

Se-Min Lim

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Education

- Sep 2020 **Doctor of Philosophy**, *University of California, Irvine*, United States.
Major: Computer Science
- Mar 2017 – **Master's Degree**, *Korea University*, S. Korea.
Feb 2019 GPA - 4.38/4.50 | Major: Electronics Engineering
- Mar 2011 – **Bachelor's Degree**, *Korea University*, S. Korea.
Feb 2017 GPA - 3.50/4.50 | Major: Electronics 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

- Nov 2019 – **Researcher**, *Parallel Computation & VLSI Architecture Lab*, Korea University, S. Korea.
Current
- 1) CRNN-based Human Posture Recognition in Video Data
 - Designed an AI system that recognizes specific human posture in video data using an end-to-end CRNN
 - 2) GRU-based Activity Recognition from Early-stage Motion
 - Implemented a customized GRU for posture correction and coaching in sports using a small number of sensor data acquired at early-stage motion
- Apr 2019 – **Researcher**, *Korea University Research & Business Foundation*, S. Korea.
Oct 2019
- 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 – **Research Assistant**, *Parallel Computation & VLSI Architecture Lab*, Korea University, S. Korea.
 Feb 2019
- 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 – **Undergraduate Student Researcher**, *Parallel Computation & VLSI Architecture Lab*, Korea University, S. Korea.
 Feb 2017
- 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 – **Teaching Assistant**, *Korea University*, S. Korea.
 Dec 2018
- 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] **Se-Min Lim**, Byeong-Cheol Chae, Soo-Bin Lim, Jooyoung Park, and Hyeong-Cheol Oh, "CRNN-based Human Posture Recognition in Video Data", *KCC 2020: Korea Computer Congress 2020*, KIISE, Online, Korea (July 02–04, 2020).

- [C2] Keon-Woo Kim, Gyu-Sam Jang, **Se-Min Lim**, In-Kyeong Ann, Jooyoung Park and Hyeong-Cheol Oh, "GRU-based Activity Recognition from Early-stage Motion", *Summer Annual Conference of IEIE*, IEIE, Jeju, Korea (Aug 19–21, 2020).
- [C3] 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).
- [C4] **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).
- [C5] **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 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