Jonghoon Jin

jhjin0@gmail.com | github.com/jhjin

Research Interest

Deep learning for computer vision

Education

Ph.D. in Electrical and Computer Engineering, Purdue University, IN — May 2014 – May 2016
M.S. in Electrical and Computer Engineering, Purdue University, IN — Aug. 2011 – May 2014
- Advisor: Dr. Eugenio Culurciello

B.E. in Electrical Engineering, Korea University, Korea — Mar. 2005 – Feb. 2011

Work Experience

Machine Learning Engineer, Apple Inc., Cupertino, CA — Dec. 2018 – present
Visual intelligence to Apple HomeKit Secure Video

Deep Learning Engineer, Lighthouse AI Inc., Palo Alto, CA — Jun. 2016 – Dec. 2018
Eyes of the smart home turning visual events in physical space into searchable keys
- Responsible for 3D object tracking and classification using RGBD and depth sensors

Machine Learning Scientist Intern, Teradeep Inc., West Lafayette, IN — Feb. 2015 – Jan. 2016
A Spin off from PhD thesis to commercialize the next generation GPU for deep learning
- Developed full stack deep learning accelerator on embedded platforms

Research Experience

Robust convolutional neural networks under adversarial noise — Jan. 2015 -– Mar. 2016
Modified CNN layers to benefit from stochasticity so as to be robust to the noise.
- Superior to standard CNNs by 13.12% (Top1) on ImageNet under adversarial noise

Convolutional neural network parameter reduction — May – Dec. 2014
Reduced CNN parameters based on filter separation for feedforward acceleration.
- 2x speed-up achieved by 90% parameter reduction without post processing

Convolutional neural network accelerator on a mobile coprocessor — May 2012 -– Dec. 2014
Developed a CNN accelerator on Zynq SoC, from hardware modules (Verilog HDL) to system driver (C) and software interpreter (Lua).
- A peak performance of 240 G-ops/s with consuming less than 4 W of power

Invited Talks / Media Highlight

Enabling machines to perceive the world like you do, CyberSci Summit 2014, Fairfax, VA, Aug. 19, 2014

Accelerating Deep Neural Networks on Mobile Processor with Embedded Programmable Logic, Neural Information Processing Systems (NIPS) Demonstration, 2013. (MIT Tech Review, BBC News, USA Today)

Publications

J. Gilmartin, J. Jin, A. Scherb, T. Kryze, and A. Teichman, "Two-way communication interface for vision-based monitoring system," U.S. Patent US10735916B2, Filed 2017

E. Culurciello, B. Martini, V. Gokhale, J. Jin, and A. Dundar, "Computing architecture with co-processor," U.S. Patent US10157156B2, Granted 2018

A. Dundar, J. Jin, B. Martini, and E. Culurciello, "Embedded streaming deep neural networks accelerator with applications," *Neural Networks and Learning Systems, IEEE Transactions on*, 2016

J. Jin, A. Dundar, and E. Culurciello, "Robust convolutional neural networks under adversarial noise," *International Conference on Learning Representation*, 2016

A. Dundar, J. Jin, and E. Culurciello, "Convolutional clustering for unsupervised learning," *International Conference on Learning Representation*, 2016

J. Jin, A. Dundar, and E. Culurciello, "Flattened convolutional neural networks for feedforward acceleration," *International Conference on Learning Representations*, 2015

A. Dundar, J. Jin, V. Gokhale, B. Martini, and E. Culurciello, "Memory access optimized scheduling scheme for dcnns on a mobile processor," in *High Performance Extreme Computing (HPEC), 2014 IEEE Conference on*, Sep 2014

V. Gokhale, J. Jin, A. Dundar, B. Martini, and E. Culurciello, "A 240 g-ops/s mobile coprocessor for deep neural networks," in *Computer Vision and Pattern Recognition Workshops (CVPRW), 2014 IEEE Conference on*, pp. 696–701, June 2014. Invited Paper

J. Jin, V. Gokhale, A. Dundar, B. Krishnamurthy, B. Martini, and E. Culurciello, "An efficient implementation of deep convolutional neural networks on a mobile coprocessor," in *Circuits and Systems (MWSCAS), 2014 IEEE 57th International Midwest Symposium on*, pp. 133–136, Aug 2014

E. Culurciello, J. Jin, A. Dundar, and J. Bates, "An analysis of the connections between layers of deep neural networks," *arXiv preprint arXiv:1306.0152*, 2013

J. Jin, A. Dundar, J. Bates, C. Farabet, and E. Culurciello, "Tracking with deep neural networks," in *Information Sciences and Systems (CISS), 2013 47th Annual Conference on*, pp. 1–5, March 2013

A. Dundar, J. Jin, and E. Culurciello, "Visual tracking with similarity matching ratio," in *Proceedings of the International Conference on Computer Vision Theory and Applications*, pp. 280–285, Feb 2013

Honors and Awards

Best presenter award, Global Top Talent Forum, Hyundai Motors Group	Aug. 2015
Graduate Student Mentor of the Summer, Purdue University	Aug. 2014
Best Intern Graduate, General Electric Korea	Jun. 2011
The Grand Award, Capstone Design Fair 2010, Korea University	Sep. 2010
Semester High Honors, Korea University	Mar. 2008 -– Jul. 2010
Best Honors Scholarships, Tuition waiver, Korea University	Feb. -– Jun. 2010
Alumni Scholarships, Tuition waiver, Korea University Alumni Association	Mar. 2008 -– Dec. 2009

Teaching Experience

Computational Neuroscience, Purdue University	Jan. -– May 2014
Electric/Electronic Circuits, Gentex technologies Korea	Jul. -– Dec. 2010
Electronic Circuits I, Korea University	May. -– Jun. 2010

Tools and Languages

Tools/Languages	C/C++/ObjC, {Py,Lua}Torch, Tensorflow, CUDA C/OpenCL, Python, Verilog HDL

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