



Education

North Carolina State University

Aug 2018 – July 2023

- *PhD, Computer Science. GPA: 3.4/4 (Expected May 2023)*
- Research Title: “Stable and deterministic multithreading for Internet of Things.”

Lahore University of Management & Sciences (LUMS), Pakistan

Aug 2015 – June 2017

- *MS, Computer Science*
- Relevant Coursework: Adv. Operating Systems, Distributed Computing, Interactive Computing, Computer Architecture.

Employment

Graduate Research Assistant

NC State Uni. - Raleigh, NC, US

Aug 2018 – Present

- Evaluating the energy & execution time overheads due to stable & deterministic multithreading in IoT benchmark applications.
- Built software to collect and predict the spatiotemporal supply, demand, & trip pricing of 10 ridesharing services (e.g., Uber and Lyft) for various cities around the world, assisting drivers/passengers to avoid competition and long waiting times (*Python3, Web APIs, Fiddler, and Postman*).
- Develop a tool to identify supply and demand trends of e-scooter-share services in the US/Europe to boost platform revenues by identifying the high demand zones. (*Python3, Web APIs, Charles Proxy, and SSL unpinning*)

Software Engineer Intern

GS Health Apps - Raleigh, NC, US

May 2021 – Aug 2021

- Designed & developed the dynamic pricing algorithm, demand prediction model, and respective web APIs for **Carefiller** - the gig-economy mobile apps for healthcare providers - <https://carefiller.com> (*PHP, HTML, JS, Web APIs, and Postman*).

Teaching Assistant

NC State Uni. - Raleigh, NC, US

Aug 2018 – Present

- *Graduate Teaching Assistant*: Internet Protocols, Theory of Automata, Concepts & Facilities of Operating Systems.

Research Intern

LUMS - Pakistan

Jan 2016 – Mar 2018

- Quantify the effectiveness of digital exergames by designing, implementing, and evaluating a set of 12 exergames for post-stroke rehabilitation. (*C#, Unity 3D, MS Kinect V2*)
- Develop the android and iOS face filter applications with cultural embellishments. (Unity3D, Android SDK, Xcode, HTML, JavaScript, and PHP). Available at: <https://tinyurl.com/5m2kydpa>
- Study the problem of state retention in transiently-powered IoT devices by designing, implementing, and evaluating an efficient checkpoint/restore solution for IoT devices. (*nesC, Tiny OS, TMote Sky*)

Projects

- **Gender Bias in TVCs**: Utilize deep learning to identify the gender and age of artists in 10k TV commercials (*Python*)
- **Demand Paging**: Implement priority scheduling and demand-paged virtual memory in Xinu OS. (*C, Xinu OS*)
- **Log Structured File System**: Implement a prototype of LFS using the existing system call interfaces (*C, FUSE*)
- **Virtual Training**: Digitize the 6th grade syllabus for physically challenged students. (*C#, LeapMotion, Unity3D*)
- **TISE API**: Build an API enabling easy integration of Unity3D with Arduino, paving a way for dynamic and immersive exergames. (*Javascript, C#, C*)

Publications

- “Understanding and Reaching the Performance Limit of Stable Synchronization Determinism” (Under review).
- “Ridesharing Services Around the World: A Comparative Analysis of Availability and Surge Pricing” (Under review).
- “A Comparative Study on the Effectiveness of Adaptive Exergames for Stroke Rehabilitation in Pakistan.” CHI 2018.
- “Incremental Checkpointing for Interruptible Computations.” SenSys 2016

Skills

- **Languages**: Python, C, C++, Java, PHP, SQL, JavaScript, \LaTeX .
- **Technologies & Platforms**: GitHub, Web APIs, AWS, IMAP, Android SDK, Postman, Fiddler, Unity3D, MS Kinect.