

RAJBIR MALIK

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Indian Institute of Technology Delhi
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EDUCATION

Indian Institute of Technology Delhi

Junior Undergraduate

Department of Computer Science and Engineering

July 2017 - Present

(Expected 2021)

Overall GPA: 9.646/10

SCHOLASTIC ACHIEVEMENTS

IITD Merit Award

Honoured for being among the top 7% academic performers of institute in the I, II IV and V semester.

Israeli Council for Higher Education

Awarded scholarship by ICHE for attending TAU summer school on merit basis.

Global Engineer Leadership (GEL) Scholarship

Awarded GEL Scholarship for summer internship program at NTHU, Taiwan.

Program Change

Selected for change of program by becoming **institute rank 5** at the end of first year. (CGPA 9.94/10)

JEE Advanced Rank 154 (amongst 150,000 candidates) in JEE Advanced 2017, **Maths: (122/122)**.

KVPY Fellow Cleared the KVPY exam, twice, in the categories SA (2017) and SX (2016)

Regional Mathematical Olympiad Cleared RMO-2016, ranked 7th nationally, and qualified for INMO.

PROJECTS

Electronic Voting Protocol

February 2019 - July 2019

Cryptography & Security Project, Prof. Subhashis Banerjee

- Designed a universally verifiable, software independent, bare-handed voting protocol with complete voter-verified accountability.
- E2E verifiable voting protocol with feasible EVM specific implementations. Protocol and various results in the process of being published.

Cybersecurity & Cryptography | Tel-Aviv University

July 2018 - June 2018

Summer Course, Prof. Amit Kleinmann

- Introduced to the concepts of cyber security; tested and implemented various cryptographic primitives.
- Studied and analyzed various attacks on digital systems and networks, and implemented defenses against common exploits such as replay attacks, buffer overflows, MITM attacks, etc.
- Learnt to use various tools (nmap, metasploit) and infrastructures (Kali), useful in security domain and penetration testing.

Cannon Game Bot

September 2019 - October 2019

Course Project, Prof. Mausam

- Designed an artificial bot for the game of cannon, involving a two stage development pipeline.
- Implemented Minimax, along with other classical algorithms as supplements, in the first pipeline.
- Supplemented the Bot with modern deep learning techniques(Q-Learning), with some game specific optimisations, to observe significant increase in the game-search depth.

Pipelined ARM Instruction Processor

February 2019 - April 2019

Course Project, Prof. Anshul Kumar

- Developed a 32 bit, pipelined processor for ARMv7 Instructions (VHDL), demonstrated on a BASYS-3.
- Supports all ARMv7 instructions including branch predictions, interrupts and privilege modes.
- Interfaced with PMod Keypad and PMod Display for various I/O programs based on user-defined input.

Bayesian Medical Analysis

October 2019

Course Project, Prof. Mausam

- Designed and trained a Bayesian Network, with a given topology, to model the inter-relationship between (some) heart diseases and observed symptoms.
- Hidden variables, from the real-world data, taken care of by the Expectation-Maximisation, along with Gibb's Sampling procedure.

Krivine and SECD Machines

March 2019 - April 2019

Course Project, Prof. Sanjeeva Prasad

- Implemented a compiler with Krivine and SECD machine in OCaml.
- A Lex Scanner converted program to tokens which were converted to an Abstract Syntax Tree using Recursive Descent Parser. Machines designed to support scoping, recursion, loops, lambdas etc.
- The AST was type checked and a low level code was generated, which was executed by the machines.

RELEVANT COURSES

Computer Science

Discrete Mathematics, Computer Architecture, Data Structures and Algorithms, Programming Paradigms, Artificial Intelligence, Computer Networks, Image Processing, Algorithm Design, Machine Learning, Distributed and Parallel Systems, Cryptography and Cyber-Security

Mathematics and Electrical

Linear Optimization, Signals & Systems, Probability Theory and Stochastic Processes, Calculus, Linear Algebra, Game Theory.

SKILLS

Programming Languages: Python, Java, C++ , JavaScript, OCaml, Golang, VHDL, ARMv7

Frameworks: OpenMP, OpenGL, MongoDB, SQLite, MPI, Git, OpenBlas, MKL

SIDE PROJECTS

I work profusely on independent projects. I love tweaking with new libraries and technologies, and many a times have come up with some interesting application. (listed below with links)

Grid Traversal : A java-applet which simulates classical traversal algorithms on user defined grid.

Traffic Simulator : A traffic simulator, both terminal and GUI based. Uses OpenGL for GUI rendering.

Image Processing Library : My own image-processing library with parallel-processing capabilities. Implemented with an in-built LeNet API. Uses MKL, OpenBlas for parallel computation.

Cryptographic Machines : Python library, for simulating encryption, decryption and cryptanalysis of various classical ciphers. (Vignere, Hill, Playfair Ciphers)

Percolation Analysis : Physical simulation, to check for the percolation limit in 2D-square grid.

N-Queens & Sudoku Solver : A simulation of the backtracking and hill-climbing solutions for N-Queens problem and Sudoku. (Uses JavaFX and Java AWT) libraries.