RAJBIR MALIK

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Indian Institute of Technology Delhi
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EDUCATION

Indian Institute of Technology Delhi *July 2017 - Present*
Junior Undergraduate *(Expected 2021)*
Department of Computer Science and Engineering 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
Selected for 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.

EXPERIENCE

Summer Internship | **Samsung Electronics, South Korea** May 2020 - June 2020
Suwon, Gyeonggi, South Korea

- Corresponded to the Big Data Analytics (AI-Big Data Lab), Visual Display Division.
- Implemented software architecture for speech summarisation using NLP and ASR primitives.

Cybersecurity & Cryptography | **Tel-Aviv University** June 2018 - July 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.

PROJECTS

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.

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.

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.

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, 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, C++ , Java, Lua, OCaml, Golang, VHDL, ARMv7
Frameworks: OpenMP, OpenGL, SQLite, MPI, OpenBlas, MKL

SIDE PROJECTS

Tweet Sentiment Analysis: Designed a Naive Bayes Classifier, for classification of tweets pre-processed via `nltk` library & feature extraction. Optimised the learning process using `tf-idf` vectorizer.

Fashion-MNIST Classifier: Implemented SVM classifier for various classes of clothing, from first principles using `cvxopt` library, incorporated with different kernels.

Gradient Boosted Trees for Virus Detection: Classifier for detecting files infected with virus.

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

Image Processing Library : Simple 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, RSA, DES)

N-Queens Simulation : Backtracking and hill-climbing solutions for N-Queens problem, visualised via `JavaFX and Java AWT`.