none">Formulated a CRF for Pre-X accounts based on previous 3 months performance data to streamline the efforts of the collections team and to stop the inflow into delinquency.Operationalized the CRF over 5 departments of bank to target 8000 risky accounts thus aiming to stop a value of INR 20 million from flowing into delinquency.Documented the official process flow and presented the document along with our analytical insights to the Head of Risk, Standard Chartered India. Personal Loans(MARSHALL) <ul style="list-style-type: none">Designed the Allocation Strategy & Treatment Plan for 60 days past due (DPD) accounts. Policy <ul style="list-style-type: none">Created a dashboard to summarize the credit cards sourcing performance based on last 4 years data | |

KEY
COURSES

- **Computer Science** Machine Learning, Computer Programming and Utilization, Computer Networks, Convex Optimization, Data Structures and Algorithms
- **Mathematics & EE** Optimal Control, First Course in Optimization, Image Processing, Controls and Instrumentation, Numerical Analysis, Probabilistic Models, Matrix Computations
- **Energy Science** Power Generation and System Planning, Mechanics of Materials, Material Sciences for Energy Applications, Transport Phenomena etc.
- **Others** Data Analysis and Interpretations, Economics, Engineering Drawing

KEY
PROJECTS

Mixed Integer Linear Programming in Unit Commitment Spring '19
Guided by Prof. Zakir Rather - [Report](#)

- Studied the unit commitment problem and did a literature survey on the different approaches to solving the unit commitment problem
- **Formulated and linearized** multiple physical constraints to make them compatible with the MILP solver
- Implemented a GUI program outputting unit schedule (using MILP) for input of unit data (with constraints) and the forecasted energy demand.

Digital Photography with Flash and No-Flash Image Pairs Fall '18
Prof. Amit Sethi - Course project - [Report](#)

- Implemented "[Digital Photography with Flash and No-Flash Image Pairs](#)" (Petschnigg et al.) for detail transfer, white balance, continuous flash adjustment, etc.
- Coded from-scratch bilateral filtering and two of its practical applications- in digital flash photography and in cartoonification of images.

Finite Difference Numerical Solution of Navier-Stokes Equations Spring '18
Prof. Manaswita Bose - Course Project - Transport Phenomena [Report](#)

- Solved the Navier-Stokes equation for an incompressible fluid, using discretized domain approximations.
- Derived and defined vorticity and stream function equations; applied finite difference approximations.
- Wrote MATLAB code for iterative solution of the Elliptic equation obtained by applying discrete boundary conditions to a 2-Dimensional, lid-driven, square cavity flow.

Enigma - MoodIndigo Express December '17
Team Creatives
[Mood Indigo](#), IIT Bombay

- Developed an online cryptic clue hunt game, on the **MEAN stack**, with **Monk**, **Jade** and **Sass**.
- Worked on **NodeJS** backend, providing secure **REST APIs** with **CRUD** functions on a **MongoDB** database.

Electronics and Robotics Club Website May '17 - June '17
Institute Technical Council
IIT Bombay

- **Developed** a website for club activities and including technical blog posts, tutorials, and event reflections.
- Implemented the website with Jekyll, to make website easier to contribute to, with posts in **Markdown**.

- Setup **auto-deployment** on **TravisCI**, a Continuous Integration provider available in the GitHub marketplace.

Smart Mirror

May '17 - June '17

Institute Technical Summer Project

- Fabricated a setup for interactive display of day-to-day information on a mirror using a **Raspberry Pi** and an LCD screen. [Video](#) and [Report](#).
- Localized and implemented the MagicMirror framework based on **Electron** which is a JavaScript framework, on the RaspberryPi and customized the CSS styling of displayed elements.
- Presented the project as part of the annual **Tech and RnD Expo** of IIT-B

Traffic Light Control System

May '17 - June '17

Motivated by Self Interest

[Transform Maharashtra](#), a government initiative

- Formulated a traffic handling system, which controls traffic lights on the basis of number of vehicles present in each entry point of the intersection, using image processing on (CCTV) camera footage.

Main and Beta Websites

May '17 - August '17

Team Creatives

[Mood Indigo](#) '17, IIT Bombay

- Contributed in development of Main and Beta Websites of Mood Indigo '17 based on **AngularJS** Framework. Uses **Sass** scripting for styling and **BrowserSync** integration for ease of development.
- Implemented a music player using **angular-soundmanager2** and scroll-based animations using **Skrollr.js**
- Made the beta website cross-compatible through addition of responsive elements to it.

OTHER EXPERIENCE

- **MOOCs:** Certified, with a **100%** grade in courses of Neural Networks and Deep Learning, Improving Deep Neural Networks, Structuring Machine Learning Projects and Convolutional Neural Networks, as part of the deeplearning.ai specialization by Andrew Ng on Coursera.
- **Image Processing:** Built an image editor with multiple image manipulation options like Equalize histogram, Gamma transform, Log transform, Blur, Sharpening, Negative etc. each from scratch. Used techniques like vectorization to improve performance. Report available [here](#).
Also built an image restoration program. Did a literature survey on image restoration techniques and implemented direct inverse filtering, truncated inverse filtering, Weiner filter de-blurring and Gamma filter de-blurring. Report available [here](#).
- **Instructing:** Instructor at multiple sessions of Institute Technical Council, IIT Bombay, including Git, GitHub, Arduino, RPi. Instructor for the Python summer course, under UGAC, IITB.
- **Electronics:** Created an ESP8266 speaker attachment to wirelessly transmit music to a speaker; wrote a python server to sample and stream any audio file. Developed an autonomous Arduino bot functioning as a Line Follower, Wall Follower, Maze Path Finder and a wrestler. Actively participated in Electronics Club sessions and made Xylobands and Audio Amplification circuits.
- **Competitive Coding:** Applied basic algorithms to solve questions on multiple websites like SPOJ, Codechef, HackerEarth and HackerRank. [Currently holds SPOJ rank #8074](#) worldwide as of 26th March 2018.

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| | <ul style="list-style-type: none"> • Wrestle.AI: Developed an Arduino based bot acting as a Line Follower, Wall Follower, Maze Path Finder and a wrestler; interfaced the Arduino with an ultra-sound sensor and self-made infrared sensors • Client Server Chat Application <i>Course Project, Prof. Mythili Vutukuru</i> Created a multi-client server program using concepts of Socket Programming in C++ with epoll • Hackathons: Part of one in top 3 teams of Microsoft code.fun.do AI for social Good Online Challenge • Journalism: Co-guide to a team of Panelists as Article Lead on "Department Sneak Peek", Insight Freshman Newsletter(FN), 2018, directing article content and structure. Panelist on the "Sophomore PoRs" article, FN 2017; interviewed multiple PoR holders regarding their work and provided content. • Community Work: Co-organized a diabetes detection camp as part of CURED (Can U Really Escape Diabetes) at the Siddhivinayak Temple premises, Mumbai (a Tech-Fest 2016 initiative). • NSS: Completed a year long course in the National Social Service, while promoting sustainability, organizing cleanliness drives and spreading awareness on going cashless for the ill-informed. | |
| TECHNICAL SKILLS | Programming Web Development Tools/Software | C++, C, Java, Python, L ^A T _E X, Bash HTML, CSS, Bootstrap, JavaScript, jQuery, Jekyll, Django, MEAN Stack Keras, Android Studio, Git, gnuplot, MATLAB, GNU Octave, AutoCAD, Arduino, Raspberry Pi |
| POSITIONS OF RESPONSIBILITY | Convener, Electronics and Robotics Club <i>IIT Bombay</i> | April '17 - May '18 <ul style="list-style-type: none"> • Working with a 10 member team, to boost the institute's Electronics & Robotics culture through hackathons, bootcamps, lectures, competitions and group discussions like the upcoming series "How Things Work" • Organized and mentored in XLR8, participated in by 500 freshmen and mentored 50+ bots in the competition. • Managed and spoke at a four day spread boot camp on Arduino, Image Processing, PID theory, Basic Electronics, Motors and Raspberry Pi attended by 400 enthusiasts across the institute |
| | Coordinator, Mood Indigo '17 <i>Team Creatives, IIT Bombay</i> | April '17 - May '18 <ul style="list-style-type: none"> • Web Coordinator for Asia's Largest College Cultural Festival with a footfall of 1.5 lakhs, hosting 230+ events • Developing websites, apps, portals for Mood Indigo '17 that receive over 6.5 million hits yearly • Managing a team of over 50 organizers to conduct and execute events in Mood Indigo '17 |
| MENTORSHIP EXPERIENCE | Volunteer, Web and Coding Club <i>IIT Bombay</i> | April '17 - May '18 <ul style="list-style-type: none"> • Conducting events like hackathons, workshops, reflections, etc. of one of the largest programming clubs in India. • Assisted in organizing several events, bootcamps and talks including ones on Git, Python and GitHub. |

- Monitored 'Seasons of Code' projects in Summer of '17 & cofounded the GSoC Incubation Cell of IIT Bombay

Technical Mentor

from IIT Bombay, for new IIT's

- Mentored students of IIT Goa in their summer-long project, on making a robotic arm.
- Guided students of IIT Dharwad in microcontroller programming, and taught them the basics of Arduino in a hands-on session.