

## RACHIT ARORA

Computer Science and Engineering  
Indian Institute of Technology, Delhi

rachit95arora@gmail.com  
www.cse.iitd.ac.in/~cs5140292/

### ACADEMIC DETAILS

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Year	Degree	Institute	CGPA/Percentage
2014-2019 (Expected)	Integrated B.Tech and M.Tech in Computer Science and Engineering	Indian Institute of Technology Delhi	8.98/10
2014	Class XII, CBSE	Bal Bharati Public School, Pitampura, New Delhi	96%
2012	Class X, CBSE	Bal Bharati Public School, Pitampura, New Delhi	10/10

### SCHOLASTIC ACHIEVEMENTS

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- **IITD Semester Merit Awards** for exceptional academic performance in over three semesters.
- **Group Mathematics Olympiad** : Qualified GMO organised by Central Board For Secondary Education (CBSE). One of the six 12th grade students to get selected nationally.
- **All India Rank 169** in Indian Institute Of Technology Joint Entrance Examination among a million candidates.
- **99.9 percentile certificate** in 12th grade national CBSE Mathematics and Chemistry final examinations.
- In the **top 15 students** selected nationwide for the **KVPY Fellowship**, 2013 by IISc Bangalore, Govt. of India.
- Selected as a National Talent Search Examination (**NTSE**) Scholar-2010 for being in National top 1000.

### INTERNSHIPS AND MAJOR PROJECTS

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#### Big Data Analysis on company tickets

*Software Engineering Internship*

Qubole, Bangalore

*May - July, 2017*

- Analysed company service tickets using the Spark framework on Scala to allow a better insight into the product.
- The project centered around automatic problem identification in new tickets, understanding product issues and gauging customer satisfaction better.
- The project involved using machine learning techniques like Frequent Pattern Mining, TF-IDF, Bayes Learning, Clustering etc on big data.
- The second leg of the internship was to develop a Cluster Configuration tool in the form of an intuitive web app.

#### Exploring ways for efficient huge page management

*Research Project*

Prof. Sorav Bansal, IIT Delhi

*July 2017 - Present*

- Huge pages are currently poorly supported for processes in modern operating systems.
- The work is centered around techniques to redesign systems in a manner that allows better utilization of the page continuity of processes in the form of huge pages.
- Ways for efficient access frequency tracking to allow huge page promotion and splitting huge pages to reduce memory bloat and fragmentation.
- The idea boils down to treating memory contiguity as a first class resource allocating huge pages to a process only with some guarantees that the process will best utilize it.

#### FPRESSO : A fast automatic FPGA architecture modeling tool

*Summer Research Internship*

Prof. Paolo Ienne, EPFL Switzerland

*May - July, 2016*

- Added support for state-of-the-art logic blocks allowing fracturable LUTs.
- Implemented the project in Java which involved designing a suitable data structure for component abstraction and designing an algorithm to map architecture delays to modes.
- Modeled area and delay values by deriving the actual hardware architecture for the abstract mode description.

## OTHER PROJECTS

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### Bot adversary for the game of Tak

Prof. Mausam, Fall 2016

Implemented an AI bot in C++ based on the minimax search with alpha beta pruning. Auto tuned weights by self training and added quiescence search and transposition table to improve performance. The board state was completely represented using 64 bit integers to allow for constant time path calculations using bit manipulation.

### Traveling Salesman Problem using Genetic Algorithms

Self Project

A C++ implementation of several genetic crossover algorithms like Partially Mapped Crossover (PMX), Cyclic crossover (CX), Edge Recombination Crossover (ERX) and Greedy crossover (GX) with some heuristics. Mutation to provide soft random restarts on stagnation. Parallelized the implementation using OpenMP to utilize inherent concurrency in the algorithm.

### Network Based Multiplayer Game

Prof. Vinay Ribeiro, Spring 2016

Designed a multi-player p2p network based game of ping pong with multiple balls, power-ups and speed-ups using Java Swing library for graphics and UDP sockets for network programming. To maintain seamless continuity of the game during network outages, applied local interpolation in the custom physics engine and made it robust by replacing failed nodes(players) with artificially intelligent bots.

### Complaint Management Portal

Prof. Vinay Ribeiro, Spring 2016

Designed and developed a full fledged Android application for registering and resolving complaints of campus residents. The back-end was implemented in PHP with a MySQL database. The application supported complaint threads and comments with voting and resolution options and support for independent issue groups.

### Prolog Interpreter in Ocaml

Prof. Sanjiva Prasad, Spring 2017

An implementation of the Prolog REPL in Ocaml using Ocamllex for lexer, Ocaml yacc for parser and coding a sigma algebra engine supporting unification and substitution.

## RELEVANT COURSES

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- **Computer Science:**

Advanced Topics in OS\*, Operating Systems, Artificial Intelligence, Machine Learning, Parallel Programming, Computer Networks, Functional Programming\*, Digital Image Analysis\*, Analysis and Design of Algorithms, Data Structures & Algorithms, Discrete Mathematical Structures, Programming Languages, Computer Architecture, Design Practices in Computer Science, Logic for Computer Science\*, Theory of Computation

- **Mathematics:**

Calculus, Linear Algebra, Probability & Stochastic Processes

## TECHNICAL SKILLS

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- **Programming Languages:** C, C++, Java, Ocaml, Scala, Python, JS, SML, Prolog, MySQL, HTML, PHP

## EXTRA CURRICULAR ACTIVITIES

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- 2014-2016 : Executive and Marketing Coordinator at ACES-ACM, the ACM student chapter of IIT Delhi
- Freshman Mentor for six IIT Delhi freshman for the year 2016.
- 2014-2016 : Member of the Stree Moderation Team under NSS (National Service Scheme). Stree is an organization working to create gender sensitization and awareness among the students of the institute and community in general.