Arham Chopra

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"I have no special talents. I am only passionately curious."

Education

Indian Institute of Technology Kanpur — *Kanpur, India*
Bachelor of Technology in Computer Science and Engineering; **CPI : 9.7/10** — *Aug. 2014 - May 2018*

Emmanuel Mission School Talwandi — *Kota, India*
Intermediate, CBSE; **Percentage : 95.4/100** — *May 2012 - May 2014*

Choithram International School — *Indore, India*
Matriculation, IGCSE, ICE Certificate; **Percentage : 91.8/100** — *May 2010 - May 2012*

Honors & Awards

2015 **Academic Excellence**, Recipient of Letter of Appreciation by UG office — *IIT Kanpur*
2014 **All India Rank 114**, IIT JEE Advanced among 150 thousand candidates nationwide — *India*
2014 **All India Rank 588**, IIT JEE Mains among 1.4 million candidates nationwide — *India*
2014 **All India Rank 177**, Kishore Vaigyanik Protsahan Yojana Fellowship — *India*
2014 **All India Rank 81**, National Science Talent Search Examination among 1 million candidates — *Kota, India*
2014 **Statewise top 1%**, National Standard Examination Physics in Rajasthan — *Kota, India*
2014 **Internation Rank 15**, 1^{st} Level of National Science Olympiad — *Kota, India*

Experience

Nutanix — *Bangalore, India*
Member of Technical Staff Intern — *May 2017 - Jul. 2017*

- 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
- 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
- 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 — *Bangalore, India*
Developer Intern — *May. 2016 - Jul. 2016*

- Built a **node.js** module to support atomic 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
- Built a **Restify.js** based back-end for Barcode app and designed a website for Elanic Premiere League

Indian Institute of Technology Kanpur — *Kanpur, India*
Teaching Assistant — *Aug. 2017 - Nov. 2017*

- Teaching assistant for the course Data Structures and Algorithms under Prof. Sumit Ganguly
- Involved in assisting the professor in creating and evaluating assignments, exams for a class of 230 students

Projects

Decentralized File Storage System — *IIT Kanpur*
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
IIT Kanpur

PROBABILISTIC MACHINE LEARNING, PROF. PIYUSH RAI — *Aug. 2017 - Nov. 2017*

- Studied a subset of **nonparametric bayesian techniques** which are based on **dirichlet process** and its variants.
- Studied different sampling-based inference techniques used in extracting data from them such as Gibbs Sampling, Metropolis Hastings, etc. and real-life interpretations like the Chinese Restaurant Process, and the Indian Buffet Process.
- Studied **small variance asymptotics**, used to achieve the inference speed of parametric techniques while retaining features from the non-parametric domain. Implemented some of these techniques in python on toy datasets

Almost-C-Compiler
IIT Kanpur

COMPILER DESIGN, PROF. AMEY KARKARE — *Jan. 2017 - May 2017*

- Implemented minimal features of a C Compiler targeting the **MIPS Architecture** using the python framework **PLY**. Tested the correctness of generated code MIPS assembly code for programs like quicksort, ackermann, mergesort, etc.
- Added support for features like type-checking, type-casting, global and local multidimensional arrays, pointers and I/O

Finding Security Flaws in Zoobar Webserver
IIT Kanpur

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
IIT Kanpur

PRINCIPLES OF DATABASE SYSTEMS, PROF. MEDHA ATRE — *Jan. 2017 - May 2017*

- Implemented miniature version of rail enquiry website using the **Neo4j** database with data obtained from a 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
IIT Kanpur

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 like UNIX, RR, FCFS, etc in varying workloads
- 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

Voice Command Recognition
IIT Kanpur

SUMMER PROJECT, ROBOTICS CLUB — *Jun. 2015 - Jul. 2015*

- Developed a voice recognition system in **Matlab** and voice navigated a bot under different noise environments
- Employed **MFCC** and **DTW** algorithms with noise filters to recognize vocal commands and perform actions accordingly

Other Projects

Combining Inpainting with Image Translation, Stock Market Prediction, Meetup Scheduler, Introduction to Cryptography,

Skills

Programming Languages	C, C++, Python, Node.js, Scala, Bash
Applications & Utilities	Git, Vim, Matlab, Octave, LaTeX, Postman, Robomongo, Wireshark
Frameworks & Databases	Restify.js, Express.js, Pytorch, Django, Kafka, MongoDB, Redis, MySQL, SQLite, Neo4j

Courses

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

Extracurricular Activity

- 12^{th} and 13^{th} in **ACM-ICPC regionals** in Kanpur, and Gwalior respectively, *2017*.
- 21^{st} in India in the **ACM-ICPC preliminary qualifiers** for onsite round, *2017*.
- 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 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