Aryan Dua

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Career Objective

I am a 2nd-year Computer Science student at IIT Delhi with a keen interest in Computers and developing new technologies and actively pursuing Machine Learning.

Academics

- GPA(2020-present) - 9.06
- Senior Secondary Examinations - 97.2%
- Secondary Examinations - 96.4%

Achievements

- Department Rank 4 (Among the top 7% of all students in semesters 1 and 2.
- Secured All India Rank 516(out of 250,000 students) in JEE(Advanced) 2020
- Secured All India Rank 534(out of 1 million students) in JEE(Mains) 2020
- Secured All India Rank 677(out of 50,000 students) in KVPY 2020
- Among the top 100 students who gave BITSAT in 2020
- Among the top 1% in National Standard Examination in Chemistry
- One of the top 685 students to qualify for the Indian National Chemistry Olympiad 2020
- Won a bronze medal at the regional level in the World Robot Olympiad 2017.

Technical Skills

Python, Prolog, SML, VHDL, Assembly, Java, C, C++, HTML, CSS, Julia, Bash scripts, Makefiles, FreeCAD, MATLAB

Academic Projects

Research Intern at Zuse Institute Berlin June 2022-Present
Mathematical Optimisation

- Programming asynchronous algorithms which involve gradients, projections and proximity operators and determining hyperparameter selection strategies for the synchronous and asynchronous version of the algorithms and comparing them both.

Data Driven Selection in Artificial muscles Jan 2022 - March 2022
Machine learning

- Built a multi-label SVM classifier which can classify the type of actuator required based on the input features like Stress, Strain, Efficiency, etc. The data collected from the research site was sparse and incomplete and so I had to implement a novel approach to build the classifier with an accuracy of 72% as of now. Instead of using all 5 feature columns to build the classifer, I had to use them 2 at a time to maximise training examples with all non-null features and then build 10 classifiers. I then found the final prediction by compiling the predictions from all the classifiers.

Speech Processor Jan 2022 - March 2022
Machine Learning for speech

- Built a basic audio-processing library which can recognise a set of 12 given keywords from any 1 second audio clip. The Machine learning algorithm for this project was written in C++. There were helper files to ease the implementation, they are in C++, python, bash script and Make.

IITD Maze Game March 2022 - April 2022
COP290

- A muliplayer maze game based on the IIT Delhi map, built using SDL2 library in C++. The multiplayer dseign has been implemented using sockets. The game is a basic life simulator of life at IITD. You have 4 coefficients that determine your "score", and be sure not to collide into the angry professor. Instructions to download and play are there in README, and the game is there on my GitHub profile.

Edge Detection Jan 2022 - March 2022

Signals and Systems

- Built a program to detect edges in an image using the properties of high and low-pass filters, 2D convolutions, Gaussian kernels, Fourier transforms, etc. The novel part about this project was that we did not use the built-in OpenCV library functions, we implemented the whole program ourselves, from scratch.

Developing machine learning models July 2021 - Dec 2021
Stanford University, Coursera

- Developing machine learning models to solve problems based on classification, neural networks, supervised and unsupervised learning algorithms.

Building a compiler Jan 2022 - March 2022
Compiler Design

- Built a full compiler which first converts any given program written in the WHILE programming language to an Abstract Syntax Tree, then from that AST it evaluates the program using a VMC Stack Machine implementation(Value - Memory - Command). The code of the compiler was written in sml(ml-lex and ml-yacc were used for lexing and parsing the program)

Building my own processor Jan 2022 - March 2022
Computer Hardware

- Built a full processor which can execute any set of machine level instructions. If you convert any program written in assembly to its corresponding binary representation, it will execute the given set of commands. All of this was written in VHDL.

Building my own cryptocurrency Aug 2021 - Nov 2021
COL106

- Developing and implementing my own Cryptocurrency, as well as the software for processing transactions through data structures in Java

Relevant Courses

University Courses Aug 2021 - Nov 2021

- Data Structures and Algorithms, Machine Learning, Programming Languages, Computer Architecture, Probability and Stochastic processes, Design Practices, Signals and Systems.

Online Courses Aug 2021 - Nov 2021
Stanford University, Deeplearning.ai

- Machine Learning, Neural Networks and Deep Learning, Structuring Machine Learning Projects, Advanced Deep Neural Networks, Convolutional Neural Networks

Extra-Curriculars

- Have represented my school at a national level quiz, Newswiz, that aired on India Today. The quiz was based on current affairs.
- Have won debate competitions and have hosted a couple of large-audience events.
- Participated in many robotics competitions, building and programming bots, both using arduinos as well as Lego Mindstorms EV3 kits.
- Worked as a volunteer for NSS IIT Delhi by going from door to door to ask for donations that we could give to the underprivileged.
- Played Cricket, Badminton and Chess, as hobbies
- Member of Institute's Drama team.

Positions of Responsibility

- Working as a teacher for underprivileged students and teaching them maths, also through NSS
- Helped junior freshmen students as an Academic mentor in the course COL100, Introduction to Programming (in Python).