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Education

- Aug 2001 Ph.D., Department of Computer Sciences, The University of Texas at Austin.
Dissertation Title: *Perceptual Grouping in a Self-Organizing Map of Spiking Neurons*.
Dissertation Advisor: Risto Miikkulainen.
- Dec 1995 M.A. Department of Computer Sciences, The University of Texas at Austin.
Thesis Title: *Laterally Interconnected Self-Organizing Feature Map in Handwritten Digit Recognition*
Thesis Advisor: Risto Miikkulainen.
- Aug 1993 B.S. Department of Computer Science, Yonsei University, Seoul, Korea.
Report Title: *Visual Programming Using SmallTalk*
Advisor: Joo S. Song.

Research Interests

1. Understanding the mechanisms of perceptual grouping in the visual system using: (1) self-organizing maps with lateral connections to capture input statistics and (2) synchronized and desynchronized spiking neurons for temporal representation of binding and segmentation.
2. Pattern recognition with laterally-interconnected self-organizing maps and classifier networks.
3. Image retrieval from large databases using image-based and text-based queries.
4. The role of image statistics in shaping cortical structure and performance.

Experience

Full-Time Position

9/01– Assistant Professor, Department of Computer Science, Texas A&M University.

Academic Research

- 11/99-1/01, 6/98-5/99, 6/97-8/97, 6/96-8/96 Research Assistant, Department of Computer Sciences, The University of Texas at Austin. Supervising Professor: Professor Risto Miikkulainen. Research Topics:
- Contour integration in a self-organizing map of spiking neurons. Statistical analysis of functional connection properties.
 - Effect of normalization in binding and segmentation.
 - Orientation map of spiking neurons and object segmentation.
 - Topographical map of spiking neurons and object segmentation.

Teaching

- 1/01-5/01, 8/97-5/98, 1/97-5/97, 8/96-12/96, Teaching Assistant, Department of Computer Sciences, The University of Texas at Austin.
1. CS345 Programming Languages (Sp01). Instructor: Professor Greg Lavender
 2. CS378 Network Protocol Implementation (Sp97, F98, Sp98), Instructor: Professor Chris Edmondson-Yurkanan.
 3. CS310 Computer Organization and Programming (F96). Instructor: Professor Chris Edmondson-Yurkanan.
 - Taught discussion sessions twice a week.
 - Developed I/O library for Motorola 68000 and wrote user's manual with the instructor.

Other

- 6/99-10/99 Intern, Exploratory Research & Development Group, Advanced Technology Division, HNC Inc. San Diego
- Developed text-to-image retrieval system in C, Tcl/Tk, and SWIG using context vectors for text representation and hierarchical self-organizing maps for image representation (DARPA CVIM Project).
- 6/95-5/96 Research Assistant, Department of Chemical Engineering, The University of Texas at Austin. Supervising Professor: Professor Roger Bonnecaze.
- Performed operating system analysis and maintenance.
- 12/92-5/93 Database Programming/Consulting, Doping Control Center, Korea Institute of Science and Technology. Supervisor: Dr. Jong-Sei Park .
- Developed research project management system and bibliography management system.

Publications

Dissertation

- Choe, Y. (2001). *Perceptual Grouping in a Self-Organizing Map of Spiking Neurons*, Department of Computer Sciences, University of Texas at Austin. Available as Technical Report AITR01-292. *Committee*: Risto Miikkulainen (chair), Benjamin Kuipers, Raymond Mooney, Wilson Geisler, and Joydeep Ghosh.

Book

Sirosh, J., Miikkulainen, R., and Choe, Y. (editors) (1996). *Lateral Interactions in the Cortex: Structure and Function*. The UTCS Neural Networks Research Group, Austin, TX. Electronic book, ISBN 0-9647060-0-8, <http://www.cs.utexas.edu/users/nn/web-pubs/htmlbook96>

Book Chapters

Miikkulainen, R., Bednar J. A., Choe, Y., and Sirosh J. (1999) *Modeling Self-Organization in the Visual Cortex*. In Oja, E., and Kaski, S. (editors), *Kohonen Maps*, New York: Elsevier.

Miikkulainen, R., Bednar, J. A., Choe, Y., and Sirosh, J. (1997). *Self-Organization, Plasticity, and Low-level Visual Phenomena in a Laterally Connected Map Model of the Primary Visual Cortex*, In R. L. Goldstone, P. G. Schyns, and D.L. Medin editors, *Perceptual Learning*, volume 36 of *Psychology of Learning and Motivation*, pages 257-308. Academic Press, San Diego, CA, 1997.

Choe, Y. and Miikkulainen, R. (1997) *Self-Organization and Segmentation with Laterally Connected Maps of Spiking Neurons*. In WSOM'97: Workshop on Self-Organizing Maps (WSOM'97, Espoo, Finland), 26–31. Espoo: Finland: Helsinki University of Technology.

Journal Articles

Choe, Y., and Miikkulainen, R. (2001). *Contour Integration and Segmentation with Self-Organized Lateral Connections.*, Under Preparation. Available as Technical Report AI2000-286, Department of Computer Sciences, University of Texas at Austin.

Choe, Y., Miikkulainen, R., and Cormack, L. K. (2000). *Effects of Presynaptic and Postsynaptic Resource Redistribution in Hebbian Weight Adaptation*. *Neurocomputing* 32:77–82.(Also in J.M. Bower (Editor), *Computational Neuroscience: Trends in Research 2000*, (CNS*99, Pittsburgh, PA), New York: Elsevier, 2000.)

Choe, Y., and Miikkulainen, R. (1998). *Self-Organization and Segmentation in a Laterally Connected Orientation Map of Spiking Neurons*. *Neurocomputing* 21:139–157.

Conference papers

Choe, Y. and Miikkulainen, R. (2000). *A Self-Organizing Neural Network for Contour Integration through Synchronized Firing*. In the Proceedings of the Seventeenth National Conference on Artificial Intelligence (AAAI-2000, Austin, TX), 123-128.

Miikkulainen, R., Bednar, J. A., Choe, Y., and Sirosh, J. (1998). *A Self-Organizing Neural Network Model of the Primary Visual Cortex*. In Proceedings of the Fifth International Conference on Neural Information Processing (ICONIP'98, Kitakyushu, Japan).

Choe, Y., and Miikkulainen, R. (1997). *Self-organization and Segmentation with Laterally Connected Spiking Neurons*. In *Proceedings of the Fifteenth International Joint Conference on Artificial Intelligence*, (IJCAI-97), 1120-1125. San Mateo, CA: Kaufmann.

Choe, Y., Sirosh, J., and Miikkulainen, R. (1996). *Laterally Interconnected Self-Organizing Maps in Hand-Written Digit Recognition*. In D. S.Touretzky, M. C.Mozer, and M. E.Hasselmo (editors), *Advances in Neural Information Processing Systems 8* (NIPS-95), 736-742. Cambridge, MA: MIT Press.

Technical Reports

Choe, Y. (1995). *Laterally Interconnected Self-Organizing Feature Map in Handwritten Digit Recognition*, Technical Report AI95-236, Department of Computer Sciences, University of Texas at Austin, [Masters Thesis]

Choe, Y. (1993). *Visual Programming Using SmallTalk*. Undergraduate Research Report, Department of Computer Science, Yonsei University, Seoul, Korea. (in Korean)

Grants and Awards

1. Significant contribution to the proposal for *Modeling Development and Perceptual Phenomena in the Visual Cortex*, National Science Foundation #IIS-9811478, December 15, 1998 - November 30, 2001. Principal Investigator: Risto Miikkulainen.
2. Significant contribution to the proposal for *Synchronization and Segmentation in a Unified Neural Network Model of the Primary Visual Cortex*, National Science Foundation Advanced Computing Resources Grant #IRI-940004P, 25 Service Units on Cray-J90 and 5,000 SU on Cray T3D at Pittsburgh Supercomputing Center, July 15, 1996 - July 15, 1997. Principal Investigator: Risto Miikkulainen.
3. Significant contribution to the proposal for *Handwritten Digit Recognition with the Laterally Interconnected Self-Organizing Map*, High Performance Computer Time Grant (Cray J90), The University of Texas at Austin, September 1, 1995 - August 31, 1996. Principal Investigator: Risto Miikkulainen.
4. Schlumberger Scholarship, Fall 1999.
5. The Office of Graduate Studies Summer Tuition Fellowship, The University of Texas at Austin, 6/1998.

Service

Invited Talk

A Self-Organizing Neural Network for Contour Integration through Synchronized Firing," invited talk, Fifth Annual University of Texas at Austin Symposium on Neuroscience, Austin, TX, February 3, 2000.

Reviewing

Reviewed for IEEE Transactions on Neural Networks, 1997.

System Administration

- 1/96- 8/01 System Administrator (Linux/HPUX/NeXTstep), The Neural Networks Research Group, Department of Computer Sciences, The University of Texas at Austin
- Planned for purchases, set up and maintained an extensive computing environment for the research group. Developed, installed and tested research tools and software.

Professional Membership

- 1999- Korean-American Scientists and Engineers Association (KSEA)
Secretary of Information Technology (Austin Chapter)
- 2000- American Association for Artificial Intelligence (AAAI)
- 2001- American Association for the Advancement of Science (AAAS)