Hsueh-Cheng 'Nick' Wang

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Research Interests and Recent Projects:

My research focuses on robotic systems in direct supports of individuals. I am interested in developing intelligent systems to solve real-world problems in the fields of robotics, cyber-physical systems, assistive technology, and cognitive science.

MIT Fifth Sense Project: 2013-Present
Project Lead. Our team develops wearable, miniaturized, and energy-efficient systems to provide navigation feedbacks for blind and visually impaired people.
(with Daniela Rus and Anantha Chandrakasan, EECS, MIT)

JR East Project: 2014-2015
Project lead in SLAM-based navigation. We aim at an indoor navigation system using text as landmarks in highly dynamic environments, such as Tokyo subway stations.
(with John Leonard and Harry Asada, Mechanical Engineering, MIT)

RobotX Competition: 2014
I assisted the MIT-Olin RobotX team to advance unmanned surface vehicle technologies and win the first place in the Maritime RobotX Challenge in Singapore.

Professional Experiences:

Assistant Professor,   2016-
Department of Electrical and Computer Engineering
National Chiao Tung University, Taiwan

Postdoctoral Associate,   2013-2016
Robotics, Vision, and Sensor Networks Group & Marine Robotics Group,
Computer Science and Artificial Intelligence Laboratory,
Massachusetts Institute of Technology (MIT), MA, USA.

Committee Member,   2014-2015
MIT Committee on the Use of Humans as Experimental Subjects.

Program Committee Member,
CVPR Workshop on Vision Meets Cognition (2015, 2014).

Reviewer,
IEEE International Conference on Robotics and Automation (ICRA 2015), IEEE on System, Man, and Cybernetics, Part A, Systems and Humans, International Journal on Document Analysis and Recognition, Ergonomics, PloS One, Journal of Vision, and Journal of Research in Reading.

Conference Session Moderator,
International Conference on Intelligent Robots and Systems (IROS 2015), NSF Young Professional Workshop on Exploring New Frontiers in Cyber-Physical Systems (2014), The Annual Meeting of the Cognitive Science Society (CogSci 2011)

Education

Ph.D. in Computer Science, University of Massachusetts at Boston.   2012
M.A. in Computer-Aided Engineering,   2003
Department of Civil Engineering, National Taiwan University, Taiwan.
B.S. in Civil Engineering, National Taiwan University, Taiwan.   2001

Awards and Funding:

Outstanding Research Talents, (10,000 USD per year for 3 years)   2015
Ministry of Science and Technology (MOST), Taiwan
Award in Joseph P. Healey Research Grant Program, (11,600 USD; Co-PI)   2015
Title: A Virtual Reality Platform for Visual Attention Research.
Young Professional Travel Grant, National Science Foundation, USA   2014
Student Travel Award, Cognitive Science Society (Top 3%)   2012
Student Travel Grant, Asia-Pacific Conference on Vision (Top 3%)   2011
Research Excellence Award, Graduate Research Symposium,   2011
Department of Computer Science, University of Massachusetts at Boston

Press Release and News Articles:

MIT News, "Italian tenor Andrea Bocelli visits MIT in support of assistive technology
and global poverty reduction," Dec. 9, 2013.
MIT News, "CSAIL, MechE marine experts win international self-driving boat
competition," Oct. 30, 2014.

Publications:
10 journal (6 SCI/SSCI, total IF: 12.78) and 25 conference publications.

Journal Papers:
[J1] Wang, H. C., Hsu, L. C., Tien, Y. M., & Pomplun, M. (2014). Predicting raters'
transparency judgments of English and Chinese morphological constituents using
latent semantic analysis. *Behavior Research Methods*, 46(1), 284-306. (SSCI, **IF:
2.46**; Ranking: 50/ 359)
[J2] Wu, C. C., Wang, H. C., and Marc Pomplun (2014). The Roles of Scene Gist and
Spatial Dependency among Objects in the Semantic Guidance of Attention in Real-
World Scenes", *Vision Research*, 105, 10-20. (SCI, **IF: 2.55;** Ranking: 15/ 108)
[J3] Wang, H. C., Schotter, E., Angele, B., Yang, J. M., Simovici, D., Pomplun, M., &
Rayner, K. (2013). Using Singular Value Decomposition to Investigate Degraded
Chinese Character Recognition: Evidence from Eye Movements During Reading.
Journal of Research in Reading, 36, S35-S50. (SSCI, **IF: 1.19**; Ranking: 21/53)
[J4] Wang, H. C. & Pomplun, M. (2012). The Attraction of Visual Attention to Texts in
Real-World Scenes, *Journal of Vision*, 12(6):26, 1–17. (SCI, **IF: 2.73**; Ranking 12/
58)

[J5] Hwang, A. D., Wang, H. C., and Pomplun, M. (2011). Semantic Guidance of Eye Movements in Real-world Scenes, *Vision Research*, 51, 1192-1205. (SCI, **IF: 2.55;** Ranking: 15/ 108)

[J6] Wang, H.-C., Hwang, A. D. & Pomplun, M. (2010). Object Frequency and Predictability Effects on Eye Fixation Durations in Real-World Scene Viewing. *Journal of Eye Movement Research*, 3(3):3, 1-10.

[J7] Wang, H. C., Pomplun, M., Ko, H. W., Chen M. L., & Rayner, K. (2010). Estimating the Effect of Word Predictability on Eye Movements in Chinese Reading using Latent Semantic Analysis and Transitional Probability. *Quarterly Journal of Experimental Psychology*, 64, 7, 1374-1386. (SCI, **IF: 1.30**; Ranking 41/ 119)

[J8] Chen, M. L., Wang, H. C., & Ko, H. W. (2009). The Construction and Validation of Chinese Semantic Space by Using Latent Semantic Analysis. *Chinese Journal of Psychology*, 51, 4, 415-435. (TSSCI)

[J9] Hsieh, S. H., Tseng, P. P., Wang, H. C. (2006). An Expert System for Preliminary Aseismic Capacity Estimation of Traditional School Classroom Buildings Using Case-Based Reasoning. *Journal of Chinese Civil and Hydraulic Engineering*. Vol. 18, No. 1, pp. 95-107.

[J10] Wang, H. C. , Tu, W. H., Yu, W. H., Chen, C. S., & Hsieh, S. H. (2001). A Study on E-Teaching/E-Learning Standardization and Courseware Sharing. *Bulletin Of The College Of Engineering*, National Taiwan University, Vol. 85, pp. 59-68.

Peer-reviewed Conference Proceeding Papers:

[C1] Jeon, D., Ickes, N., Raina, P., Wang, H. C., & Chandrakasan, A. P. (2016). A 0.6V, 8mW 3D Vision Processor for a Navigation Device for the Visually Impaired. International Solid-State Circuits Conference (ISSCC), San Francisco, USA.

[C2] Wang, H. C., Finn, C., Paull, L., Kaess, M., Rosenholtz, R., Teller, S., & Leonard, J. (2015). Bridging Text Spotting and SLAM using Junction Features, *IEEE/RSJ International Conference on Intelligent Robots and Systems* (IROS), Hamburg, Germany.

[C3] Anderson, A., Fischell, E., Howe, T., Miller, T., Parrales-Salinas, A., Rypkema, N., Barrett, D., Benjamin, M., Brennen, A., DeFillipo, M., Lenoard, J., Paull, L., Schmidt, H., Wang, H. C., Yaari, A. (2015). An Overview of MIT-Olin's Winning Entry in the Inaugural AUVSI RobotX Competition, *10th Conference on Field and Service Robotics*, Toronto, Canada.

[C4] Wang, H. C., Landa, Y., Fallon, M., & Teller, S. (2013). Spatially Prioritized and Persistent Text Detection and Decoding. Fifth International Workshop on Camera-Based Document Analysis and Recognition (CBDAR), Washington D. C., USA.

[C5] Wu, C. C., Wang, H. C., Pomplun, M. (2013). The Role of Scene Gist and Spatial Dependency among Objects in the Semantic Guidance of Attention. *Annual Meeting of the Cognitive Science Society (CogSci 2013)*, Berlin, Germany. (Accepted as oral presentation, 28%)

[C6] Plummer, P., Wang, H. C., Tzeng, Y. T., Pomplun, M., & Rayner K. (2012). A Connectionist Model of Concept Activation during Reading using Latent Semantic Analysis and LandScape Model. In Proceedings of *Annual Meeting of the Cognitive Science Society (CogSci 2012)*, Sapporo, Japan. (**Student Travel Award, with 21 awards out of 798 contributions**, presented by Patrick Plummer)

[C7] Wang, H. C., Tien, Y. M., Hsu, L. C., & Pomplun, M. (2012). Estimating Semantic Transparency of Constituents of English Compounds and Two-Character Chinese Words using Latent Semantic Analysis. In Proceedings *of Annual Meeting of the Cognitive Science Society (CogSci 2012)*, Sapporo, Japan.

[C8] Wang, H. C., Lu, S. J., Lim, J. H., & Pomplun, M. (2012). Visual Attention is Attracted by Text Features Even in Scenes without Text. In Proceedings of *Annual Meeting of the Cognitive Science Society (CogSci 2012)*, Sapporo, Japan.

[C9] Wang H. C. & Pomplun, M. (2011). The Attraction of Visual Attention to Texts in Real-World Scenes. In Proceedings of *Annual Meeting of the Cognitive Science Society (CogSci2011)*, Boston, USA. (Oral presentation, 32%)

[C10] Hwang, A. D., Wang, H. C., & Pomplun, M. (2009). Semantic guidance of eye movements during real-world scene inspection. In Proceedings of *Annual Meeting of the Cognitive Science Society (CogSci 2009)*, Amsterdam, Netherlands. (Oral presentation, 32%)

Conference Presentations:

[C11] Wang, H. C., Namdev, R., Finn, C., & Teller, S. (2014). Text Spotting for the Blind and Visually Impaired. NSF Young Professional Workshop on Exploring New Frontiers in Cyber-Physical Systems, Washington D. C., USA. (Oral Presentation with **Travel Grant**)

[C12] Wang, H. C., Finn, C., Mattinson, B., Namdev, R., & Teller, S (2013). Exhibition in Second Andrea Bocelli Foundation Challenges Workshop, MIT, Cambridge, MA, USA.

[C13] Wang, H. C., Schotter, E., Angele, B., Yang, J. M., Simovici, D., Pomplun, M., & Rayner, K. (2012). Using Singular Value Decomposition to Investigate Degraded Chinese Character Recognition: Evidence from Eye Movements During Reading. China International Conference of Eye Movements (CICEM), Dalian, China. (**Invited Guest Speaker**)

[C14] Wang, H. C. & Pomplun, M. (2011). The Attraction of Visual Attention to Texts in Real-World Scenes. *Asia-Pacific Conference on Vision (APCV)*, Hong Kong.

[C15] Wang, H. C., Angele, B., Schotter, E., Yang, J. M., Simovici, D., Pomplun, M., & Rayner, K. (2011). Singular Value Decomposition is a Valid Predictor of Stroke Importance in Reading, *16th European Conference on Eye Movements (ECEM)*, Marseille, France.

[C16] Wang, H. C. & Pomplun, M. (2011). How Does Text in Real-World Scenes Attract Attention? *Scene Understanding Symposium (SUnS)*, Boston, USA.

[C17] Wang, H. C. & Pomplun, M. (2010). How Text Attracts Attention in Real-World Scenes. *European Conference on Visual Perception (ECVP)*, Lausanne, Switzerland.

[C18] Wang, H. C., Hwang, A. D., Pomplun, M. (2009). Object Frequency and Predictability Effects on Eye Fixation Durations in Real-world Scene Viewing. *15th European Conference on Eye Movements (ECEM)*, Southampton, UK.

[C19] Wang, H. C., Tien, Y. M., Hsu, L. C., & Pomplun, M. (2010). The Role of Semantic Transparency in Processing of Two-character Chinese words, *Asia-Pacific Conference on Vision (APCV)*, Taipei, Taiwan. (**Student Travel Grant, 5 out of approximately 200 contributions**)

[C20] Wang, H. C., Chen, M. L., Ko, H. W., & Kintsch, W. (2007). Estimating Word's Predictability on Lexical Processing using Latent Semantic Analysis – Verification from Eye Movement Data, *14th European Conference on Eye Movements (ECEM),* Potsdam, Germany.

[C21] Wang, H. C., Chen, M. L., & Ko, H. W. (2007). Modeling and Simulation of Word Identification on Orthographically and Phonologically Similar Words in Context. *46th Annual Conference of the Taiwanese Psychology Association*, Tainan, Taiwan.

[C22] Wang, H. C. & Ko, H. W. (2007). Automatically Generated Lessons and Practices of the Knowledge of Chinese Characters and Words, *Proceeding of ED-Media 2007 (World Conference on Educational Multimedia, Hypermedia & Telecommunications)*, Vancouver BC, Canada.

[C23] Ko, H. W., Chen, M. L., & Wang, H. C. (2005). The Role of Word during Reading Expository Text: Evidence from Eye Movement. *13th European Conference on Eye Movements*, Bern, Switzerland.

[C24] Wang, H. C. and Hsieh, S. H. (2003). On Development of a Computer System for Preliminary Aseismic Estimation of School Classroom Building Using Case-Based Reasoning. *Proceedings of Asian Pacific Conference on Shell and Spatial Structures (IASS-APCS)*, Taipei, pp. 146~147.

[C25] Wang, H. C. and Hsieh, S. H. (2002), Preliminary Seismic Safety Assessment of School Building Using Case-based Reasoning Technique. *Proceedings of 15th KKCNN 2002 Symposium on Civil Engineering*, Singapore, pp. 280~284.

Technical Skills:

Programming: C/C++, Matlab, Java, Python
Middleware and Libraries: Robotic Operating System (ROS), lightweight communication and marshalling (LCM), Android, OpenCV, PCL, EIGEN, Caffe
Sensors and Hardware: laser range scanners (LIDARs), depth sensors (Kinect and stereo cameras), pan/tilt/zoom cameras, eye trackers (EyeLink systems), Google Tango device, Nvidia Jetson, Odroid

Teaching

Instructor, Robotic Vision.	2016
Instructor, CS105 Computer Concepts.	2008-2011
Guest Instructor, CS670 Artificial Intelligence.	2012
Teaching Assistant, CS637 Database-Backed Web Sites & Web Services.	2008

Department of Computer Science, University of Massachusetts at Boston.