Bilal Naeem

765-746-9359 | bilalnaeemcs@gmail.com | linkedin.com/in/thebilalnaeem | github.com/bilalnaeemcs

Education

Purdue University, IN Aug 2024

Master of Science in Computer Science; GPA: 3.76

- Relevant Courses: Operating Systems, Compilers, Software Engineering, Network Security, Software Security

Lahore University of Management Sciences (LUMS), Lahore May 2021

Bachelor of Science in Computer Science; GPA: 3.62 (Dean's Honor List, Distinction)

- Relevant Courses: Data Structures, Deep Learning, Algorithms, Databases, Distributed Systems

Technical Skills

Languages: C, C++, Python, Go, Javascript, Rust, SQL
Frameworks: Git, LLVM, RESTful API, eBPF, Glibc, Unity, .NET, QT
Systems: Linux, Unix, QEMU/KVM, VT-x, Kubernetes, Docker, AWS

Professional Experience

Purdue Reliable and Secure Systems Lab, IN June 2021 – Dec 2023

Software Engineer

- Led a team to achieve low-latency initialization of hardware-accelerated virtual machines.
- **Reduced VM clone time to 20ms** for QEMU/KVM using in-memory snapshots and smart copying of page tables.
- Contributed to **open-source** development and upstream integration of On-Demand Fork feature for Linux Kernel.
- Developed a system improving AFLGo's ability to reproduce bugs by up to **200x** and identifying **7 additional bugs** across **38 real-world applications**.
- Reduced pagefault overhead by 6x in fuzz testing via dirty page tracking and memory redirection.

LUMS Internet Security and Privacy Lab, Lahore Aug 2019 – June 2021

Software Engineer

- Developed a framework for automated playthrough and security testing of Android applications. Identified security and privacy breaches in **100** Android applications.
- Designed comprehensive tutorials on advanced automation, scraping and security paradigms for lab members.
- Contributed to an automated benchmarking system for software debloating tools: solved **two** critical bugs in system, benchmarked multiple state of art debloating tools.

Softronix, Lahore Dec 2019 – Feb 2020

Software Engineer

- Developed server-side APIs and Windows services for a Enterprise Sales Application in C#/.NET, used by over **150,000** users.
- Spearheaded integration of newly built APIs with company's legacy SQL database.

Projects

VR Fitness App | C#, Unity, LLM, AI April 2024 – May 2024

- Improved concordance of VR Fitness app with realtime progressive overload in participants.
- Incorporated ChatGPT to prompt and increase user motivation by **50%**

On-Demand Fork for High-Performance Virtual Machines | QEMU/KVM, Kubernetes, C, Go Aug 2021 – Dec 2023

- Reduced VM clone time by 98%, enabling fast deployment of VM-based pods in Kubernetes.
- Developed a customizable GDB script for real-time debugging, improving debugging efficiency by 10x.

SmartFork | C++, LLVM Aug 2021 – Dec 2023

- Integrated memory optimization features to reduce page fault overhead and improve fuzzing throughput by 6x.

Accelerating Failure Reproduction through Augmented Fuzzing | C, Python, Bash, AFLGo April 2022 – Nov 2023

- Developed a system that enhanced AFLGo's efficiency in generating failure-inducing inputs by 9-200x.
- Automated testing and data collection, reproducing failure inputs in over 90% of real-world applications.

Madadgaar | Javascript, React, Firebase, Firestore, Fullstack May 2020 – Aug 2020

- Developed a platform connecting hospitals and blood banks, facilitating over 100 successful blood donations.
- Managed a team using Agile methodologies, resulting in a 2x increase in user engagement.

Recollect: Accelerating Production Failure Reproduction through Augmented Fuzzing
Authors: Hanze Zhang, Congyu Liu, **Bilal Naeem**, Pedro Fonseca
(Under Submission)