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Hassan Iqbal

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Education

North Carolina State University, Raleigh, North Carolina, USA **Aug 2018 – present**

- Ph.D. in Computer Science *(Expected May 2023)*
- *Research Areas:* Cloud Computing and Gaming, Deep Learning, Networking and Performance Evaluation
- *Courses:* Design and Analysis of Algorithms, Operating System, Performance Evaluation, Advance Internet Protocols

Lahore University of Management Sciences (LUMS), Pakistan **Aug 2016 – May 2018**

- M.Sc. in Electrical Engineering
- *Course:* Topics in Internet Research, Operating System, Probability and Random Processes, Numerical Analysis

Experience

Research Assistant **NCSU** **Aug 2018 – Present**

Cloud Gaming: Characterize and enhance the quality of service/experience of cloud gaming platform- Google Stadia

- Develop a lightweight chromium module for streaming and networking data extraction and identify bitrate adaptation parameters that degrade bitrate by 5 times and frame-rate by 2 times *(C, Python3, Chromium, WebRTC, QUIC, FFmpeg, usbmon)*
- Design, implement a deep-learning video-frame analysis technique to extract frames of interest with 95% accuracy *(TensorFlow)*

AWS Network Measurement: Analyze the availability and latency of AWS network for elastic compute cloud and serverless

- Build a large-scale longitudinal measurement system for 210 region pairs/ 244 availability zone pairs while identifying several cases of cloud unavailability and latency spikes on AWS network infrastructure *(Python3, C, AWS, Cloud formation, Serverless Lambda, Kubernetes, BPF)*
- Use long short-term memory (LSTM) to predict packet losses with 92% accuracy *(TensorFlow)*

Spam Political Biases: Model and evaluate political biases in spam filtering algorithm of Gmail, Outlook, and Yahoo *(Python3, C++, IMAP, Selenium WebDriver)*

Research Assistant **LUMS** **January 2017 – May 2018**

Scylla: Develop a software control layer on contiki-OS, interleaving multiple wireless stacks such as 6LoWPAN/Bluetooth 4.2 on a single radio, with priority-scheduling for multiple traffic types, to achieve near stack-native performance while simultaneously offering both wireless stacks *(C, Contiki, Time-Slotted Channel Hopping, TI SensorTag CC2650)*

- Deliver a talk on challenges of wireless heterogeneity in IoT and emerging opportunities at COMSYS, RWTH Aachen, Germany

Software Engineer **Netsol Technologies** **March 2013 – August 2015**

- Pursue front-end development and release of a consumer lease calculation engine for auto-financing industry *(C#, SQL, SVN)*
- Lead on optimizing performance and bug fixing on a live asset financing application

Project Engineer **Alstom Grid** **July 2012 – December 2012**

- Lead a team of 5 for deployment and commissioning of telecom infrastructure in 14 power/grid stations and designed primary and backup routing plan for voice and data of 30+ sites of the national grid of Pakistan *(SDH, NEC PABX, AREVA PLC)*

Projects

- **Multi-Server Queuing System:** Implement a simulator for M/M/m and M/G/m system and evaluate their performance for First Come First Serve and Shortest Job First service disciplines *(Python3)*
- **Web-Server**: Develop a web-server simulator, with multiple I/O disks, for queuing service disciplines First Come First Serve, Shortest Job First, and Priority Preemptive/Non-Preemptive, and evaluated on 10 million requests *(Python3)*
- **Blockchain in IoT:** Design prototype for access management in IoT using permissioned blockchain with PBFT (python)
- **Ramdisk:** Implement a virtual disk drive using system call interface of filesystem in userspace *(C, FUSE)*
- **User Shell:** Develop a shell command interpreter with parsing, I/O redirection, command execution, and signal handling *(C)*
- **Thread Library:** Implement a user-level threading library supporting create, yield, join, and exit operations *(C)*
- **Smart Energy Metering:** Design and implement a complete smart energy metering system involving data acquisition, concentration, transmission over GSM link to base station, and bill generation *(C, C#, SQL, Zigbee, GSM)*

Publications

- Characterizing the Availability in AWS Network from the Perspective of Tenants *(Under review in PAM 2021)*
- Characterizing the Biases in Spam Filtering Algorithms of Gmail, Outlook, and Yahoo During the US Elections 2020 *(Under review in WWW 2021)*
- Interleaving Multiple IoT Stacks on a Single Radio *(ACM CoNEXT 2018)* [DOI]
- Taming Link-layer Heterogeneity in IoT *(ACM SenSys 2017)* [DOI]

Technical Skills

- **Languages:** Python, C, C++, SQL, C#, LaTeX
- **Technologies & Platforms:** AWS, Cloud formation, Serverless Lambda, Kubernetes, Docker, Linux, GitHub, SVN, TensorFlow, Keras, NumPy, Pandas, MatplotLib, Visual studio, Eclipse, WebRTC, FFmpeg, BPF, ns-3, netem, Web APIs, IMAP