HIMANSHU **MUNDHRA**

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EDUCATION

Degree	Institute / Board	Year	CGPA / %
B. Tech in Computer Science and Engineering	IIT Kharagpur	2016 - 2020 (Expected)	**9.57 / 10**
All India Senior School Certificate Examination	Birla High School - CBSE	March, 2016	**95.2 %**
All India Secondary School Examination	Birla High School - CBSE	March, 2014	**10 / 10**

INTERNSHIP

Member of Technical Staff Intern at Rubrik, Inc. — Summer'19

The current methods for large data transfer in files or streams were computationally expensive on the host side and slow. Moreover, the data transfer in some products was taking place in a serialised manner, leading to low throughput, especially on the high latency replication links.
My task was to **build from scratch** a **High-Throughput Pipeline-able Data Streaming Library** with a minimal overhead above the TCP to support smooth and fast data flow between two hosts. This library provided support to both **rewindable and non-rewindable** producer and consumers on a **secured duplex channel**.

TEACHING EXPERIENCE

Teaching Assistant for Algorithms-I CS20003, IIT Kharagpur — **Jul'19 - Present**

- Organise tutorials for the students, set practice problems and solve them in the class of 120 along with doubt clearing.

Lecturer at Competitive Programming Workshop, IIT Kharagpur — **Jan'19 - Apr'19**

- Designed and Lectured an Intermediate Competitive Programming Workshop for the students of IIT Kharagpur.

MAJOR PROJECTS

Live Modifiable Server — Ongoing

- Aim to implement a **live modifiable server**, where changes in code are immediately reflected in the running executable.
- A WrapperServer Program ensures that while the modified source code is being restarted in a separate thread, the previous **state of the connection is not lost** and the program begins execution from the paused state.

Multi Target Stance Detection using Graph Convolution Networks — Ongoing

- Aim to **assign a stance to textual data** by a user catering to a particular target or a set of related targets using GCNs.
- **TextGCNs** generate a **multi-layer graph** that will incorporate the user history and comments on the topic of interest.
- Aim to utilise **user background information** to be able to predict their stance in a more accurate manner.
- GCNs Semi-supervised framework allows us to train a small dataset and achieve results similar to full-supervision.

Loadable Kernel Module — Autumn'19

- Created a world-readable and writable user-space interface to the LKM as a file in the **/path/proc** folder.
- The LKM **stores data in a BST** and reads data node by node in each read call in user determined order of tree traversal.
- The LKM **handles concurrency and mutual exclusion of data** from **multiple user-space programs**.

Memory-Resident Unix-Like File System — Spring'19

- Created a **Multi-Level Directory Tree like File System** which supports all Linux-type file commands.
- **Linked List Implementation** where the Free Blocks are a Bit Vector and Data Blocks are maintained in a FAT.
- **iNode Implementation** where the Free Blocks are a Linked List and the File Blocks are maintained in iNodes.

AWARDS and ACHIEVEMENTS

- Holding **InstituteRank 10** among the B.Tech students of the Indian Institute of Technology, Kharagpur — **Sep'19**
- Holding **DepartmentRank 4** among the B.Tech students of the Department of Computer Science & Engineering — **Sep'19**
- **Peak Rating 1977** on CodeChef, **1726** on Codeforces and **Level 7** on InterviewBit — **Sep'19**
- Qualified for **Google Code Jam - Round 2** and **Facebook Hacker Cup - Round 2** — **May'19**
- Acquired a **Rank of 45** in ACM-ICPC Amritapuri-Coimbatore Regionals Onsite Finals — **Dec'18**
- **Awarded** by the Department of Computer Science & Engineering for performance par excellence in 2017 — **Apr'18**
- **Awarded** the Batch of 1985 Scholarship by the Institute for excellent academic performances in 2016-17 — **Mar'18**
- **Changed Department** to Computer Science & Engineering by acquiring an **InstituteRank 9** in the first year — **Jul'17**
- Acquired a **top 1.22%** rank in JEE Advanced-2016 and **top 0.32%** rank in JEE Mains-2016. — **Jun'16**

TERM PROJECTS

Virtual Memory using Demand Paging **Spring'19**

- Created **different modules** such as Master, Scheduler, Processes and the Memory Management Unit (MMU).
- Implemented message passing between modules through **Blocking Synchronous IPC Message Queues**.
- Accessed **Shared Memory** synchronously using **signals & messages** to indicate safe and mutually exclusive access.

Reliable User Datagram Protocol **Spring'19**

- Created a **Static Library** with all required functions for our protocol - socket(), send(), recv(), close().
- Created a **Concurrent Thread** which managed the Receiving of Messages and placed them into the Receive Buffer.
- This Thread also managed the **Acknowledgements and the Re-transmissions** to ensure reliability.

Auditorium and Room Booking System (HOVA) **Spring'19**

- Developed a **Web Application** on Java NetBeans using **JSP and MySQL** to automate room booking in IIT Kharagpur.
- Included dynamic features like submitting/accepting booking request at both the Applicant and Verification Side.

Query Answering over Linked Data (QALD) **Autumn'18**

- Translated **natural language query into SPARQL query** and **retrieved answers** to the query from an **RDF store**.
- Explored various NLP based libraries and frameworks such as Stanford CoreNLP and tried to **relate semantic information** from the **generated parse tree** to be able to **design a SPARQL query to extract answers from DBpedia**.

Restaurant Automation System (RAS) **Spring'18**

- Developed a **Desktop Application** on Java NetBeans using **Swing and MySQL** to automate all activities in a restaurant.
- Tested the software using **JUnit Testing technique** with a **well-rounded test suite** to debug the errors.
- Employed industrial software development techniques including preparing **SRS**, **DFD** and **UML Diagrams**.

Systems Programming **Spring'19 - Ongoing**

- Implemented a rudimentary **Command-Line Interpreter** for Linux on C++ using **forks and pipes**.
- Simulated a **Multi-threaded mutually exclusive deadlock free** Producer-Consumer problem implementation.
- Implemented a **multi-threaded** Sparse-Matrix Multiplication program and analysed change in execution time with number of threads, chunks size assigned to each thread and scheduling algorithms.

Socket Programming **Spring'19 - Ongoing**

- Developed an **iterative FTP Server and FTP Client** following a subset of the File Transfer Protocols.
- Developed a simplistic implementation of a **Peer-to-Peer Live Chat Relay Server**.
- Developed a version of the Linux-Command **$traceroute** using **Raw Sockets** and the **TTL Field** in the IP Header.

OTHER PROJECTS

Web Crawlers - Developed workable web crawlers for CodeChef, InterviewBit and CreateDebate using BS4 and Requests
tinyC Compiler - Wrote a Lexical Analyser in Flex, Semantic Parser in Bison and Machine Independent Code Generator
Machine Learning - Developed a Regression Tool, a Decision Tree Classifier and a Hierarchical Clustering Tool
Natural Language Processing - Implemented N-gram models, POS Tagging and Transition based Dependency Parsing

COURSEWORK INFORMATION

Completed with Laboratory Component: Algorithms I, Software Engineering, Switching Circuits and Logic Design, Computer Organisation and Architecture, Compilers, Operating Systems, Computer Networks, Database Management Systems
Completed: Discrete Structures, Probability and Statistics, Formal Language and Automata Theory, Algorithms II, Knowledge Modelling and Semantic Technologies, Linear Algebra, Machine Learning, Advancements in OS Design, Artificial Intelligence, Natural Language Processing, Object Oriented Systems, Parallel Algorithms, Theory of Computation

SKILLS and EXPERTISE

Languages/ OS : C, C++, Python, UML, MySQL, Java, JSP, LaTeX, MIPS, Windows, Ubuntu
Tools : Git, Netbeans, Swing, VSCode, Sublime Text, Arcanist/Phabrigator, Vim
Libraries : C++ STL, NumPy, Pandas, Matplotlib, Scikit, NLTK, OpenMP, BeautifulSoup, Requests

POSITIONS of RESPONSIBILITY

Tech Lead at CodeClub, IIT Kharagpur **Oct'17 - Present**

- Organised an **HSBC powered Hackathon** in campus for the students of IIT Kharagpur.
- Organised **up.AI**, a one of a kind flagship event solely dedicated to the use of AI for Social Good.
- Organized **Code.Fun.Do**, a Microsoft sponsored hackathon which involved the participation from various institutes.
- **Head - Technical Blogs** on Programming at https://medium.com/@codeclub.iitkgp.

Student Mentor at Student Welfare Group, IIT Kharagpur **Aug'18 - Present**

- **Mentor** to 5 students of the junior batch, act as the first stop for all their academic and personal doubts .