Shubham Sharma

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Educational Qualifications

Year	Degree/Certificate	Institute	CPI/%
2019(Expected)	Dual-Degree(B.Tech-M.Tech)	Indian Institute of Technology, Kanpur	9.3/10(MT) | 8.8/10 (BT)
2014	Higher Secondary Education	Shivaji Science College, Nagpur	90.15%
2012	Secondary Education	D.A.V Public School, Akola	99.64%

Achievements

- Received **Academic Excellence Award (IIT Kanpur)** for distinctive performance in the academic term 2015-16 and 2017-18
- Selected for fellowship in **Kishore Vaigyanik Protsahan Yojana (KVPY)**(SX Stream)
- Awarded **Second Best Sectional Award** for building an Effective Irrigation System model in the course TA201, IIT Kanpur
- Secured 3rd position in **FPGA Design Challenge**, at Techkriti 2016, annual Intercollegiate Technical Festival of IIT Kanpur

Publications

1. **GANAK: A Scalable Probabilistic Exact Model Counter**
   Shubham Sharma, Subhajit Roy, Kuldeep S. Meel and Mate Soos
   Proceedings of International Joint Conference on Artificial Intelligence (IJCAI), 2019
2. **WAPS: Weighted and Projected Sampling**
   Rahul Gupta, Shubham Sharma, Subhajit Roy and Kuldeep S. Meel
   Proceedings of International Conference on Tools and Algorithms for the Construction and Analysis of Systems (TACAS), 2019
3. **Knowledge Compilation meets Uniform Sampling**
   Shubham Sharma, Rahul Gupta, Subhajit Roy, and Kuldeep S. Meel
   Proceedings of International Conference on Logic for Programming Artificial Intelligence and Reasoning (LPAR), 2018
4. **Verity: Blockchains to Detect Insider Attacks in DBMS**
   Shubham S Srivastava, Medha Atre, Shubham Sharma, Rahul Gupta, Sandeep K Shukla
   Submitted.
5. **Detecting Insider Attacks on Databases using Blockchains** (Extended Abstract)
   Shubham Sharma, Rahul Gupta, Shubham Sahai Srivastava and Sandeep K. Shukla
   Proceedings of 2nd Advanced Workshop on Blockchain: Technology, Applications, Challenges, ISRDC IIT Bombay, 2017

Internships

- **National University of Singapore, Singapore**
  Research Attachment Intern *May'18-Nov'18*
  - Designed novel techniques for counting and sampling of solutions of boolean formula
  - Implemented and released new tools- KUS and WAPS beating state-of-the-art uniform and weighted samplers
  - Implemented GANAK a new scalable probabilistic exact model counter beating the state-of-the-art model counters
  - Worked in collaboration with highly qualified researchers, undergoing a period involving extensive discussions and meetings for a possible approach and formulation of problems
- **Nutanix Software India Pvt Ltd, Bangalore**
  MTS Intern *May'17-July'17*
  - Studied the architecture of Nutanix DRaaS (Disaster Recovery as a Service)
  - Developed libraries and workflows in nutest (Nutanix automation framework) for various scenarios in DRaaS
  - Automated, modified and executed test suites using nutest to cover the positive and negative code paths of DRaaS
  - Tracked, identified and logged bugs using JIRA and worked closely with DR team to fix them
- **Okul Education Solutions Pvt Ltd, New Delhi**
  Stack Developer *May'16-July'16*
  - Maintained, developed and analyzed features for Okul; application that aimed at giving on-line education for school students
  - Used AJAX, JSON with jQuery for data request and response processing, Amazon Web Services to store and retrieve files and Google, Facebook OAuth2 services to build a social authentication feature
  - Developed and simulated the Item Response Theory

Key Projects

- [**Computer Systems Security**] **Securing Zoobar Web Server**
  Mentored by ***Prof. Sandeep Shukla*** *Jan'17-April'17*
  - Studied the architecture of zoobar web server - a model of OKWS web server for building fast and secure web services
  - Exploited security vulnerabilities using control hijacking techniques, privilege escalation techniques, buffer overflow attacks, broswer-based attacks like SQL injection, cross site scripting, cross site request forgery and cookie thefts

- Improved application security using stack canaries, privilege separation and server-side sandboxing

- [**Compilers**] **Compiler for Scala**
  *Mentored by **Prof. Amey Karkare*** *Jan'17-April'17*
  - Programmed a Scala to NASM(an 80x86 and x86-64 assembler) compiler with support for basic data-types, conditional statements, looping statements, arrays, type checking, basic type inference, nested functions and recursion
  - Implemented lexer, parser, register allocation algorithm, symbol table, optimization algorithm, advanced three address code, assembler and abstract syntax tree for various Scala language features
  - Developed extra features like default parameter value of functions, classes and special data-structure(list) to store graphs

- [**DBMS**] **AuctionBase**
  *Mentored by **Prof. Medha Atre*** *Jan'17-April'17*
  - Analyzed and parsed large volume of data downloaded from eBay website and designed a good relational schema for it
  - Implemented triggers and various integrity constraints in order to maintain data integrity and consistency
  - Developed back-end to manage Auctionbase data using SQLite database management library and user friendly front-end for real time auction

- [**Distributed Systems**] **HBase for Prutor**
  *Mentored by **Prof. Satyadev Nandakumar*** *Aug'16-Nov'16*
  - Studied the architecture of HBase, its limitations and advantages in comparison with traditional MySQL database
  - Experimentally analyzed Select and Insert query on HBase and MySQL using multi-threading
  - Compared the performance of MySQL and HBase on different scenarios(queries per sec) and made conclusions accordingly

- [**Algorithms and Web Technologies**] **Automatic Room Allocation**
  *Mentored by **Prof. Satyadev** and **Prof. Kurur*** *Aug'16-Nov'16*
  - Built an application to allocate best possible rooms to hostel students in their respective wings according to their preferences
  - Modified the Stable Marriage algorithm and Hungarian/Munkres algorithm and used their combination to find best matching pair of students for a particular room

- [**Machine Learning**] **Wildlife Conservation Project**
  *Mentored by **Prof. T.V Prabhakar*** *Dec'15-Jan'16*
  - This project aimed to identify areas vulnerable for tigers in a national park to minimize their killing by poachers
  - Generated data facilitating formation of clusters and incorporated attributes like terrain, month and time of killing
  - Built SVM (Support Vector Machine) trained over this data to get coefficients of hypothesis resulting in 80% accuracy

- [**Discrete Maths**] **Picks Theorem Analysis**
  *Mentored by **Prof. Rajat Mittal*** *Sept'15-Nov'15*
  - Studied the proof of Picks theorem using Induction and Euler's formula
  - Studied the relation between Pick's theorem and Farey's sequence
  - Extended the theorem to calculate area of polygons having holes

- [**Machine Learning**] **Gesture Recognition Using IMU Sensor**
  *Mentored by **Electronics Club IIT Kanpur*** *May'15-June'15*
  - Collected, filtered and processed the data of yaw, pitch and roll from an IMU sensor using Matlab
  - Studied Neural Network architectures and trained the network to recognize 10 gestures that achieved 90% accuracy
  - Built an interface using java.awt.project library in Matlab to operate different keyboard keys and mouse cursor using gestures

Technical Skills

- **Programming Languages :** C/C++, Python, Haskell, C#, HTML, CSS, Javascript, Verilog, Php
- **Software and utilities :** Latex, Git, Matlab, Django, Visual-Studio, PyCharm, R-studio, SQL Server
- **Platforms :** Linux and Windows

Relevant Courses

- **Computer Science :** Data Structure and Algorithms I/II, Fundamentals of Computing, Computer Organisation, Computing Laboratory I/II, Operating Systems, Theory of Computation, System Security, DBMS, Compiler Design and Analysis, Computer Networks, Machine Learning Techniques, NLP, Blockchain Technology and Application, Computational Complexity, Software Engineering
- **Mathematics :** Probability and Statistics, Linear Algebra, Abstract Algebra, Discrete Mathematics, Introduction to Logic, Introduction to Calculus, Complex Variables, Numerical Methods

Positions of Responsibility

- **Student Volunteer, ETAPS 2019, Prague Czech Republic** *April'19*
- **Teaching Assistant, Computer Science Department, IIT Kanpur** *Jan'19-April'19*
- **Student Guide, Institute Counselling Service** *July'15-April'16*
- **Secretary, Electronics Club** *July'15-April'16*
- **Tiger Ambassador of Akola City** *May'10-May'11*