Talha Waheed

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Education

University of Illinois Urbana-Champaign 2022 – Present
PhD, Computer Science *Advisors: Brighten Godfrey and Radhika Mittal*

Lahore University of Management Sciences (LUMS) 2018 – 2022
BS, Computer Science

Publications

Multi-party Load Balancing in the Cloud
Talha Waheed, Sachin Ashok, Brighten Godfrey, Radhika Mittal, and Rayadurgam Srikant.
Under submission.

Coal Not Diamonds: How Memory Pressure Falters Mobile Video QoE
Talha Waheed, Zahaib Akthar, Ihsan Ayyub Qazi, and Zafar Ayyub Qazi.
ACM CoNEXT 2022.

Research Projects

Multi-party Load Balancing in the Cloud
Advisors: Brighten Godfrey and Radhika Mittal

- Identified performance inefficiencies of cloud application load balancers.
- Designed *MPLB*, a global load-balancing solution that optimizes performance, reduces load imbalance across the cluster, and ensures cluster-wide fair resource distribution.
- Addressed critical challenges in global load balancing, including fast and dynamic adaptations to changing workloads, ensuring compatibility with diverse heterogeneous applications, and enforcing stable fair shares of resource allocation across the cluster.
- Implemented *MPLB* on *Envoy*, deployed it on *Kubernetes*, and evaluated it on a comprehensive sweep of possible topologies and load distributions on both microservice-based and monolithic applications.

Impact of Memory Pressure on Mobile Video Streaming QoE
Advisors: Zafar Qazi, Ihsan Qazi, and Zahaib Akhtar

- Performed a user study of memory usage patterns through `SignalCapturer`, an IRB-approved, privacy-compliant Android application I developed.
- Measured mobile video QoE under memory pressure by creating video playback server setups through DASH and Exoplayer, and developing a remote Node.js server to apply and persist memory pressure on the device.
- Analyzed system-level traces using Perfetto and found that frequent CPU preemption by the disk I/O daemon `mmcqd` and increased CPU usage by the memory reclaim daemon `kswapd` reduced CPU availability for video playback, degrading video performance under memory pressure.

Teaching Assistantships

Cloud Networking | Prof. Brighten Godfrey Spring 2025
Network-Centric Computing | Prof. Zafar Qazi Spring 2022
Data Structures | Prof. Ihsan Qazi Spring 2021

Notable Technical Skills

Languages: C, C++, Go, Python, JavaScript, Java
Frameworks/Libraries: Kubernetes, Istio, Envoy, Gurobipy, Android Studio, FFmpeg

Awards

Sohaib and Sara Abbasi Computer Science Fellowship | University of Illinois Urbana-Champaign Aug 2022
Award of High Distinction | LUMS May 2022