Arham Chopra

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Education

- **Indian Institute of Technology Kanpur** — Kanpur, U.P., India
  Bachelors in Computer Science and Engineering; CPI: 9.7/10* — *Aug 2014 – July 2018*
- **Emmanuel Mission School** — Kota, Rajasthan, India
  Intermediate (+2); Percentage: 95.4/100 — *Aug 2012 – May 2014*
- **Choithram International** — Indore, M.P. , India
  Matriculation; Percentage: 91.8/100 — *Aug 2010 – May 2012*

Scholastic Achievements

- **All India Rank 114** in **IIT-JEE Advanced**, *2014* among 150 thousand students
- **All India Rank 588** in **IIT-JEE Mains**, *2014* among 1.4 million students
- Recipient of **Kishore Vaigyanik Protsahan Yojana Fellowship**, *2014*
- Among **top 1%** in Rajasthan in National Standard Examination in Physics, *2014*
- **National Rank 81** in **National Science Talent Search Examination**, *2014*
- **International Rank 15** in 1^{st} level of National Science Olympiad, *2014*
- Recipient of **Letter of Appreciation** by **UG office**, for commendable academic performance, *2015*

Experience

- **Nutanix** — Bengaluru, India
  Member of Techical Staff Intern — *May 2017 - July 2017*
  - **Kafka Benchmark**: Designed a config based python framework to automate the benchmarking of metrics like CPU and memory usage, throughput rate for **Apache Kafka** through JMX beans and **confluent-kafka-python module**
  - **Kafka Library**: Built a library module to interact with Kafka in terms of message communication through different modes using the confluent-kafka-python module. Also supported management functionality like CRUD operations over topics, safe removal operations over nodes and topics partition rearrangement operations over a cluster
  - **Client APIs**: Implemented bulk and stream APIs for reading data from Kafka via different modes using websockets
  - Received a pre-placement offer at the end of the internship period
- **Elanic** — Bengaluru, India
  Developer Intern — *May 2016 - July 2016*
  - **MongoDB**: Built a **node.js** module to support **ACID** transactions in **MongoDB** including features like **savepoint, commit, rollback** by extending **Mongoose**. Used **Redis**, as in-memory database, to implement functionality of redo logs in **Oracle**, ensuring atomicity and isolation. Supported some **validation checks** for partial consistency
  - **Subsidiary**: Built a **Restify.js** based back-end for Barcode app and designed a website for Elanic Premiere League
- **Indian Institute of Technology Kanpur** — U.P. , India
  Teaching Assistant — *Aug 2017 - Nov 2017*
  - Teaching assistant for the course *Data Structures and Algorithms* under Prof. Sumit Ganguly
  - Invloved in assisting the professor in creating and evaluating assignments, exams for a class of 230 students

Projects

- **Decentralized File Storage System**
  Computer Networks, Prof. Dheeraj Sanghi — *Oct 2017 - Nov 2017*
  - Designed a decentralized storage system that uses client supplied space to store information in a distributed fashion
  - Designed an application layer protocol for communication with clients via upload, download, and copy requests
  - Implemented replication (via copy functionality) during upload to increase availability of data and prevent data loss
  - Added support for addition new client, and authentication for access control of files for the differnt clients

- **Small Variance Asymptotics**
  Probabilistic Machine Learning, Prof. Piyush Rai *Aug 2017 - Nov 2017*
  - Studied a subset of **non parametric bayesian techniques** which are based on **dirichlet process** and its variants.
  - Also studied different sampling-based inference techniques used in extracting data from them like Gibbs Sampling and real-life interpretations like the Chinese Restaurant Process, and the Indian Buffet Process.
  - Studied **small variance asymptotics**, used achieve the inference speed of parametric techniques while retaining features from the non-parametric domains. Implemented some of these techniques in python on toy datasets
- **Almost-C-Compiler**
  Compiler Design, Prof. Amey Karkare *Jan 2017 - May 2017*
  - Implemented minimal features of a **C Compiler** targeting **MIPS Architecture** using python framework **PLY**. Tested the correctness of generated code for programs like quicksort, ackermann, mergesort, etc.
  - Added support for some non-trivial features like **type-checking, type-casting, global and multidimensional arrays, pointers and standard I/O** with terminal
- **Finding Security Flaws in Zoobar Webserver**
  Computer Systems Security, Prof. Sandeep Shukla *Jan 2017 - May 2017*
  - Explored the security flaws like control hijacking, privilege separation for Zoobar Web server in a series of assignments
  - Performed simple attacks like buffer overflow, XSS, CSRF, SQL-injection to gain control over the system
  - Implemented mitigation techniques like stack canaries, server-side sandboxing, privilege and access control
- **RailQuery**
  Principles of Database Systems, Prof. Medha Atre *Jan 2017 - May 2017*
  - Implemented miniature version of Rail Enquiry using the Neo4j Database with static data obtained from railway API.
  - Designed an **ANNE stack** based rail enquiry website, using MVC framework, to answer queries like train between stations, train routes, all directly reachable stations, connecting trains using proper DB structure and indices
- **Delving into UNIX with NachOS**
  Operating Systems, Prof. Mainak Chaudhari *Aug 2016 - Dec 2016*
  - Implemented some parts of the **Standard System Call Library** like fork, join, exec, sleep, exit, etc. in NachOS
  - Implemented and evaluated performance of process scheduling algorithms(UNIX, RR, FCFS, etc) in varying workload
  - Implemented the Virtual Memory and different dynamic page allocation strategies of the UNIX Operating System such as LRU, LRU Clock, FIFO, etc. and evaluating the performance of each on varying workload environments
- **Other Projects**
  - Voice Command Recognition System, Stock Market Prediction, Meetup Scheduler, Introduction to Cryptography, The Pascal's Triangle, The Flying Raptor

Skills

- **Languages**: *Working Knwoledge* C, C++, Python, Bash
  Familiar: JavaScript, Scala, SQL, HTML/CSS
- **Tools and Frameworks**: Git, Vim, Matlab, Octave, LaTeX, Postman, Robomongo, Django, Pytorch, Wireshark
- **Databases and Operating Systems**: MongoDB, Redis, MySQL, SQLite, Neo4j, Windows, Linux

Relevant Courses

Functional Programming*	Modern Cryptography*	Computer Architecture*
Computer Systems and Security	Computer Networks	Operating Systems
Randomized Algorithms	Probabilistic Machine Learning	Compilers
Design and Analysis of Algorithms	Machine Learning Techniques	Theory of Computation
Databases	Visual Recognition	Data Structures and Algorithms

*Currently Ongoing

Extracurriculars & Non-Technical Skills

- 1^{st} prize in **Autodesk Fusion 360 Challenge** in Uttar Pradesh
- 2^{nd} **position overall** as well as in **Embedded** event in 4^{th} **Inter-IIT Tech Meet** representing **IIT Kanpur**
- 2^{nd} and 4^{th} position as well as in 51^{st} and 52^{nd} **Inter-IIT Aquatics Meet** representing **IIT Kanpur** respectively
- Senior Marketing Executive in **Techkriti'16** and Company Coordinator for **Student Placement Office** in 2016-2017