OMAR EQBAL

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RESEARCH INTERESTS

Operating Systems, Computer Architecture, Computer Networks

EDUCATION

- **Cornell University** **2024 - Present**
  Ph.D., Computer Science
  Advisor: Prof. Rachit Agarwal

- **Indian Institute of Technology (IIT) Kharagpur** **2016 - 2021**
  Dual Degree (B.Tech + M.Tech), Computer Science and Engineering
  CGPA: 9.87/10   (Prime Minister Gold Medalist)

WORK EXPERIENCE

- **Member of Technical Staff 2 & 3 | Nutanix, Bangalore** **July 2021 - July 2024**
  - Worked on developing software for deploying and managing applications in a hybrid cloud.
  - Migrated a microservice and the model layer written in legacy Python code to Golang with optimizations, leading to significant performance improvements.
  - Developed a log monitoring tool allowing to trace requests across multiple microservices.

SELECTED PROJECTS

- **Dynamic Page Configuration in Tiered Memory Systems** **Sept 2024 - Present**
  - The project aims to dynamically decide page size - hugepage or basepage - and page placement across different memory tiers in a tiered memory system.
  - As hugepages reduce address translation overhead and basepages allow packing hot pages in the fast tier, we plan to design a system which optimally performs page splitting, merging and migration to improve application performance.

- **Distributed Collaborative Editor | Github Link** **March 2021 - April 2021**
  - Developed a distributed system for allowing multiple users to simultaneously work on a single document.
  - Utilized operational transformation to maintain the consistency of documents.
  - Implemented passive replication, crash detection, and recovery handling after crash to make the system fault tolerant against crash faults.

- **Super Resolution in Live Streaming System | Github Link** **Sept 2020 - April 2021**
  - Developed an end-to-end player using an existing super-resolution framework and added optimizations to reduce inference time and computation resources.
  - Evaluated a super-resolution model for frame quality, processing time, and computation resources used.
  - Formulated a scheduling problem and proposed a solution for collaborative video streaming where multiple clients download video segments and apply super-resolution.

- **Keyword and Image based Search | Github Link** **Sept 2020**
  - Developed a web application for searching using keywords and images and getting the relevant news articles.
  - Implemented create, insert, and search for R-Tree for storing the images in histogram representation.
  - Search was implemented by first filtering based on keywords using TF-IDF and then finding similar images using K-NN in the filtered articles.

- **Loadable Kernel Module** | <u>Github Link</u>   **Aug 2019**
  - Developed a Loadable Kernel Module for storing user data in a binary search tree inside kernel space and exposing different interfaces to manipulate the data.
  - Handled concurrency and separate data from multiple user processes.

- **Reliable Communication over Unreliable Links** | <u>Github Link</u>   **March 2019**
  - Implemented a message-oriented, reliable, exactly-once delivery communication layer over UDP sockets using timeout and retransmissions.
  - Provided APIs for the implemented socket, which can be used from the user application.

- **Virtual Memory Simulation** | <u>Github Link</u>   **March 2019**
  - Designed a simulation of virtual memory management system using demand paging.
  - Implemented page-fault handling module with page table and TLB using LRU replacement algorithm.
  - Developed a scheduler module that maintained a ready queue for scheduling processes.

AWARDS AND ACHIEVEMENTS

- Recipient of **Prime Minister Gold Medal**, awarded for obtaining **Institute Rank 1** among the graduating Dual Degree students across all departments.   2021

- Awarded **Institute Silver Medal** for having **Department Rank 1** among the graduating Dual Degree students of the Dept. of Computer Science and Engineering.   2021

- Awarded **Prof. J. Das Cup** for outstanding academic performance among the outgoing students.   2021

- Acknowledged by the Dept. of Computer Science and Engineering for **performance par excellence**.   2018

- Shortlisted for **Goralal Syngal Memorial Scholarship** for academic excellence at the end of first year.   2017

- Qualified for **KVPY** Fellowship, awarded by the Dept. of Science and Technology, Govt. of India.   2015

- Recipient of **NTSE** scholarship, awarded by NCERT, Govt. of India.   2012

EXTRA CURRICULAR ACTIVITIES

- Teaching Assistant, Database Management Systems (CS43002)   Jan 2021 - April 2021
- Teaching Assistant, Theory of Computation (CS41001)   Sept 2020 - Dec 2020
- Mentor, Student Welfare Group   Aug 2018 - April 2019
- Tech Team Head, Spring Fest 2019   May 2018 - April 2019