MohammadHasan Shammakhi

Wireless Communication Engineer

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Summary of Qualifications

- MSc in Electrical Engineering specializing in Communication Systems and Signal Processing.
- +7 years of experience in designing and developing communication system products, spanning various hardware platforms including FPGAs and GPUs.
- Proficient in Wireless Communication, Signal Processing, SW/HW Development. , and AI.
- Strong knowledge of wireless communication protocols such as DVBS2X, DVBT2, WIFI, IoT, LTE, 3G/4G, GNSS/GPS physical layer, data-link layer, and channel coding.
- Extensive proficiency in the development of SDRs, radio links, and customized transmitters and receivers.
- Extensive expertise in MATLAB and Python ML and DL using Tensorflow and PyTorch
- Strong skills in FPGA and GPU programming, C/C++ and Qt, MATLAB, Python,and Git.
- Effective in teamwork and skilled in project management.
- Dedicated professional, problem-solving mindset, and attentive to quality and detail.

Experience

- **Principal Wireless Engineer** Jan 2024 - Present
  Bluvec Technologies
  - **R&D Applied**: Engaged in research and development for drone detection, with a focus on GPU and CPU implementation. Additionally, actively involved in the creation of a post-processing engine using Golang.
- **Senior Applied R&D** May 2023 - Dec 2023
  Qualinx and NextIO .B.V
  - **System Designer and Developer**: Redesigned and developed various processing blocks for a GNSS receiver for GPS, GLONASS, Galileo, and BeiDou satellites. Implemented the solution in C++ as the RTL reference model.
- **Project Manager and Applied Research and Development** Mar 2020 - May 2023
  Sunyar Co
  - **Satellite and Wireless Communication System Designing**: Developed real-time satellite and wireless communication systems for various projects, encompassing the design and implementation of systems such as the GMR satellite receiver, GPU-Based Software Defined Radio (SDR), DVBS, DVBS2, and DVBS2X receivers, and a customized communication link for video transmission.The Design meets specific requirements and employed GPUs or FPGAs based on project demands.
  - **System Developer**: Experienced in developing different aspects of products such as real-time software using Qt or C++, implementing mutliprocessor system engines, developing GPU based process, FPGA based processes and designing the chains to implement the physical layer and data link layer of communication links, encompassing various types of channel encoding/decoding, interleaving, scrambling, and source encoding/decoding, in both the transmitter and receiver sides.
  - **AI-Based System Developer**: Designed/Implemented ML and DL based AMR and QoT estimations systems.
  - **Other Responsibilities**: Established this company and Managed more than ten projects in about three years.
- **Project Manager and Applied R&D** Feb 2016 - Mar 2020
  Farateif Pouya Technology
  - **System Designer**: Developed diverse communication systems tailored for implementation in FPGAs and GPUs, employing both fixed-point and floating-point architectures to meet specific requirements.(Sep 2018 - Mar 2020)
  - **Senior Software and Hardware Developer**: Implemented CPU and GPU-based projects utilizing Qt, C++, and CUDA for efficient real-time data processing. Additionally, designed GPU-FPGA based projects employing CUDA, system generator, and VHDL to leverage the power of parallel processing.

- **Tutor**: Mentored and trained over ten individuals in the field of software and hardware engineering, in addition to fulfilling other responsibilities.(Mar 2019 - Mar 2020)
- **FPGA Developer**: Executed multiple projects utilizing Xilinx FPGAs with the System Generator tool and occasionally VHDL to construct advanced wideband communication systems.(Feb 2016 - Sep 2018)

- **Communication System Advisor** Aug 2018 - Nov 2018
  Sepehran
  - **FPGA-Based System Advisor**: Addressed longstanding challenges that persisted within the company for over a year by successfully implementing an enhanced anti-jamming algorithm as a subblock for their radar project.

Education

- **M.Sc. in Electrical Engineering, Communication Systems** 2014–2016
  Amirkabir University of Technology *Tehran, Iran*
  Thesis: Sparse Modeling Methods based on Machine Learning (19.4/20),
  Specialization: Signal Processing Based on Machine Learning

- **B.Sc. in Electrical Engineering, Electronics** 2010 – 2014
  Shahid Rajaee University *Tehran, Iran*
  Thesis: Differential Research of SPECK Block Cipher (20/20),
  Specialization: Cryptography

Skills

- **GPU Programming:** CUDA (Expert), cuFFT, cuBLAS, Multistream
- **Engineering Tools:** System Generator(SysGen), Xilinx Vivado & ISE, Proteus, CodeVision, MATLAB
- **AI and Signal Processing:** Machine Learning (scikit-learn), Neural Network and Deep Learning (Tensorflow, Pytorch), Signal Processing (Scipy), Image processing and Computer Vision(OpenCV, scikit-image, PIL), Video Streaming (FFMPEG, GStreamer), Parallel Processing(Cupy, Numba), and Numpy
- **Programming Languages and IDEs:** C(Advanced), C++(Expert - IKM score: 83), Qt(Expert), Assembly(Beginner), Python (Advanced - IKM score: 82), R(Intermediate), CUDA(Expert)
- **Operating Systems:** Windows, Linux
- **FPGA Programming:** System Generator (Expert), VHDL(Intermediate), HLS(Beginner)
- **Other Utilities:** LaTeX, Microsoft Office, Git

  Human Languages: Persian(Native), English(Intermediate)

Publications

- P. Haji Faraji, M.H. Shammakhi, H. Sheikhzadeh , **" Joint Feature-Sample Selection for Facial Expression Recognition",**, Computer Vision and Image Understanding, Elsevier . **2023** (Submitted)(It can be found in my Github page)
- M.H. Shammakhi, P. Haji Faraji , **"Gb/Sec Frame-Based Phase Locked Loop on Gpu ",** 2022.
- M.H. Shammakhi, P. Haji Faraji, M. Mohammadi, M. Hoseinzadeh ,**" GPU-Based Parallel Algorithm for Wide-band Signal Timing Recovery",** Turkish Journal of Computer and Mathematics, 2021.
- M. Soltani, M.H. Shammakhi, S. Khorram, H. Sheikhzadeh ,**" Combined mRMR Filter and Sparse Bayesian Classifier for Analysis of Gene Expression Data",**, 2016 2nd International Conference on Signal Processing and Intelligent Systems 13-15 Dec. 2016
- M.H. Shammakhi , V. Ghanbari, "In Persian Title,", 2016 1st International Conference New Perspective in Electrical and Computer Engineering, Sep. 2016
- M.H. Shammakhi , V. Pourahmadi ,P. Khavari , A. Mirzaei ,**"Combined mRMR-MLPSVM scheme for high accuracy and low cost handwritten digits recognition",** 2015 9th Iranian Conference on Machine Vision and Image Processing (MVIP). IEEE, 18-19 Nov. 2015

References

The list of references will be provided to recruiters on demand.