

CENGİZ GÜNAY

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OBJECTIVE:

Research on intelligent systems and computation in biologically inspired systems. Interested in both theoretical and practical issues in cognition and computation.

EDUCATION:

Degrees:

- 2000–2003 Center for Advanced Computer Studies, University of Louisiana at Lafayette,
Computer Science, Ph.D., GPA 3.8
- 1998–2000 Center for Advanced Computer Studies, University of Louisiana at Lafayette,
Computer Science, M.Sc., GPA 3.77
- 1994–1998 İstanbul Teknik Üniversitesi, Turkey.
Electronics and Communications, B.Sc.

Selected Coursework:

Computational Basis of Intelligence Neural Networks Knowledge Representation
Autonomous Agent Architecture Cognitive Neuroscience Computational Neuroscience

WORK EXPERIENCE:

- 01/2004–present **Postdoctoral Fellow/System Administrator**, Dept. of Biology, Emory University, Atlanta, GA.
Single cell and network modeling using GENESIS software and analysis using Matlab at the Jaeger Lab. Programming parameter search procedures in Perl for finding neuron models that match physiological experiments. System administration of research tools in a network of Windows and Linux computers.
- 06/2003–08/2003 **Graduate Assistant**, University of Louisiana at Lafayette.
Working on neural networks for modeling signal behavior in spiking networks similar to the brain.
- 06/2003–08/2003 **Research Assistant**, University of Louisiana at Lafayette.
Designed an environment for integrating the work of a group of developers under a JSP front-end for a customizable metasearch engine project. The project involved using tools such as; Ant, Javadoc, Tomcat, Jakarta Struts; with components for; web crawling, HTML and XML parsing/creation, storage in Oracle database, providing multi-user web service with login, etc. (see demo site at <http://selego.com>)
- 07/1999–present **Part-time Web Designer and Programmer**, Majik Carpets Inc., Istanbul, Turkey.
Developed E-Commerce infrastructure using PERL, PHP, MySQL database and HTML-CSS (see <http://majikcarpets.com>).
- 06/2002–08/2002 **Software developer**, C.H. Fenstermaker and Assoc., Lafayette, LA
Developed a Java applet embedded in an ASP and VB-script web framework, as a visualization tool using competitive learning to dynamically display multi-dimensional data.
- 08/2001–12/2001 **Instructor**, University of Louisiana at Lafayette, LA.
Taught a course on advanced data structures and object oriented programming in C++.
- 01/1999–08/2000 **Research Assistant**, University of Louisiana at Lafayette, LA.
Created software for research in neural networks using C/C++, Java, Matlab, and PERL. Also worked as administrator for a network of 8 Linux and Windows PC computers.
- 02/1998–08/1998 **Part-time System Administrator**, Yagmur Cybercafe, Istanbul, Turkey. Maintained a network of Windows PCs and a Linux Server for an Internet cafe.

- 1996–1997 **Volunteer System Administrator**, Student Computer Club, Technical University of Istanbul, Turkey. Maintaining user accounts and network of 5 Linux PCs and 8 terminals for hundreds of students.
- 1994–1997 **Part-time Programmer/Designer**, Compuphiliacs Software, Istanbul, Turkey. Lead programmer and designer in a large-scale PC game project using C and assembly language.

AWARDS AND MEMBERSHIPS:

- 2004–07 Postdoctoral Fellowship, Emory University.
- 2005 Travel fellowship from Mathematical Biosciences Institute at the Ohio State University for the 2005 Workshop for Young Researchers in Mathematical Biology.
- 2003 Travel fellowship from Boston University for presenting at the International Conference on Cognitive and Neural Systems.
- 2000–03 University Doctoral Fellowship from the University of Louisiana at Lafayette.
- 2002–03 Secretary, President of local IEEE student chapter at the University of Louisiana at Lafayette.
- 2002–04 Member of the AI Interface Standards Committee (http://www.igda.org/ai/ai_committee.php).
- 1997–98 President of computer club student organization at the Technical University of Istanbul.
- 1993 Awarded third place in programming competition of PC World Magazine, IDG Inc. in Istanbul, Turkey.

SELECTED PROJECTS:

- 2004–06 Created Matlab toolbox for managing experimental and simulated neural data in databases. The toolbox can analyze and plot multi-dimensional data and conduct electrophysiological measurements. The database is created from parallel simulations of neural models conducted by Perl scripts and GENESIS neural simulation language.
- 2002–03 Ph.D. Dissertation that focuses on creating a simulation environment for analyzing the behavior of spiking neural networks. This distributed simulation software is created with the JAVA language, using various new software technologies such as BEANSHELL, and also maintaining connection with other open-source utilities.
- 2001 A neural network simulator designed to analyze synchronization behavior of coupled dynamic systems.
- 2000 Distributed neural network simulation using Java RMI technology.
Information retrieval using concept-base retrieval that creates concept descriptions from a thesaurus using Java.
- 1999 A large-scale integrated neural network simulator in MatLab for use in education and research.
- 1998 Inference engine using LISP language.

PUBLICATIONS:

Journal Papers

- Cengiz Günay, Jeremy R. Edgerton, and Dieter Jaeger (2006). "Channel density distributions explain dynamical variability between neurons: using a combined physiology and computer simulation database approach." In preparation.
- Cengiz Günay and Anthony S. Maida (2006a). "A stochastic population approach to the problem of stable recruitment hierarchies in spiking neural networks." *Biological Cybernetics*, 94(1): 33–45.
- Cengiz Günay and Anthony S. Maida (2006b). "Using temporal binding for hierarchical recruitment of conjunctive concepts overp delayed lines." *Neurocomputing*, 69(4–6): 317–367.
- István S. N. Berkeley and Cengiz Gunay (2004). "Conducting banding analysis with trained networks of sigmoid units." *Connection Science*, 16(2): 119–128. István S. N. Berkeley and Cengiz Günay (2004). "Conducting banding analysis with trained networks of sigmoid units." *Connection Science*, Vol. 16, No. 2.
- Cengiz Günay and Anthony S. Maida (2003a). "Temporal binding as an inducer for connectionist recruitment learning over delayed lines." *Neural Networks*, vol 16/5–6, pp. 593–600.

Published Conference Papers

- Cengiz Günay and Anthony S. Maida (2003b). "Using Temporal Binding for Connectionist Recruitment Learning over Delayed Lines." *Proceedings of the International Joint Conference on Neural Networks*, vol. 1, pp. 224–229. Portland, Oregon, July 2003.
- C. Günay, A. S. Maida (2001), "The Required Measures of Phase Segregation in Distributed Cortical Processing" *Proceedings of the INNS-IEEE International Joint Conference on Neural Networks 2001*, vol. 1, pp. 290–295. Washington, D.C., July 2001.
- A. S. Maida, B. Rowland, C. Günay (2001a). "Simulation of Planar I/F Networks with Delayed Connections", *Proceedings of the International Joint Conference on Neural Networks*, vol. 1, pp. 302–307, Washington, D.C., July 2001.
- A. S. Maida, B. Rowland, C. Gunay (2001b). "Synchronized Firing in a Time-delayed Neural Network", *Proceedings of the 14th International Florida Artificial Intelligence Research Society Conference*, pp. 485–488. Key West, Florida, May 2001.
- C. Gunay (2000). "Agent Architecture: Using Java Exceptions in a Nonstandard Way and an Object Oriented Approach to Evolution of Intelligence." In Loganantharaj, R., Palm, G., and Ali, M., editors, *Intelligent Problem Solving. Methodologies and Approaches*, vol. 1821 of *Lecture Notes in Artificial Intelligence*, pp. 717–722, Springer-Verlag, Berlin, 2000.
- I. Berkeley, C. Gunay, and A. Maida (2000). "The value of value units: A flawed foray into non-monotonicity." In *Intelligent Engineering Systems Through Artificial Neural Networks*, vol. 10, edited by C. Dagli, A. Buczak, J. Ghosh, M. Embrechts, O. Ersoy and S. Kercel. New York, NY: Asme Press.

Conference Abstracts

- Cengiz Günay, Jeremy R. Edgerton, and Dieter Jaeger (2005). "Role of channel density variability in controlling neural dynamics: using physiological and modeling databases." Poster presented at the Society for Neuroscience 35th Annual Meeting, Washington, DC, Oct. 2005.
- Cengiz Günay, Jeremy R. Edgerton, and Dieter Jaeger (2005). "Role of channel density variability in controlling neuronal dynamics: using physiological and modeling databases." Poster presented at the 14th Annual Computational Neuroscience Meeting CNS*2005 in Madison, Wisconsin, July 17-21, 2005.
- Cengiz Günay and Anthony S. Maida (2005). "A stochastic population approach to the problem of stable propagation of synchronized spike volleys." Poster presented at the 14th Annual Computational Neuroscience Meeting CNS*2005 in Madison, Wisconsin, July 17-21, 2005.
- Cengiz Günay, Jeremy R. Edgerton, and Dieter Jaeger (2005). "Using a brute-force database approach in the analysis of the high-dimensional parameter space of a globus pallidus neuron model." Poster presented at the 2005 Workshop for Young Researchers in Mathematical Biology, Mathematical Biosciences Institute, Ohio State University, Mar. 2005.
- Cengiz Günay, Jeremy R. Edgerton, and Dieter Jaeger (2005). "Using physiological and modeling databases to investigate the role of channel density variability in controlling neural dynamics." Poster presented at the Cosyne Computational and Systems Neuroscience 2005 meeting, Salt Lake City, Utah, March 17-20, 2005.
- Cengiz Günay, Jeremy R. Edgerton, and Dieter Jaeger (2004). "Analysis of a Globus Pallidus Neuron Model Using a Brute-Force Conductance Parameter Search." Poster presented at the Society for Neuroscience 34th Annual Meeting, San Diego, CA, Oct. 2004.
- Cengiz Günay and Anthony S. Maida (2004). "A Stochastic Approach to the Problem of Stable Propagation of Synchronized Spike Volleys in Hierarchies." Poster presented at the 20th Annual South East Nerve Net Conference in Atlanta, GA, Mar. 2004.
- Cengiz Günay and Anthony S. Maida (2003d). "A Robust Mechanism for Creating New Memories using Noisy Delays and Lateral Inhibition." Poster presented at the Seventh International Conference on Cognitive and Neural Systems, Boston University, MA, May 2003.
- Cengiz Günay and Anthony S. Maida (2002a). "Tolerating Delays and Preventing Crosstalk in Direct-Indirect Connection Topologies with Neural Networks Employing Recruitment Learning." Poster presented at the Sixth International Conference on Cognitive and Neural Systems, Boston, MA, May 2002.
- A. S. Maida, B. Rowland, C. Gunay (2001c). "Simulations of Planar Integrate and Fire Networks with Delays and Refractory Periods." Poster presented at the Fifth International Conference on Cognitive and Neural Systems, Boston, MA, May 2001.
- I. S. N. Berkeley, C. G. Prince, and C. Gunay (1999). "RATNET: Exploring Rat Navigation with Artificial Neural Networks." Paper presented at The Southern Society for Philosophy and Psychology Conference, Louisville, Kentucky, April 1999.

Invited Talks

Cengiz Günay and Anthony S. Maida (2002b). "Tolerating Delays and Preventing Crosstalk in Direct-Indirect Connection Topologies with Neural Networks Employing Recruitment Learning." Talk given at the Department of Electrical and Electronics Eng., Dokuz Eylül University, Buca, İzmir, Turkey. Aug 26, 2002.

Cengiz Günay and Anthony S. Maida (2002c). "Tolerating Delays and Preventing Crosstalk in Direct-Indirect Connection Topologies with Neural Networks Employing Recruitment Learning." Talk given at the İzmir Institute of Technology, İzmir, Turkey. Aug 28, 2002.

Anthony Maida and Cengiz Günay (2001). "Recruitment Learning and Synchronized Firing in Neural Networks: A Faculty/Student Presentation." Talk given at the Institute of Cognitive Science at the University of Louisiana at Lafayette. Oct 19, 2001.

Technical Reports and Theses

Cengiz Günay (2003). "Hierarchical learning of conjunctive concepts in spiking neural networks." Ph.D. Dissertation, Center for Advanced Computer Studies, University of Louisiana at Lafayette. Lafayette, LA 70504-4330, U.S.A.

Cengiz Günay and Anthony S. Maida (2003e). "Using temporal binding for hierarchical recruitment of conjunctive concepts over delayed lines." Technical Report TR-2003-2-1, Center for Advanced Computer Studies, University of Louisiana at Lafayette, Lafayette LA 70504-4330, U.S.A.

Cengiz Günay (1998). "Symbolic analysis of electronic circuits." Bachelor's thesis. Electrical and Electronics Department, Istanbul Technical University, Istanbul, Turkey.

COMPUTER SKILLS:

Computer Languages/Protocols:

C/C++, Fortran, Basic

Java (Struts, ANT, JSP, Servlets, Swing, AWT, RMI)

MATLAB, Mathematica, GENESIS, SPICE

PERL (DBI, CGI, HTTP, LWP, XML modules)

ASP (VB-script, JavaScript)

UNIX Shell scripting (sh, bash, csh)

SQL (Oracle, SQLServer, MySQL),

Pro*C/C++

HTML, XML (cXML), HTTP (Cookies, etc.)

Object Oriented Design (with UML)

Operating Systems: Windows 95/98/2000/NT, UNIX (**Linux**, Solaris/SunOS, HP-UX, OS-X), BeOS

LANGUAGES: English, French, Turkish.

REFERENCES:

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