CURRICULUM VITAE

WEIWEI HUANG

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RESEARCH INTERESTS:

My research interest is in robotics, particularly I am interested in designing robots that engage in human environment and make interactions with humans. I have designed several types of robots like NECO, ASLAN and BIG-ARM. Currently, I am actively involved in DARPA new grand challenge which makes me focus on disaster response robot. Beyond my immediate background in dynamic control, my work often incorporates aspects of machine learning, computer vision, sensors, electronics and physical fabrication.

WORKING EXPERIENCES:

Carnegie Mellon University, Pittsburgh, USA 2012.02-present
Postdoctoral Research Fellow with the Robotics Institute working on perception and humanoid locomotion planning, mainly for DARPA (Defense Advanced Research Projects Agency) new grand challenge

Institute for Infocomm Research, A*STAR, Singapore 2010.08-2012.02
Research Scientist with Computer & Graphics Interface department, worked on Neuro-Cognitive robot for spatial navigation.

EDUCATION:

National University of Singapore, Singapore, 2005.8–2010.08
Ph.D. in Mechatronics, worked on humanoid robot design and locomotion control.

University of Science and Technology of China, China, 2000.09–2004.06
B.Eng. in Automation

PROJECTS AND ACHIEVEMENTS:

DAPAR Grand Challenge (CMU, Pittsburgh)

The goal of this grand challenge is to push the state-of-the-art in robotics beyond today's capability in support of the DoD's disaster recovery mission.

Role involved:

- Doing the perception for a 3D understanding of the environment.
- Developing the optimal path planner for the robot to navigate in a complex environment.

NSF Project: Trajectory Libraries for Locomotion on Rough Terrain (CMU, Pittsburgh)

The objective of this project is to develop methods to design control systems for humanoid robots that show human levels of competence, robustness and flexibility in locomotion on human-scale rough terrain.

Role involved:

- Developed the optimal path planner for the robot to walk on rough terrain.

Project of 3D Walking Device

This project targets to diagnose walking disorders and provide therapy. It can be also used as a 3D navigation tool for a 3D virtual environment experience.

Role involved:

- Developed the EtherCAT based real-time control system for the device.
- Developed an optimal control algorithm for the device.

ACM Project (I2R, Singapore)

This is a big project founded by A*STAR. The goal is to develop a new memory system for the rapid changing technology. The idea of the new memory system comes from human brain while realized by chips with spiking connection.

Role involved:

- Developed the NEuro-Cognitive rObot, namely 'NECO', which has onboard computing, 3D vision system, and two manipulate arms and self-localization ability.
- Developed an associate memory structure which was filed as Technique Disclosure by the Institute and preparing for the Patten application.

CODAR Project (I2R, Singapore)

This project goes together with the ACM project. It targets to develop a cognitive robot that can communicate with human.

Role involved:

- Developed a brain inspired navigation algorithm which enables the robot to build the map of the environment and localize itself.

LOCAS Project (NUS, Singapore)

This project is founded by DSTA which target to develop the first human-size humanoid robot in Singapore. This is a join program with NTU (Nanyang Technological University).

Role involved:

- Team leader in NUS side
- Built the full size humanoid robot ASLAN in NUS side
- Developed the walking algorithm for different types of environments.

ROBOTICS COMPETITION INVOLVED

DAPAR Grand Challenge (US, 2013)

- Ongoing

RoboCup robot competition (Singapore, 2010)

RoboCup is an international scientific initiative with the goal to advance the state of the art of intelligent robots.

- ASLAN won the champion of RoboCup 2010 in adult size humanoid soccer
- ASLAN won the champion of RoboCup 2010 in adult size humanoid technical challenge
- ASLAN was nominated as the third candidate of Best Humanoid Award

Asia-Pacific Robot Contest (Thailand, 2003)

The Asia-Pacific Robot Contest is an Asian Oceanian College robot competition..

- As a member in USTC team, we won the best engineering award in the Competition

KEY SKILLS

- Expert in robot design and control; has fully responsibility to develop robots like ASLAN and NECO.
- Great experience in ROS and GAZEBO based programming and simulation.
- Great experience in the dynamic modeling and control
- Expert in different type of communication protocols like RS232, CANBus, EtherCAT and MODBus.
- Familiar with different type of real time system like RT-LINUX and RTX in Windows
- Strong programming skills in C, C++, JAVA and Matlab.

ACADEMIC ACTIVITIES

- IEEE, IEEE Robotics and Automation Society and IEEE Computational Intelligence Society (since 2010)
- Program Committee of IEEE International Conference on Information and Automation 2013
- Invited Reviewer of TRO, Robotica, International Journal of Humanoid Robot and many conference like ICRA, IROS, humanoids.

SOCIAL ACTIVITIES

- **Director** of Innovation and Entrepreneurship panel in CMU Summit on US-China Innovation and Entrepreneurship 2012-2013
- **Secretary**, committee member of The Innovation and Entrepreneurship Association Singapore 2010-2012
- **Organizer** of 2008 Olympic Opening Ceremony Event in Singapore 2008
- **Director** of Event Department of USTC association Singapore 2007-2010
- **Committee member** of NUS Toastmaster Club 2008-2009

PATENT AND PUBLICATIONS

Technical Disclosure

[1]. **W. Huang**, H. Tang, H. Li, Z. Huang; *A Brain-Inspired Neural Architecture for Cognitive Navigation;* Institute for Infocomm Research 2011

Journals

[2]. **W. Huang**, C. M. Chew; *Coordination based CPG Structure for 3D Walking Control;* Robotica, v31 (05), pp. 777-788, Aug. 2013.

[3]. **W. Huang**, H. Tang; *Vision Enhanced Neuro-Cognitive Structure for Robotic Spatial Cognition;* Neurocomputing, Accepted Mar. 2013.

[4]. **W. Huang**, C. M. Chew; Y. Zheng; G. S. Hong; *Bio-inspired locomotion control with coordination between neural oscillators*; International Journal of Humanoid Robotics, v 6, n 4, pp. 585-608, Dec. 2009

Journals under Reviewing

[5]. **W. Huang**, C. H. Tan, B. Tian, H. Tang, H. Li, L. Shi; *Robotic Spatial Cognition by Cognitive Map and Episodic Memory*; IEEE Transactions on Robotics, Major Revision

Conferences

[6]. S. Feng, X. Xinjilefu, **W. Huang**, C. Atkeson; *3D Walking Based on Online Optimization* IEEE-RAS International Conference on Humanoid Robots 2013

[7]. **W. Huang**, J. Kim and C. Atkeson; *Energy-Based Optimal Step Planning for Humanoids*, IEEE International Conference on Robotics and Automation (ICRA), 2013.

[8]. **W. Huang**, A. H. Adiwahono, C. M. Chew, G. S. Hong; *A General Framework for Dynamic Walking Control*, Dynamic Walking Conference 2012.

[9]. **W. Huang**, H. Tang, J. Yu, C. H. Tan; *A Neuro-Cognitive Robot for Spatial Navigation*; International Conference on Neural Information Processing，P 485-492, 2011.

[10]. H. Tang and **W. Huang**; *Brain Inspired Cognitive System for Learning and Memory*; International Conference on Neural Information Processing, P 477-484, 2011.

[11]. H. Adiwahono; C. M. Chew; **W. Huang**; V. H. Dau; *Humanoid robot push recovery through walking phase modification*; IEEE Conference on Robotics, Automation and Mechatronics (RAM 2010), p 569-74, 2010

[12]. H. Adiwahono; C. M. Chew; **W. Huang**; Y. Zheng; *Push recovery controller for bipedal robot walking*; IEEE/ASME International Conference on Advanced Intelligent Mechatronics (AIM), p 162-7, 2009

[13]. **W. Huang**; C. M. Chew; G. S. Hong; *Coordination between oscillators: An important feature for robust bipedal walking*; IEEE International Conference on Robotics and Automation (ICRA), p 3206-3212, 2008

[14]. **W. Huang**; C. M. Chew; Y. Zheng; G. S. Hong; *Pattern generation for bipedal walking on slopes and stairs*; IEEE-RAS International Conference on Humanoid Robots (Humanoids 2008), p 205-10, 2008

[15]. **W. Huang**; C. M. Chew; G. S. Hong; *Coordination in CPG and its application on bipedal walking*; IEEE International Conference on Robotics, Automation and Mechatronics, RAM 2008, p 450-455

[16]. **W. Huang**; C. M. Chew; G. S. Hong; N. Gnanassegarane; *Trajectory Generator for Rhythmic Motion Control of Robot using Neural Oscillators*; Advances in Climbing and Walking Robots (pp 383-392) 2007

Thank you very much for taking time to read my resume.