Fenil Gaurang Mehta

Computer Science & Engineering

Indian Institute of Technology, Bombay

203050054

M.Tech.

Gender: Male

DOB: 27-10-1998

Examination	University	Institute	Year	CPI / %
Post Graduation	IIT Bombay	IIT Bombay	2022	9.63
Graduation	Savitribai Phule Pune University	International Institute of Information Technology, Pune	2020	9.14
Intermediate	CBSE	The Orchid School, Pune	2016	88.80%
Matriculation	CBSE	The Orchid School, Pune	2014	9.6

MAJOR PROJECTS AND SEMINAR

- **Improving Smart Contract Computation in Sharded Blockchain** *(Aug'21-Present)*
  *(M.Tech Project, Guide: **Prof. Vinay Ribeiro**)*
    - **Objective:** To increase the allowable smart contract computation on Ethereum in the sharded blockchain setup using Tuxedo protocol without compromising the security
    - As a part of phase 1, understand the working and implementation of Ethereum, Sharded Blockchains, and on-chain protocol Tuxedo which increases smart contract computation time by delaying transaction validation
    - As a part of phase 2, implement the Tuxedo protocol on top of existing sharded blockchain and integrate the implementation with an already built experimental setup and produce the results

- **Ransomware Detection and Recovery techniques** *(Jan'21-May'21)*
  *(M.Tech Seminar, Guide: **Prof. Vinay Ribeiro**)*
    - Literature survey of various ransomware detection and recovery techniques with their limitations
    - Understood weaknesses in existing solutions and reasons behind risk of ransomware which is still prevalent
    - Explored techniques to defend against ransomware

- **Feedforward Neural Network based Chess models** *(Sep'19-Apr'20)*
  *(B.E. Project, Guide: **Prof. Bailappa Bhovi**)*
    - Generated training data from **420K chess games** using distributed computing on about hundred lab computers
    - Developed models which can play chess without performing any state space search using FFNN
    - Understood the strengths and limitations of the developed system and published a research paper

COURSE PROJECTS AND ASSIGNMENTS

- **Simulation of a P2P Cryptocurrency Network in Python** *(Aug'21-Ongoing)*
  *(CS765: Introduction to Blockchains, Cryptocurrencies and Smart Contracts, Instructor: **Prof. Vinay Ribeiro**)*
    - Create a discrete-event simulator for a P2P cryptocurrency network with configurable parameters like number of peers, transaction generation rate, processing speed, network latency, etc.
    - Simulate cryptocurrency related operations like transaction verification, transaction forwarding, block generation, block mining, block forwarding, and maintaining the blockchain
    - Study the blockchain tree for different system parameters using a visualization tool

- **Multi-Threaded Key-Value Store in C++** *(Oct'20-Nov'20)*
  *(CS744: Design and Engineering of Computing Systems, Instructor: **Prof. Umesh Bellur**)*
    - Implemented an efficient and scalable multi-threaded key-value server running over TCP sockets with an LRU cache from scratch which can serve **13K+ requests per second** and provided an API for the same
    - Built a client that accepts user commands and manipulates the key-value database by communicating with the server over sockets using the exposed API
    - Evaluated the performance by measuring response time and throughput for different rates of requests per sec

- **Container using Namespaces and CGroups in C++** *(Mar'21)*
  *(CS695: Topics in Virtualization and Cloud Computing, Instructor: **Prof. Mythili Vutukuru**)*
    - Built a lightweight container with its isolated filesystem, network state, hostname and procfs
    - Added the option to control CPU and memory usage of the container by setting appropriate cgroups
    - Got an insight into the differences between containers and virtual machines

- **Multi-Cycle Processor in VHDL** *(Apr'21-May'21)*
  *(CS226: Digital Logic Design, Instructor: **Prof. Virendra Singh**)*
    - Designed and implemented finite state machine for the control unit, registers, and an ALU which supports addition and *nand* operation for an 8-register 16-bit multi-cycle processor with custom instruction set architecture
    - Understood how a processor executes each instruction using various components like program counter, memory, instruction register, general purpose registers, ALU and some hidden registers

- **Autoscaler using libvirt API in Python** *(Mar'21)*
  *(CS695: Topics in Virtualization and Cloud Computing, Instructor: **Prof. Mythili Vutukuru**)*
  - Implemented an autoscaler which can start/stop virtual machines based on CPU load of running VMs and inform the load balancer in case of a VM failure
  - Allowed the user to configure thresholds for CPU high/low load and time for which the load should be above/below the threshold before taking any action
  - Plotted real time CPU load graph for all running virtual machines

OTHER RELEVANT WORK

- **Context Search Tool** *fms* *(Apr'21-Aug'21)*
  - Developed a command line searching tool like a search engine to find data from local files based on keywords and regex which highlights matches with multiple colours to make the results more interpretable
- **Google Summer of Code student with OSGeo** *(May'19-Aug'19)*
  - Ported MapMint project from python2 to python3, fixed library dependencies, performed basic testing, updated the installation scripts and wrote a detailed report of all the progress; Worked with 20000+ lines of code
- **Optimize Sorting of Array of large objects** *(Aug'18-Aug'19)*
  - Devised an algorithm in C++ to perform sorting of in-memory array of large objects with N swaps only
  - Performs **faster** than $std :: sort$ (**2.98 times**) and seven other well known sorting algorithms
- **Three Android Apps on the Play Store** *(2016-2020)*
  - Empty Folder Cleaner (**2.8M+ downloads**), Rootify (**320K+ downloads**) and Math Practice (7K+ downloads)
  - Designed the applications and their features with ease of use in mind
  - Created a custom algorithm to search for empty folders without deleting them

MAJOR COURSES TAKEN

Algorithms and Complexity	Design and Engineering of Computing Systems
Foundations of Machine Learning	Topics in Virtualization and Cloud Computing
Critical Thinking for the Digital Age	Advanced Network Security and Cryptography
Introduction to Blockchains, Cryptocurrencies and Smart Contracts ^{ongoing}	

POSITIONS OF RESPONSIBILITY

- **Teaching Assistantship** for **CS101**: Computer Programming and Utilization *(Oct'20-Mar'21)*
  *(Instructors: **Prof. Bhaskaran Raman** and **Prof. Kameswari Chebrolu**)*
  - Mentored 24 students, resolved their doubts, conducted weekly theory and practical sessions
  - Assisted instructors in evaluating lab assignments and projects
- **Teaching Assistantship** for **CS780**: Critical Thinking for the Digital Age *(Jul'21-Present)*
  *(Instructor: **Prof. Om Damani**)*
  - Assist instructor in grading assignments, projects, quizzes and exams

TECHNICAL SKILLS

- **Programming Languages**: C++, Python, Golang, Shell script, Awk, SQL
- **Tools and Technologies**: Vim, CLion, PyCharm, Git, LaTeX

ACHIEVEMENTS AND EXTRACURRICULAR ACTIVITIES

- Secured **Department Rank 2** out of 130+ students in M.Tech Computer Science and Engineering *(2020-21)*
- Secured **All India Rank 112** amongst 97481 students in GATE (CS) with two months of preparation *(2020)*
- Ranked **First** in the department in Semester 3 of B.E. with an **SGPA** of **9.36** *(2017)*
- **Winner** of Codestorm Competition conducted in my B.E. college *(2019)*
- **Winner** of Code-Blooded Competition conducted in my B.E. college *(2018)*
- Won **Institutional Scholarship** for excellent Merit Score in the MHT-CET entrance exam *(2016)*
- **Participated** in National Level Inter-Engineering Sports Meet for **Badminton** *(2017)*
- Completed **Portrait Sketching** course organized by Institute Cultural Council *(2021)*

INTERESTS AND HOBBIES

- Reading
- Badminton, Volleyball, Any team sport
- Developing custom applications to avoid repetitive work