Jonghoon Jin

jhjin0@gmail.com | jhjin.com | github.com/jhjin

Research Interests

Deep learning for computer vision

Education

Ph.D. in Electrical and Computer Engineering, Purdue University, USA	May 2014 – May 2016
M.S. in Electrical and Computer Engineering, Purdue University, USA	Aug. 2011 – May 2014
- Advisor: Dr. Eugenio Culurciello	
B.E. in Electrical Engineering, Korea University, Korea	Mar. 2005 – Feb. 2011

Work Experience

Deep Learning Engineer, Lighthouse AI, Palo Alto, CA   Jun. 2016 – present
Eyes of the smart home turning visual event in physical space into searchable information
- Responsible for segmented 3D tracking and RGBD object/action classification.

Machine Learning Scientist Intern, Teradeep Inc., West Lafayette, IN   Jan. 2015 – Jan. 2016
A spin off from Purdue to commercialize the next generation GPU for deep learning
- Implemented a smart-camera system capable of person detection and face idetification.

Research Experience [Publication No.]

Automatic face clustering and identification with convolutional neural networks   May 2015 -– May 2016
Implemented a face identification system that automatically clusters similar faces using
CNNs with triplet loss and locality sensitive hashing.

Robust convolutional neural networks under adversarial noise [2]   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 [4]   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 [1, 5, 6, 7]   May 2012 -– Dec. 2014
Implemented a CNN accelerator on Zynq SoC, as a major role, 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

Visual object tracking with convolutional neural networks [9, 10]   Jan. -– Aug. 2012
Trained CNNs, augmented with radial basis function, for general-purpose use in
tracking and recognition tasks.

Publications

[1] 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
[2] J. Jin, A. Dundar, and E. Culurciello, "Robust convolutional neural networks under adversarial noise," *International Conference on Learning Representation*, 2016

Publications

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

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

[5] 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

[6] 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

[7] 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

[8] 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

[9] 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

[10] 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

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)

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

BME 495A - **Computational Neuroscience**, Purdue University	Jan. -– May 2014
Electric/Electronic Circuits, Gentex technologies Korea Co., Ltd	Jul. -– Dec. 2010
KEEE 301 - **Electronic Circuits I**, Korea University	May. -– Jun. 2010

Skills and Personal Information

Tools/Languages	C/C++, Lua/Torch7 (Regular contributor), CUDA C, OpenCL, MATLAB, Python, Verilog HDL, HTML, PHP, Java, Xilinx tools

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