Seyed Amir Alavi| Embedded Systems Engineer

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Professional Experience

May 2018– Present, Firmware Engineer
Voltaware, London, United Kingdom

- Developed firmware in C for smart meters with WiFi and 3G/4G cellular communication.
- Optimized the DSP algorithms for power metering operation and appliance detection.
- Designed a continuous integration (CI) pipeline for automated unit and integration testing.
- Managed customer requested variations of smart meters with white-labeling as the product owner.
- Implemented security measures for meter tampering-detection and security of communication.
- Applied test-driven development (TDD) method into firmware development using Unity.
- Designed test-benches for performance validation of DSP algorithms and device quality assurance.
- Designed a secure over-the-air (OTA) process for selective and batch remote firmware upgrades.
- Worked with AWS IoT Core and Thingsboard IoT management frameworks.
- Developed ML models using TensorFlow lite for microcontrollers using Jupyter and Pandas.

Jul 2015 – Sep 2017, Embedded System Designer
Gostaresh Hararat Matboe Nour (GHMN), Tehran, Iran

- Designed a low-cost building management system (BMS) based on OpenHAB.
- Designed ethernet-based controllers with multiple digital and analog I/Os in Altium Designer.
- Managed the production line from PCB fabrication and assembly to quality assurance.
- Developed firmware in C++ for AVR and ESP8266 processors with ENC26J60 ethernet controller.
- Designed HMI panels using Raspberry Pi computing module with parallel RGB interface.
- Developed GUI interface of HMI panels using Qt/QML with EGLFS support using Raspbian.
- Provided teaching courses for installers of the products.

Sep 2014– May 2015, Embedded Software Developer
Pouyesh Samtech Fartak, Tehran, Iran

- Developed packet sniffing and processing tasks for layer L3 managed network switches.
- Developed unidirectional link detection (UDLD) mechanism.
- Developed DHCP snooping and Dynamic ARP Inspection controllers.
- Worked with libtins library to test the security controllers of the produced network switches.

Skills

- Embedded C programming in VSCode, Eclipse with BARR-C:2018 and MISRA C coding standards.
- Test-driven development (TDD) and unit-testing based Unity and CppUTest
- Working knowledge of C++11 object-oriented programming, SOLID principles, and design patterns.
- Multi-threaded programming with FreeRTOS, MbedOS.
- Software release and containerization using Docker and Docker Compose.
- Control system design and simulation in MATLAB/Simulink
- Bash and Python scripting in Linux environments.
- Make and CMake automated build systems.
- Schematic and PCB design in Altium Designer, and Circuit Maker.
- Design microcontroller-based devices based on AVR and ARM processors (Cortex M3/4/7)
- Firmware development for SPI, UART, and I2C communication interfaces.
- STM32F103/107/429, ESP32, ESP8266, and MW320 WiFi/BT microcontrollers.

- Git version control system and CI/CD using Gitlab
- Experience with embedded ML using TensorFlow lite for microcontrollers.
- Working knowledge of Qt/QML GUI design for Linux devices using Raspberry PI computing module.
- Familiar with embedded Linux and building images from source using Buildroot.
- Familiar with Linux device driver architecture and character device drivers.

Education

Ph.D. ***Electronics Engineering (Full Scholarship),***
Queen Mary University of London, London, UK, September 2017 - March 2021 (Expected)

MSc. ***Control Systems Engineering*****,**
Shahid Beheshti University, Tehran, Iran, September 2014 - May 2017

BSc. ***Electrical Engineering - Power Network Transmission and Distribution*****,**
Power & Water University of Technology, Tehran, Iran, September 2009 - September 2013

Academic Experience

- Research Assistant, Queen Mary University of London, London, United Kingdom, 2020
  Title: Hybrid sources powered microgrids for remote areas using aged Li-ion batteries, UKRI GCRF.
- Teaching Fellow, Queen Mary University of London, London, United Kingdom, 2020
  Course: Advanced Control Systems, Semester 2019-20.
- Research Assistant, Queen Mary University of London, London, United Kingdom, 2018
  Title: Distributed and networked control of microgrids/nanogrids, EPSRC.
- Research Project, Shahid Beheshti University, Tehran, Iran, 2016
  Title: Design and development of a multi-color industrial 3D printer for large objects.
- Research Project, Shahid Beheshti University, Tehran, Iran, 2013.
  Title: Real-time substation distributed control system (DCS) simulator based on IEC 61850.
- Research Project, Power & Water University of Technology, Tehran, Iran, 2012
  Title: Power transmission line wiring design software based on IEEE standards.

Publications

My most cited recent publications are listed as follows. For a complete list of my publications please refer to my Google Scholar profile.

- Alavi, Seyed Amir, Xiaomiao Li, and Kamyar Mehran. Chapter: "Delay resilient networked control with application to microgrids.", Book: Control Strategy for Time-Delay Systems: Part II: Engineering Applications 2020, Publisher: Academic Press.
- "Optimal Observer Synthesis for Microgrids With Adaptive Send-on-Delta Sampling Over IoT Communication Networks" IEEE Transactions on Industrial Electronics, 2020.
- "A distributed event-triggered control strategy for DC microgrids based on publish-subscribe model over industrial wireless sensor networks." IEEE Transactions on Smart Grid, 2019.
- "Microgrid Optimal State Estimation Over IoT Wireless Sensor Networks With Event-Based Measurements." IECON 2019-45th Annual Conference of the IEEE Industrial Electronics Society, IEEE, 2019.
- "A Distributed Control Strategy with Fractional Order PI Controller for DC Microgrid" 2019 Smart Grid Conference (SGC), IEEE, 2019.
- "Voltage control in LV networks using electric springs with coordination." 2018 IEEE Canadian Conference on Electrical & Computer Engineering (CCECE). IEEE, 2018.
- "An IoT-based data collection platform for situational awareness-centric microgrids." 2018 IEEE Canadian conference on electrical & computer engineering. IEEE, 2018.

Languages

English (Professional proficiency): IELTS Academic, Overall: 7
Persian (Native)