

# Syed Shahrukh Hussain

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## SUMMARY

As an experienced engineer, I excel in **C/C++(11)**, **Python(7)**, **PHP(7)**, **Java(4)**, **C#(2)**, **JavaScript(7)**, and **Node.js(2)** for firmware and application software development across **ARM, x86, and x86-64** platforms, including **Linux, Windows**, and RTOS (**Nucleus, FreeRTOS, Thread X**). My skills extend to **TCP/IP, USB, I2C, SPI, Ethernet, NAS, SIP and USIM** protocols. Hands-on in utilising **Raspberry PI, Beaglebone, STM32** and **ESP32**. IoT gateway design using **ZeroMQ** and **MQTT**. I am proficient in **MySQL, MSSQL, PostgreSQL**, and **Redis, ETCD, Kafka** for robust data management. I leverage **Eclipse, Visual Studio GDB**, follow **MISRA** standards, and use **Git, Perforce, SVN** for effective version control. I have developed pipelines for code analysis (**Valgrind, PCLint, Clang**) and unit tests using **GoogleTest**. Additionally, I am skilled in **TensorFlow**, and **OpenCV**, enabling me to integrate machine learning capabilities seamlessly into projects.

## EXPERIENCE

### Principal Software Engineer (Firmware)

Jan 2023 - Jan 2024

[Aircod Technologies](#)

- Develop 4G/5G traffic decoding and statistical analysis android firmware using C/C++.
- Using Android SDK, build parser and engine for control plane and data plane traffic capturing and analysis, including RRC/L3, RACH, Paging, VoLTE/VoNR, and SIP.
- Create Java native API for android application using adb bridge reverse TCP.
- Write unit tests and functional tests using GoogleTest.
- Implemented throttling based on USB current usage profiling to optimise battery consumption by managing power-intensive tasks.

### Staff Engineer (Firmware)

Aug 2021 - Dec 2022

[U-Blox](#)

- Develop 4G LTE modem embedded firmware using C/C++.
- Developed NAS PLMN (3GPP 24.301) to identify and select the appropriate mobile network for registration and communication.
- Contributed to AT Terminal (3GPP 27.007) commands development.
- Worked on improvement of cell search (band scan) and cell reselection for mobile registration with MME.
- Write unit tests and functional tests using Cpputest.
- Pioneered open-source implementations for mobile device Subscription Concealed Identifier (SUCI) computation, pushing boundaries in security and privacy.

### Principal Software Engineer

Feb 2021 - Dec 2022

[Aircod Technologies](#)

- Develop high performance software using C++.

- Designed and developed IoT solutions using Kafka, Etcd, ZeroMQ, PostgreSQL, REST, and Docker.
- TCP/IP data ingest client development and enhancement.
- Write unit tests and functional tests using GoogleTest.
- Developed GitLab CI/CD pipelines for build, testing, and deployment.
- Engaged Linux USB driver development using Libserial and [libusb](#) on Raspberry PI.
- Improved C++ scheduler efficiency(throughput, memory and battery usage) using callgrind profiling.

### **Principal Software Engineer**

Apr 2020 – Nov 2020

[Afiniti](#)

- Developer high performance software using C/C++.
- Develop multithreaded algorithms using Linux system shared memory.
- Micro services programming.
- Develop high availability TCP (mesh network) / UDP (multi-casting) cluster node failover recovery daemon surpassing industry standards in functionality and reliability.
- Integrate Java applications with C++ using JNI.
- Integrated Watchdog with OpenSIPS for failure detection.
- Write unit tests and functional tests using GoogleTest.
- Developed a fast algorithm to minimise call recovery after failover.

### **Application Engineer**

June 2019 - Feb 2020

[AMD](#) (formerly Silexica GmbH. A Xilinx Company)

- Designed and developed C++ applications and algorithm demos for C++ run time performance enhancement products.
- Conducted analysis of High-Level Synthesis (HLS) C/C++ designs.
- Authored a white paper on C++ algorithm speedup through FPGA using HLS.
- ROS 1 and ROS 2 analytics platform development.
- AWS based automation script in python to build virtual machines and compile and configure real time Linux and install ROS analytics package from S3 to provide a cloud platform startup kit.

### **Staff Engineer (Firmware)**

May 2017 - June 2019

[U-Blox](#)

- Develop 4G LTE modem embedded firmware using C/C++.
- Developed NAS EMM (3GPP 24.301) attach, detach and tracking area update (TAU) procedures.
- Contributed to AT Terminal (3GPP 27.007) commands development.
- Participated in USIM/USAT (3GPP 31.111) development and conformance.
- Bearer Independent Protocol development using TCP sockets.
- 3GPP NAS procedures testing using Python.
- Write unit tests and functional tests using Cpputest.
- Developed an integration layer framework to communicate between two CPU cores for U-Blox LTE module using shared memory and message queues.

## **Technical Lead (Firmware)**

March 2013 - May 2017

[Siemens Digital Industries Software](#) (formerly Mentor Graphics)

- Develop a real time operating system (RTOS) using C/C++.
- Low level I2C, SPI and UART driver interfacing and JTAG debugging.
- Develop Nucleus RTOS TCP/IP application protocols like FTP, Secure FTP, HTTP and DHCP.
- Contributed to Nucleus RTOS FAT (File System) development.
- IoT gateway development and porting to Nucleus RTOS. MQTT client porting with native TCP/IP stack on Nucleus.
- Secure protocol development for FTP using wolfSSL open source library. This involved implementing the RFC for SFTP and testing with popular FTP clients.
- Hardware cryptography integration for STM32 embedded devices using wolfSSL.
- Firmware debugging on Beaglebone SBC.
- File system enhancement and VFS integration. DHCP feature enhancement.
- Protocol testing using Python scrapy.
- Full stack development and DevOps for Sourcery CodeBench release system using JavaScript, Python, Ruby, Java, MySQL and AWS.
- Provide Nucleus RTOS openssh porting enhancement that improved secure file system capability on a constraint device.

## **Software Engineer**

Mar 2004 - Dec 2012

Abydeen Business Consulting

[Sigmatec Solutions Private Limited](#)

[University of Management & Technology](#)

Universal Telecom Company

- Desktop WIN32 / MFC and embedded software development using C/C++.
- UART driver development and usb block data streaming using TCP/IP socket programming.
- Linux Kernel module enhancements.
- Full stack development using PHP, Python, C#, Java, JavaScript, JQuery, MySQL SQL Server and PostgreSQL.
- Developed client software for World Telecom Labs IPNx VOIP switch.
- Managed Windows RAID 5 servers.

## **EDUCATION**

### **MSc (Computer Science) 3.98 GPA**

Virtual University of Pakistan, 2016 - 2018

### **Master of Business Administration**

University of Adelaide, Australia, 2006 - 2007

### **BSc Honors (Computing) with Distinction**

Staffordshire University, UK (APIIT Malaysia), 2001 - 2004

## **CERTIFICATIONS**

- Oracle 8 Certified Database Administrator
- Certified Six Sigma Green Belt.