

Prakhar Agarwal

THIRD YEAR UNDERGRADUATE · COMPUTER SCIENCE AND ENGINEERING, IIT KANPUR

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Education

IITK (Indian Institute of Technology, Kanpur)

BACHELOR OF TECHNOLOGY, COMPUTER SCIENCE AND ENGINEERING

Kanpur, India

2015 - 2019 (Expected)

- Cumulative Grade Point/ CPI: **9.64/10.0**

Central Public School

RBSE

Rajasthan, India

2013

- 12th GRADE | Aggregate **89.8%**

Kendriya Vidyalaya, Jhalawar

CBSE

Rajasthan, India

2013

- 10th GRADE | CGPA **10.0/10.0**

Honors & Awards

2018	2nd Rank , Championship Value Prediction(CVP-1), ISCA-2018	Los Angeles
2015	All India Rank 126 , among 1.2 million students in JEE ADVANCED	India
2015-17	Academic Excellence Award , for 2015-16 and 2016-17 by IIT Kanpur	Kanpur, India
2015	0.1 Percentile , JEE MAINS	India
2014	KVPY Fellow All India Rank 232 , IISc Bangalore and Government of India	Bangalore, India
2014	1 Percentile , Physics Olympiad (NSEP) HBCSE	Rajasthan, India
2014	Qualified , Chemistry Olympiad (NSEC) HBCSE	Rajasthan, India

Publication

DFCM++: Augmenting DFCM with Early Update and Data Dependency-driven Value Estimation

Los Angeles, California, US

INTERNATIONAL SYMPOSIUM ON COMPUTER ARCHITECTURE

June 2018

Placed 2nd at Championship Value Prediction Workshop (CVP-1)

Work Experience

Samsung Electronics Headquarters

Suwon, South Korea

CLOUD LAB

May 2018 - July 2018

- Designed a prototype for Event Monitoring and Corrective Action for network functions of Samsung.
- Worked on a simulator of the Data Collection, Analytics and Events (DCAE) module of Open Network Automation Platform(ONAP).
- Used various APIs like REST-API, Kafka-python, Durable-rules, etc. to develop the simulator.
- The simulator can be used for testing purposes in Samsung's solutions for network virtualization.

Bombay Stock Exchange

Bombay, India

IT DEPARTMENT, SECURITY TEAM

May 2017 - July 2017

- Worked on designing and improving Network security architecture of Bombay Stock Exchange with IBM.
- Found vulnerabilities and audited BSE network with SEBI compliance.

IIT Kanpur

Kanpur, India

TUTOR, INTRODUCTION TO COMPUTING (ESC101)

July 2018 - Present

- An introductory course in C and programming techniques, with more than 450 enrolled students.
- Conducting Tutorial Lectures for a batch of 40 students, once every week.
- Designing and Grading Lab Sessions, Quizzes, Theory and Lab exams.
- Supervising the work of Teaching Assistants.

Projects

Side-Channel Attacks exploiting Speculative Execution

IIT Kanpur

PROJECT, PROF. BISWABANDAN PANDA

August 2018 - Present

- The aim of the project is to discover new side-channel attacks using various speculative techniques like cache, prefetching, out-of-order execution, value prediction, branch prediction, etc.
- Mounted Flush-Reload, Flush-Flush, and other side-channel attacks on current processors.
- Using gem5 simulator to explore new side-channel attacks based on value and branch prediction.

Gotham Compiler

IIT Kanpur

COURSE PROJECT, PROF. SUBHAJIT ROY

January 2018 - April 2018

- Implemented a compiler for a fully functional subset of Go programming language in python from scratch.
- Used ply and yacc to obtain the parse tree and GCC for generating the binary from assembly code.
- Incorporated advanced features like structures, pointers, multi-dimensional arrays, operator overloading, string concatenation, recursion, multiple declarations, sequential assignments, etc.

Autonomous Underwater Vehicle github.com/AUV-IITK REPORT

IIT Kanpur

MEMBER, TEAM AUV-IITK, PROF. K.S. VENKATESH & PROF. SACHIN SHINDE

December 2015 - April 2017

- Leader Software Subsystem of team AUV-IITK.
- First Runner-ups at the National level Competition SAVE-NIOT (2016) in debut attempt.
- The aim of the Robot is detecting and following a line, hitting a buoy, firing torpedoes at given targets and dropping objects underwater.
- Implemented the tasks using Robot Operating System (ROS) for Controls, OpenCV for Image Processing and Gazebo for simulation.

Securing Zoobar Server

IIT Kanpur

COURSE PROJECT, PROF. SANDEEP SHUKLA

Jan 2017 - April 2017

- Found various security vulnerabilities in the server code.
- Exploited vulnerabilities using control hijacking techniques like buffer overflow and format string attacks.
- Performed various browser-based attacks like SQL injection, XSS, CSRF on Zoobar web application.
- Fixed security bugs in web server, implemented privilege separation and server-side sand-boxing of executable profiles in the okws server.

Text Generation

IIT Kanpur

COURSE PROJECT, PROF. PURUSHOTTAM KAR

August 2017 - December 2017

- The aim of our project is to capture the artistic style of an author and then generate text in that same style.
- We use character-level language models using multi-layered RNNs/LSTM and attention models on top of that to account for long-term dependencies.
- As an alternative approach, we also aim to use neural style transfer for text in a fashion similar to artistic style transfer for images by Gatys et al.

Introduction to Game Theory github.com/pkhrag/Game-Theory

IIT Kanpur

SEMESTER PROJECT, ACA

January 2016 - April 2016

- Developed an AI for zero-sum games like Tic-Tac-Toe and Connect-4.
- Used min-max algorithm with alpha-beta optimization and heuristic functions.
- Explored Monte Carlo Simulation for computing better heuristic function.
- Implemented feature of connecting two AIs over a network using ZeroMQ library.

Other Projects

Exploiting Media Projection Vulnerability in Android Implementing OS Functionality in NachOS
Centralized File Storage System

Relevant Courses

Completed

Computer System Security
Operating Systems*
Machine Learning Techniques
Data Structures and Algorithms
Discrete Mathematics
Introduction to Electronics
Computer Laboratory
Compiler Design

Computer Organization
Advanced Algorithms*
Computer Networks
Probability and Statistics*
Multivariable Calculus
Logic in Computer Science
Introduction to Economics

Linear Algebra
Computational Complexity Theory
Theory of Computation
Partial Differential Equation
Abstract Algebra
Introduction to Programming
Computer Architecture*

Ongoing

Secure Memory Systems

Cyber Security of Critical Infrastructures

* : A* Grade for exceptional performance

Skills

Programming C/C++, Python, X86 Assembly, ROS, Octave, MIPS, Verilog, R, Golang, Java

Web JavaScript, HTML, CSS, SQL

Utilities Bash, Git, GDB, \LaTeX , Sublime, Vim, Numpy, OpenCV

Platforms Windows, Linux(Ubuntu), Arduino, Android, FPGA, Gem5, ChampSim

Positions of Responsibility

ACA Coordinator

IITK

DEPARTMENTAL STUDENT BODY

January 2017 - Present

- Conducted various events in the department like CTFs, Hackathons, and other competitions.
- Organized departmental trip, departmental freshers, farewell and happy hour.

Counselling Service (IITK)

IITK

ACADEMIC MENTOR

August 2016 - July 2017

- Helped students to cope up with academics.
- Took institute level doubt sessions for Fundamentals of Computing course.

Programming Club, IITK

IITK

PROJECT MENTOR

May 2017 - July 2017

- Mentored 20 students in a project Ethical Hacking and Cyber Security.
- Designed a CTF for intra-IITK Science and Technology Championship.