

Navneet Agarwal

Curriculum Vitae

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Education

- 2014–2018 **Indian Institute of Technology Bombay**, *Bachelor of Technology (B.Tech).*
Major: Computer Science and Engineering (with Honors)
Minor: Applied Statistics and Informatics
GPA - 9.65
- 2012–2014 **St.Stephen's School, Kolkata**, *High School.*
Stream: Science, Score - 97.00%
- 2011–2012 **St.Stephen's School, Kolkata**, *High School.*
Stream: Science, Score - 96.6%

Interests

Data Analytics, Financial technology, Statistics

Peer Reviewed Conference Publications

- 2018 **Authors:** Navneet Agarwal, Sanat Anand & Manoj Prabhakaran [\[paper\]](#)
Title: On Secure m-Party Computation, Commuting Permutation Systems and Unassisted Non-Interactive MPC
Conference: 45th International Colloquium on Automata, Languages, and Programming (ICALP) ([ICALP](#)) 2018 - Accepted as Brief Announcement

Scholastic Achievements

- 2015 Among the top 10 in a batch of 880 students to be granted a branch change to computer science based on extraordinary performance
- 2014 Secured **64th** rank (State rank **3**) in IIT JEE Mains among 1.5 million candidates
- 2014 Obtained **5th** rank in State Joint Entrance Examination **WBJEE**
- 2013 Attained **15th** rank in the Nationwide Education and Scholarship Test (**NEST**)
- 2014 Bagged Rank **312** in IIT JEE Advanced among 150,000 candidates
- 2014 Cleared the written examination of Special Class Railway Apprentice Examination
- 2013 Selected for the **KVPY** Mentorship Scheme, attended the **Vijoyshi** National Science Camp and ranked **256** out of 100,000 students
- 2013 Participated in Department of Science and Technology (DST) inspired internship science camp conducted by Jagadis Bose National Science Talent Search **JBNSTS**
- 2014 Attained international rank **66** and state rank **3** in the International Maths Olympiad and national rank **28** and state rank **1** in the National Science Olympiad

Internships

- May–July 2017 **Machine Learning for quoting PRDC Risk Charges.**
Goldman Sachs Services Private Limited
- Analyzed the relation between the Monte Carlo generated pathwise payoffs and the **PRDC risk charges**
 - Modelled the data using **big data** machine learning techniques such as Adaboosting and Neural Networks
 - Achieved an overall RMS error within **one tenth** of the data's standard deviation
- July 2017 **Volatility Interpolation in Strike and Expiry.**
Goldman Sachs Services Private Limited
- Implemented a fully implicit finite difference method to efficiently interpolate and extrapolate a discrete set of option quotes to an **arbitrage consistent** full continuous surface of local volatility in expiry and strike
 - Examined various time change functions to accurately model the implied volatility
- May–July 2016 **Rule Workbench, .**
Electronics For Imaging India Pvt. Ltd.
- Designed **REST Framework APIs** and a web application for a rule engine to facilitate the users to create their own business rules in a user friendly manner
 - Developed a user friendly UI for better interaction with the customer for operation on the rules using NodeJS and AngularJS along with HTML
 - Used MySQL database queries to support the creation, deletion and updation of rules through the UI
 - Used **Mocha** Unit Testing to test the correctness of the APIs
- Dec 2015 **Public Opinion Aggregator, .**
Zupp Carpooling, Chitrani Technologies Pvt. Ltd.
- Developed the back-end of a mobile app (a **public opinion poll aggregator**)
 - Worked on Android Studio and integrated the app with the database using PHP and MySQL
 - Analysed the data collected in a week's duration and displayed the results in a user friendly manner for the user to be able to make several comparisons

Research Projects

- Jan–Oct 2017 **Secure Multi-Party Computation, IIT Bombay - *UG Thesis*.**
Guide : Prof. Manoj Prabhakaran
- Proved a characterization for Aggregated Semi-Honest MPC Functionality and related it to an existing framework of Non-Interactive MPC
 - Accepted as a brief announcement in the International Colloquium on Automata, Languages, and Programming (ICALP) 2018 [\[report\]](#)

Key Course Projects

Autumn **Intelligent agent for bomberman**, *Reinforcement Learning*.

2017-18 Instructor : Prof. Sivaram Kalyanakrishnan

- Designed a neural network for representing the Q-function and used Q-learning updates for training the agent
- Explored effects of human-based features on quality and time of convergence for approximation of Q-values
- Used the idea of Curriculum Learning to teach the agent [\[github link\]](#)

Spring **Agent for Pacman**, *Artificial Intelligence*.

2016-17 Instructor : Prof. Sivaram Kalyanakrishnan

- Built an intelligent agent of Pacman and compared various heuristics like search, reflex agent, Minimax with pruning, Expectimax and use of evaluation functions to maximize the performance
- Explored another case wherein ghost position is unknown and inferred using Particle Filters and Dynamic Bayes Net

Spring **Malicious URL Detector**, *Machine Learning*.

2015-16 Instructor : Prof. Ganesh Ramakrishnan

- Extracted lexical and host based features for a URL and did further feature selection to reduce the complexity
- Implemented and tuned various classification models on the selected features to receive high accuracy results [\[github link\]](#)

Autumn **Scanned Document Refiner**, *Image Processing*.

2016-17 Instructor : Prof. Ajit Rajwade

- Developed an automated system to enhance the quality of pictures of documents
- Used heuristics for finding the Convex Hull and applied Projective Transformations to nullify the skew of the document
- Implemented Adaptive Binarization for text and image enhancement in the document

Autumn **Non-interactive CryptoComputing for NC_1** , *Advanced Tools from Modern Cryptography*.

2017-18 Instructor : Prof. Manoj Prabhakaran

- Gave a C++ implementation for [SY'99](#): one of the first works on homomorphic encryption- gives a one round MPC protocol for NC_1 circuits [\[github link\]](#)
- Created a remote cryptocomputer which runs a circuit on encrypted data and returns output such that the original party doesn't learn the circuit [\[report\]](#)

Spring **UC-secure Multi-party Voting**, *Cryptography and Network Security*.

2016-17 Instructor: Prof. Manoj Prabhakaran

- Developed a protocol for UC-secure multi-party voting against computationally unbounded adversaries using cut-and-choose methodology
- Implemented the above protocol in C++ and observed its practical viability through bench-marking [\[report\]](#)

Teaching Activities and other positions of responsibilities

- Autumn 2017-18 **Teaching Assistant** for Prof. Kameshwari Chebrolu - Foundations of Network Security and Cryptography (CS 742/416M)
- 2017-18 **Department Academic Coordinator** (DAMP) - Leading a team of 20 mentors to help them guide CSE students under the DAMP programme and maintain regular interaction between the faculty and the mentors to smooth the mentoring process
- 2016-17 **Department Academic Mentor** (DAMP) - Among the 16 department academic mentors who are each responsible to guide a group of 8 students of second year in academics and help them cope with their curriculum
- 2015-16 **Convener**, Table Tennis Club, IIT Bombay - Conducted workshops of the game and organized freshmen sports orientation along with council members. Organized a general championship and a treasure hunt participated by nearly 550 students

Relevant Additional Courses

- Maths Probability Theory, Derivative Pricing, Statistical Inference, Regression
- Machine Learning Machine Learning, Artificial Intelligence, Intelligent and Learning Agents
- Miscellaneous Digital Image Processing, Data Analysis and Interpretation

Extracurriculars

- Qualified for Stage 2 of the **WorldQuant** International Quant Championship
- Part of bronze medal winning team in the Institute Table Tennis League (ITTL)
- Developed and demonstrated a Windows App under **Code.Fun.Do** competition held by Microsoft
- Participated in Game Jam 2015 and developed a game using **Unity**
- Led and managed 13 players in Institute Table Tennis League and finished 4th
- Successfully completed a Lawn Tennis camp conducted by the institute
- Successfully completed the National Sports Organisation (**NSO**) in Table Tennis in the first year

References

Manoj Prabhakaran
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