Se-Min Lim

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Education

Sep 2020 **Doctor of Philosophy**, *University of California, Irvine*, United States.
Major: Computer Science

Mar 2017 – Feb 2019 **Master's Degree**, *Korea University*, S. Korea.
GPA - 4.38/4.50 | Major: Electronics and Information Engineering

Mar 2011 – Feb 2017 **Bachelor's Degree**, *Korea University*, S. Korea.
GPA - 3.50/4.50 | Major: Electronics and Information Engineering

Research Interest

Artificial Intelligence

- Neural networks, machine & deep learning, computational neuroscience, signal & image processing
- Wearable sensors technology, skill assessment, human visual perception, computer vision

Computer Architecture

- FPGA based accelerators for neural networks, low power design
- Energy-aware computing, embedded systems, system-on-chip

Applications

- Human activity recognition, motion similarity evaluation, neural networks based coaching assistant system

Professional Experience

Apr 2019 – Oct 2019 **Researcher**, *Korea University Research & Business Foundation*, S. Korea.

1) Low-Cost Method for Recognizing Table Tennis Activity
   - Implemented an upgraded FPGA hardware accelerator with high energy efficiency and processing based on cosine similarity for recognizing table tennis activity
2) Activity Recognition from Early-Stage Motion
   - Designed LSTM RNN based neural networks for inference of table tennis posture using few time-series data acquired at early-stage of motion

Mar 2017 – Feb 2019 **Research Assistant**, *Parallel Computation & VLSI Architecture Lab*, Korea University, S. Korea.

1) LSTM-Guided Coaching Assistant for Table Tennis Practice
   - Constituted a deep space state model derived from LSTM and compared two players' low-dimensional latent trajectories through probabilistic inference

2) Low-Cost Assistive System for Table Tennis Practice
   - Developed two FPGA hardware accelerators each based on two separate systems-LSTM RNN and cosine similarity-and compared their functionality and efficiency
3) Pipelined Squarer for Unsigned Integers of up to 16 Bits
   - Applied the pipelining technique, CSA (Carry-Save Adder) tree and ripple-carry method to design a squarer
4) Deep Learning-Based Assistive System for Table Tennis Practice
   - Designed two-stacked unidirectional, bidirectional, and residual LSTM RNNs by adding specific embedding layer for inference of table tennis posture

Mar 2015 – Feb 2017 **Undergraduate Student Researcher**, *Parallel Computation & VLSI Architecture Lab*, Korea University, S. Korea.

1) Deep Learning-Based Real-time People and Objects Recognition System for Blind People
   - Designed real-time human and objects recognition system based on YOLO CNN by using NVIDIA TX 1
2) Kinect Camera-Based Forward Head Posture Correction Device
   - Developed a portable embedded device that detects forward head posture and gives proper advice for correction by linking with Android application
3) Raspberry Pi 2 Model B-Based CAN Bus Driver
   - Implemented a Raspbian based CAN(Controller Area Network) bus protocol driver

Mar 2017 – Dec 2018 **Teaching Assistant**, *Korea University*, S. Korea.

- Electronic Circuits II, Signals and Systems I, Electric Circuits II, Pre-Calculus, Calculus
- Introduction to Applied Mathematics, Digital System Laboratory, Discrete Mathematics, Computer Architecture

Publication

[J1] **Se-Min Lim**, Jooyoung Park, and Hyeong-Cheol Oh, "Low-cost Method for Recognizing Table Tennis Activity", *IEICE Trans. on Information and Systems*, Vol.E102-D, No.10, pp.2051-2054, Oct. 2019.

[J2] **Se-Min Lim**, Hyeong-Cheol Oh, Jaein Kim, Juwon Lee, and Jooyoung Park, "LSTM-Guided Coaching Assistant for Table Tennis Practice", *MDPI Sensors*, 2018, 18(12), 4112-4126, DOI: 10.3390/s18124112.

[C1] Keon-Woo Kim, **Se-Min Lim**, Jooyoung Park, In-Kyeong Ann and Hyeong-Cheol Oh, "Activity Recognition from Early-stage Motion", *KCC 2019: Korea Computer Congress 2019*, KIISE, Jeju, Korea (June 26–28, 2019).

[C2] **Se-Min Lim**, Keon-Woo Kim, Jong-Wun Yang, Jooyoung Park, and Hyeong-Cheol Oh, "Low-Cost Assistive System for Table Tennis Practice", *KCC 2018: Korea Computer Congress 2018*, KIISE, Jeju, Korea (June 20–22, 2018).

[C3] **Se-Min Lim**, Jong-Wun Yang, Jooyoung Park, and Hyeong-Cheol Oh, "Deep Learning based Assistive System for Table Tennis Practice", *KSC 2017: Korea Software Congress 2017*, KIISE, Busan, Korea (December 20–22, 2017).

[T1] **Se-Min Lim**, "AI-Based Coaching Assistant System for Sports Practice", *Master Thesis*, Korea University, Feb. 2019.

Patents

[1] **Se-Min Lim**, Seongjin Choi, and Hyeong-Cheol Oh, "Pipelined Squarer for Unsigned Integers of up to 16 Bits", KR101974779, filed Apr. 25, 2019.

Awards and Fellowships

Awards

Jul 2018 **Best Poster Award**, *Korea Computer Congress 2018*.
Korean Institute of Information Scientists and Engineers

Sep 2016 **Best Research of Undergraduate Student Award**, *Department of Electronics and Information Engineering Congress 2016*.
Korea University

Fellowships

Mar 2017 – Feb 2019 **Fellowships of Research & Teaching Assistant**, *Korea University*.

Jun 2015 – Dec 2016 **National Grant**, *Korea Student Aid Foundation*.

Sep 2016 **Scholarship for Undergraduate Student Researcher**, *Korea University*.

Dec 2015 **Scholarship of Korea University Alumni Association**, *Korea University*.

Skills

Computer Language Skills

- C/C++, Window/Linux Programming, Python, Verilog, VHDL, MATLAB, HTML

Software Skills

- Visual Studio, PyCharm, iPython Notebook, Jupyter, Spider, Quartus Prime, Vivado, ISE WebPack, Multisim, Microsoft Office