Di-Wei Huang

dwh@cs.umd.edu ▮ www.cs.umd.edu/~dwh
A.V. Williams Bldg., College Park, MD 20742

Summary of Qualifications

- Ph.D. in computer science with emphasis in neural computation and computational intelligence
- 8-year research experience in neural networks, machine learning, robotics, human-computer interaction (HCI), and computer networks
- Strong programming skills with proficiency in software engineering and data structures
- Effective communication skills, demonstrated by solid publication records, presentations, and teaching

Education

Ph.D. in Computer Science — Expected May 2016
- University of Maryland, College Park
- Dissertation: Multi-self-organizing map architectures based on limit cycle attractors

M.S. in Computer Science and Information Engineering — Jun. 2006
- National Taiwan University (GPA: 4.0)
- Thesis: A mobility management mechanism using location cache for wireless mesh networks

B.S. in Computer Science and Information Engineering — Jun. 2004
- National Chiao-Tung University, Taiwan (GPA: 3.91, class ranking: 2/55)

Research Experience

Graduate Research Assistant, University of Maryland, College Park — 2013–Present
- Developing intelligent robot control that supports programming by demonstration, or imitation learning (supported by ONR). The techniques that I developed allow humans to "teach" a robot how a potentially dangerous or tedious task is done by simply demonstrating it, and the robot learns to perform the task autonomously in new situations. Our approach focuses on incorporating brain-inspired neurocognitive architectures, hierarchical planning, causal reasoning, and machine learning to create a robot agent that, instead of just mimicking human motions, understands the purposes of human actions and imitates demonstrated procedures in a goal-oriented way.
- Exploring arm control using oscillatory self-organizing maps (SOMs). This is the first attempt to control stable arm reaching using SOMs with non-static neural activities based on limit cycle attractors, which make the resulting neural architecture more robust and brain-like. I'm also working on implementing the architecture on a Baxter robot using Robot Operating System (ROS).
- Creating a task demonstration platform where a human demonstrator is invisible to a robot learner, based on the hypothesis that, in many situations, object behaviors are more critical than human behaviors, and that human body can be ignored. I have built a simulated environment in which a demonstrator can manipulate objects using mouse and GUI inputs. We expect that this scenario will be more effective than conventional methods in many cases, and have successfully used it in a block-arranging task and a disk-drive dock maintenance task.

Full-time Research Assistant, National Taiwan University — 2008
- Created a covert communication scheme and implemented a proof-of-concept prototype using TCP/IP packet manipulations. The results showed that our secret communication method could be achieved with acceptable bandwidth and reasonably low error rates.

Graduate Research Assistant, National Taiwan University — 2004–2006
- Devised and formulated a novel mobility management mechanism for wireless mesh networks using location cache. The results were published in a top-rated IEEE journal.
- Led 6 undergraduate students to successfully implement custom IPv6 technologies for VoIP and video streaming, including a tunneling server, a tunneling broker, client-side tools, and a QoS monitor.

Teaching Experience

Graduate Teaching Assistant, University of Maryland, College Park 2008–2013

- ❖ Advised and motivated 30–90 undergraduate students each semester to succeed in mid- to high-level computer science courses, through office hours, class discussions, project designs, and homework/exam feedbacks.
- ❖ Received positive feedback that was above college average from students.
- ❖ Courses: Neural Computation (graduate level), Data Structures, Intro. to Algorithms, Rise of the Machines (an AI introduction course), and Computer Networks.

Graduate Teaching Assistant, National Taiwan University 2005–2006

- ❖ Courses: Personal Communication Services and Information Systems.

Relevant Experience

Department Network Administrator Staff, National Taiwan University 2005–2006

- ❖ Upgraded Wifi, DNS, and NAT services for ∼500 users and achieved low downtime.

Department Network Administrator Staff, National Chiao-Tung University 2002–2004

- ❖ Maintained a Taiwan's nation-wide NNTP service and department workstations; Provided technical support at the department's Computer and Network Center.

Freelance Software Developer 2001–2006

- ❖ Developed financial software for Pstock, Inc., Taiwan.
- ❖ Open source library: an RTF document emitter for Microsoft .NET framework in C#. (`https://sourceforge.net/projects/netrtfwriter/`)

Selected Honors and Awards

Computer Science Department Fellowship, University of Maryland, College Park 2008–2010

Studying Abroad Scholarship, Ministry of Education, Taiwan 2008–2010

Best Master's Thesis Award, Institute of Information & Computing Machinery, Taiwan 2006

The Xun Hwa Scholarship, National Chiao-Tung University 2003

The Mr. Shao Xun Yuan Memorial Scholarship, National Chiao-Tung University 2002

5-time Academic Achievement Award, National Chiao-Tung University 2000–2004

Selected Publications (5/15)

[1] **Huang, Di-Wei**, Katz, G. E., Langsfeld J. D., Oh H., Gentili R. J., and Reggia J. A., "An Object-Centric Paradigm for Robot Programming by Demonstration," *17th International Conference on Human-Computer Interaction (HCII'15)*, Los Angeles, California, United States, Aug. 2015.

[2] **Huang, Di-Wei**, Katz, G. E., Langsfeld J. D., Gentili R. J., and Reggia J. A., "A Virtual Demonstrator Environment for Robot Imitation Learning," *IEEE International Conference on Technologies for Practical Robot Applications (TePRA'15)*, Boston, Massachusetts, United States, May 2015.

[3] **Huang, Di-Wei**, Gentili, R. J., and Reggia, J. A., "Self-Organizing Maps Based on Limit Cycle Attractors," *Neural Networks*, vol. 63, pp. 208–222, Mar. 2015.

[4] **Huang, Di-Wei**, Gentili, R. J., and Reggia, J. A., "Limit Cycle Representation of Spatial Locations Using Self-Organizing Maps," *IEEE Symposium on Computational Intelligence, Cognitive Algorithms, Mind, and Brain (CCMB'14)*, pp. 79–84, Orlando, Florida, United States, Dec. 2014.

[5] **Huang, Di-Wei**, Lin, P., and Gan, C.-H., "Design and Performance Study for a Mobility Management Mechanism (WMM) Using Location Cache for Wireless Mesh Networks," *IEEE Transactions on Mobile Computing*, vol. 7, no. 5, pp. 546–556, May 2008.