

CURRICULUM VITAE

ERHAN OZTOP, Ph.D.

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RESEARCH INTERESTS

Investigating how humans and other biological systems process information and solve problems from a computational viewpoint.

Developing paradigms and techniques for science and engineering based on the principles obtained by the study of biological systems.

EDUCATION

- 2002 **PhD, Computer Science**, University of Southern California, Los Angeles, CA
Thesis: Modeling the Mirror: Grasp Learning and Action Recognition
Advisor: Prof. Michael A. Arbib
- 1996 **MS, Computer Engineering**, Middle East Technical University, Ankara, Turkey
Thesis: A New Content Addressable Memory Utilizing High Order Neurons
Advisor: Prof. Marifi Guler
- 1993 **BS, Mathematics**, Middle East Technical University, Ankara, Turkey
- 1993 **BS, Computer Engineering**, Middle East Technical University, Ankara, Turkey

PROFESSIONAL EXPERIENCE

April 2011 – Present

Researcher, National Institute of Information and Communications Technology (NICT), Advanced ICT Research Institute, Brain ICT Laboratory

December 2009 – Present

Vice Department Head, Communication and Cognitive Cybernetics Department, Advanced Telecommunications Research Institute International (ATR), Computational Neuroscience Laboratories (Cognitive Mechanisms Laboratories as of April 2010)

Visiting Associate Professor, Osaka University, School of Engineering Science

April 2009 – November 2009

Vice Department Head, Communication and Cognitive Cybernetics Department,
Advanced Telecommunications Research Institute International (ATR),
Computational Neuroscience Laboratories

April 2008 – March 2009

Vice Department Head, Humanoid Robotics and Computational Neuroscience
Department, Advanced Telecommunications Research Institute International
(ATR), Computational Neuroscience Laboratories

Group Leader, Humanoid Brain Science Group in ICORP Computational Brain
Project, Japan Science and Technology Agency (JST)

April 2004 – March 2008

Researcher, Japan Science and Technology Agency (JST), ICORP Computational
Brain Project

June 2002 - March 2004

Researcher, Advanced Telecommunications Research Institute International,
Computational Neuroscience Laboratories, Department of Cognitive Neuroscience

1997 - 2002

Research Assistant, University of Southern California, Brain Project

Teaching Assistant, University of Southern California, Computer Science
Department

1993 – 1996

Research Assistant, Middle East Technical University, Department of Computer
Engineering

PUBLICATIONS

International Journal Publications

1. Babic J, Hale JG, Oztop E (in press) Human sensorimotor learning for humanoid robot skill synthesis. Adaptive Behavior
2. Ugur E, Oztop E, Sahin E (2011) Goal emulation and planning in perceptual space using learned affordances. Robotics and Autonomous Systems 59, 580-595
3. Oztop E (2009) Sign representation of Boolean functions using a small number of monomials. Neural Networks 22: 938-948
4. Chaminade T, Oztop E, Gordon C, Kawato M (2008) From self-observation to imitation: visuomotor association on a robotic hand. Brain Research Bulletin 75(6): 775-784

5. Oztop E (2006) An upper bound on the minimum number of monomials required to separate dichotomies of $\{-1,1\}^n$. *Neural Computation* 18: 3119-3138
6. Oztop E, Kawato M, Arbib M (2006) Mirror neurons and imitation: A computationally guided review. *Neural Networks* 19: 254-271
7. Oztop E, Imamizu H, Cheng G, Kawato M (2006) A computational model of anterior intraparietal (AIP) neurons. *Neurocomputing* 69: 1354-1361
8. Oztop E, Franklin DW, Chaminade T, Cheng G (2005) Human-humanoid interaction: Is a humanoid robot perceived as a human? *International Journal of Humanoid Robotics* 2:(4) 537-559
9. Oztop E, Wolpert D, Kawato M (2005) Mental state inference using visual control parameters. *Cognitive Brain Research* 22: 129-151
10. Oztop E, Bradley NS, Arbib MA (2004) Infant grasp learning: a computational model, *Exp Brain Res.* 158:480-503
11. Oztop E., Arbib MA (2002) Schema design and implementation of the grasp-related mirror neuron system. *Biological Cybernetics* 87: (2) 116-140
12. Arbib MA, Billard A, Iacononi M, Oztop E (2000) Synthetic brain imaging: Grasping, mirror neurons and imitation. *Neural Networks* 13: (8-9) 975-997
13. Oztop E, Mulayim AY, Atalay V, Yarman-Vural F. (1999) Repulsive attractive network for baseline extraction on document images. *Signal Processing* 75 (1) 1-10

Manuscripts Submitted or in Preparation

14. Gurbuz S, Oztop E, Inoue N (under review) Head pose estimation using 3D frontal face data reconstructed from stereo images. *Transactions on Pattern Analysis and Machine Intelligence*
15. Moore B, Oztop E (under review) Robotic grasping and manipulation through human visuomotor learning. *Robotics and Autonomous Systems*
16. Babic J, Oztop E, Kawato M (in preparation) Human balance control: a comparison with control of reaching and pointing movements

Online and Domestic Journal Publications

17. Oztop E (2007) Models of mirror system. *Scholarpedia* (online encyclopedia), 2(10):3276
18. Oztop E, Kawato M (2005) Conceptual and Computational Models of Mirror Neurons. *The Brain & Neural Networks* (Journal of Japanese Neural Network Society) 12: 61-73
19. Arbib MA, Oztop E, Zukow-Goldring P (2005) Language and the Mirror System: A Perception/Action Based Approach to Communicative Development. *Cogniție, Creier, Comportament / Cognition, Brain, Behavior* vol. IX(3) 239-272

Invited Book Chapters

1. Oztop E, Kawato M (2009) Models For The Control of Grasping In: Nowak D, Hermsdoerfer J (eds) Sensorimotor Control of Grasping: Physiology and Pathophysiology. Cambridge University Press
2. Oztop E (2009) Mirror Neurons: Extraordinary or Ordinary? In: Minett JW, Wang W (eds) Language, Evolution, and the Brain. City University of Hong Kong Press
3. Oztop E, Arbib M, Bradley N (2006) The Development of Grasping and the Mirror System. In: Arbib M (ed) Action to Language via the Mirror Neuron System. Cambridge University Press
4. Crowley M, Marmol S, Oztop E. (2002) Crowley-Arbib Saccade Model. Chapter in The Neural Simulation Language, MIT Press, MA 2002

Theses

5. Oztop E (2002) Modeling the Mirror: Grasp Learning and Action Recognition. Ph.D. thesis, University of Southern California
6. Oztop E (1996) A New Content Addressable Memory Utilizing High Order Neurons. Master thesis, Middle East Technical University, Turkey

Peer Reviewed Conference Papers

1. Kober K, Oztop E, Peters J (2010.06) Reinforcement Learning to adjust Robot Movements to New Situations, Robotics: Science and Systems, Proc., Zaragoza, Spain
2. Steffen J, Oztop E, Ritter H (2010.10) Structured Unsupervised Kernel Regression for Closed-loop Motion Control, IEEE International Conference on Robotics and Automation, Proc., Taipei, Taiwan
3. Moore B, Oztop E (2010.8) Redundancy parameterization for flexible motion control, ASME IDETC 2010, Montreal, Canada
4. Ugur E, Sahin E, Oztop E (2009.11) Affordance learning from range data for multi-step planning. International Conference on Epigenetic Robotics: Modeling Cognitive Development in Robotic Systems, Proc., Venice, Italy
5. Hajdinjak B, Babic J, Oztop E (2009.9) Improving Balance Regulation In Visuo-motor Control For Humanoid Robots. IEEE International Symposium on Computer and Information Science, Guzelyurt, Proc., Northern Cyprus
6. Ugur E, Sahin E, Oztop E (2009.9) Predicting Future Object States Using Learned Affordances. IEEE International Symposium on Computer and Information Science, Guzelyurt, Proc., Northern Cyprus
7. Oztop E, Lin LH, Kawato M, Cheng G (2007.4) Extensive Human Training for Robot Skill Synthesis: Validation on a Robotic Hand. IEEE International Conference on Robotics and Automation, Proc., Roma, Italy
8. Oztop E, Lin LH, Kawato M, Cheng G (2006.12) Dexterous Skills Transfer by Extending Human Body Schema to a Robotic Hand. IEEE-RAS/RSJ International Conference on Humanoid Robots, Proc., Genova, Italy

9. Gump T, Azad P, Welke K, Oztop E, Dillmann R, Cheng G (2006.12) Unconstrained Real-time Markerless Hand Tracking for Humanoid Interaction. IEEE-RAS/RSJ International Conference on Humanoid Robots, Proc., Genova, Italy
10. Welke K, Oztop E, Ude A, Dillmann R, Cheng G (2006.12) Learning feature representations for an object recognition system. IEEE-RAS/RSJ International Conference on Humanoid Robots, Proc., Genova, Italy
11. Oztop E, Chaminade T, Cheng G, Kawato M (2005.12) Imitation Bootstrapping: Experiments on a Robotic Hand IEEE-RAS/RSJ International Conference on Humanoid Robots, Proc., Tsukuba, Japan
12. Oztop E, Imamizu H, Cheng G, Kawato M (2005.7) A Computational Model of Anterior Intraparietal (AIP) Neurons 14th Annual Computational Neuroscience Meeting, Madison, Wisconsin, USA
13. Chaminade T, Franklin D, Oztop E, Cheng G (2005. 7) Motor interference between Humans and Humanoid Robots: Effect of Biological and Artificial Motion. 4th IEEE International Conference on Development and Learning. INTEX Osaka, Japan
14. Oztop E, Franklin D, Chaminade T (2004.11) Human-Humanoid Interaction: Is a humanoid robot perceived as human? IEEE-RAS/RSJ International Conference on Humanoid Robots, Proc., Santa Monica, California, USA
15. Oztop E, Wolpert D, Kawato M (2003) Mirror neurons: key for mental simulation? Proceedings of Computational Neuroscience Meeting, Alicante, Spain

Other Articles and Poster Presentations (selected)

1. Oztop E, Cheng G, Imamizu H, Kawato M (2008.7) Mirror Neurons: Do we really know their function? The 31st Annual Meeting of the Japan Neuroscience Society, Tokyo.
2. Fujimoto I, Shimada Y, Kimura M, Kamitani Y, Erhan Oztop, Alexander Harner, Murase K (2007.4) Real-time f-MRI system for non-invasive BMI (in Japanese), Japanese Society of Radiological Technology 63th Science Meeting
3. Kimura M, Imamizu H, Shimada Y, Oztop E, Harner A, Kamitani Y (2007.2) Online fMRI decoding ~ Reading Janken gesture from brain activity ~, Japanese Electronic Telecommunication Society, 2nd Brain Interface Meeting
4. Kimura M, Imamizu H, Shimada Y, Nakamura T, Oztop E, Kamitani Y (2006.1) Real time fMRI Decoding, Mechanisms of Brain and Mind, 6th Winter Workshop
5. Oztop E, Imamizu H, Cheng G, Kawato M (2005.1) Emergent Grasp Affordance Encoding via Grasp Learning. Mechanisms of Brain and Mind, 5th Winter Workshop
6. Oztop E, Arbib MA (2001) Mirror neuron system for grasping: a model for the monkey, In Society for Neuroscience 31st. Annual Meeting Abstracts (27) 58.6

Invited Talks at International Workshops and Conferences

1. Oztop E (2010.9) Human sensorimotor learning for robot skill synthesis (Keynote Speech), IEEE International Symposium in Robot and Human Interactive Communication (RO-MAN 2010), Viareggio, Italy
2. Oztop E (2010.5) Can we learn from biology about object representation for grasping and manipulation? Workshop on Representations for object grasping and manipulation, IEEE International Conference on Robotics and Automation, Anchorage, Alaska, USA
3. Oztop E (2009.9) Human Visuomotor Learning for Robot Skill Synthesis. First IEEE Workshop on Computer Vision for Humanoid Robots in Real Environments, IEEE International Conference on Computer Vision, Kyoto, Japan
4. Oztop E, Hale J, Babic J, Kawato M (2009.5) Connecting humans and robots for efficient robot skill generation. Workshop on Approaches to Sensorimotor Learning on Humanoid Robots, International Conference on Intelligent Robots and Systems, Kobe, Japan
5. Oztop E, Hale J, Babic J, Kawato M (2008.9) Robots as complex tools for humans to control: Human visuo-motor learning for robot skill synthesis. Workshop on Grasp and Task Learning by Imitation, International Conference on Intelligent Robots and Systems, Nice, France
6. Oztop E, Babic J, Hale J, Cheng G, Kawato M (2007.11) From Biologically Realistic Imitation to Robot Teaching via Human Motor Learning. 14th International Conference on Neural Information Processing, Kitakyushu, Japan
7. Oztop E (2007.4) Modeling Mirror Neurons. International Seminar on Language, Evolution, and the Brain, International Institute for Advanced Studies, Kyoto, Japan
8. Oztop E. (2004.9) Modeling the Mirror Neurons. In: the Workshop on Robotic Imitation, International Conference on Intelligent Robots and Systems, Sendai, Japan

Patents

US Patent 2006-026330 (pending) An algorithm that solves any binary classification problem in $\{-1,1\}^n$ with an upper bound guarantee on the minimum number of monomials

PROFESSIONAL SERVICE

Reviewer for the Journals

(Computationally oriented Journals)

Neural Networks
IEEE Transactions on Neural Networks
IEEE Transactions on Systems, Man, and Cybernetics
Biological Cybernetics
PLoS Computational Biology
Connection Science

Artificial Life

(Neuroscience oriented Journals)

Experimental Brain Research
Cerebral Cortex
European Journal of Neuroscience
Philosophical Psychology
Brain Research

(Robotics Journals)

International Journal of Robotics Research
Advanced Robotics
Robotics and Autonomous Systems
Autonomous Robots
IEEE Transactions on Robotics

Other Reviewing Activities

IEEE/RSJ International Conference on Intelligent Robots and Systems
IEEE International Conference on Robotics and Automation
IEEE/RAS International Conference on Humanoid Robots
The Scientific Committee of the Association Française contre les Myopathies

Memberships

International Neural Network Society
Japan Neuroscience Society
IEEE