Ayush Agarwal

Third year Undergraduate,
Computer Science and Engineering,
IIT Kanpur.

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Education

Year	Degree	Institute	CPI
2017(Expected)	B.Tech, Computer Sc.	IIT Kanpur	8.6/10
2013	HSCE	St.Anselm's Sr. Sec. School	89%
2011	AISSE	St.Anselm's Sr. Sec. School	10/10

Achievements

- All India Rank **146** in **JEE**-Advanced 2013 given by 0.15 million students.
- **HackCon 2015**, **Runners up** in the nation wide **CTF** organised by IIIT-D.
- **Build The Shield**, Finished 10th in the nation wide **CTF** organised by **Microsoft**.
- **NTSE** and KVPY **Scholar**
- Bronze in **Inter-IIT**(2015) Data Analytics competetion.
- Rank-**1** in International Mathematics Olympiad(IMO) by SOF.
- Among final **35** students selected for **OCSC** Camp for International Physics Olympiad(**IPhO**),2013.
- Cleared Regional Mathematics Olympiad(**RMO**) and National Standard Examination in Astronomy(**NSEA**).
- Secured AIR-**8** in stage-1 National Science Olympiad(**NSO**) by SOF.

Internships

- **Cache Side-Channeling Attacks** *under Prof. Brendan Dolan-Gavitt, NYU Tandon, 2016*
  - Studied different forms of possible Cache Side Channel attacks.
  - Implemented the side channel attack to exploit the AES key from OpenSSL implementation.
  - Proposed and implemented a simple, lightweight and generalised binary search based defense mechanism to detect any known cache-side channel attacks.
- **Online Management Portal** *under Prof. Manindra Agarwal, 2015*
  - Developed the backend **Models** and **Api** in **Scala** using the **Akka's actor model** on top of a minimal framework.
  - Developed a Cookie based **Stateless** Authentication System.
  - Established a cross host overlay network among **Dockers** in a **CoreOS** cluster using **Weave**.
  - Designed and developed the frontend using bleeding edge frameworks like AngularDart, Polymer, etc.

Projects

- **CROC** *under Prof. Purshottam Kar, 2016*
  - Extensively studied state of the art SVMs and cutting plane techniques for multi-label classification.
  - Explored various performance measures like Precision@k, Area Under Curve (AUC), partial AUC (pAUC) and their existing algorithms to gain insight into the existing optimisation techniques for such performance measures
  - Proposed a novel algorithm for optimising Concentrated ROC (CROC) and partial CROC (pCROC), performance measures originating from the field of Bioinformatics for optimising early retrieval
  - Presently running experiments on offline and online learning using the proposed algorithm and aiming for a publication

- **HScraper** *under Prof. Piyush Kurur, 2015*
  - Designed and developed a web crawling and parsing library in **haskell** as part of CS653 project.
  - HTML parser was developed on top of Parsec. Library also has support for parsing malformed HTML using html-tidy.
  - Provides functionalities similar to BeautifulSoup of python.

- **Scala Compiler** *under Prof. Subhajit Roy, 2016*
  - Programmed a Scala to x86 cross compiler with support for basic datatypes, conditional statements, looping statements, arrays, nested functions and recursion.
  - Hosted on https://github.com/agarwalayush/scalaCompiler

- **NachOS** *under Prof. Mainak Chaudhari, 2015*
  - Implemented system calls pertaining to Fork, Exec, Join, Yield, Sleep and Exit for NachOS (a rudimentary OS).
  - Programmed different signal handling methods, process scheduling and page replacement algorithms and evaluated their relative performance.

- **Object Detection and Classification in Traffic Surveillance Video**
  - Extracted regions of interest from the video using image processing algorithms.
  - Experimented with different feature representations of images like HoG and SIFT for training the classifiers
  - Achieved a classification accuracy of 88.8% using Linear SVC as classifier and HoG feature representation.

- **Hotel Recommendation System** *2014*
  - Developed a hotel recommendation based on the customer reviews.
  - Wrote python scripts using **BeautifulSoup** to crawl customer review data from tripadvisor.
  - Used this data for **LDA** to assign rankings to the hotels.

- **Portal for Academic Mentor System for Counselling Service,IITK** *2014*
  - Developed an online portal for better interaction of Counselling Service and academically deficient students. Used **MVC** architecture from a **Codeignitor** (php-framework).

Relevant Courses

Computer System Security	Advanced Operating Systems
Compiler Design	Operating Systems
Computer Organisation	Functional Programming
Algorithms - II	Theory of Computation
Data Structure and Algorithms	Introduction to Databases
Computer Networks	Machine Learning

Technical Skills

Languages	Haskell, Scala, C, C++, Python, Php, Dart, JavaScript, Bash Scripting
Platforms	Linux (Arch Linux, Ubuntu, CoreOS), Windows
Tools	PostgresSQL, Node.js, Angular, docker, weave, vagrant Z3, Git, Sbt