

Gan Ma

JSPS Postdoctoral Fellow

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CAREER

Waseda University, Tokyo— JSPS Postdoctoral Fellow

July 2015 - PRESENT

- Research area: Falling motion control of humanoid robots
- Co-Supervisor: Atsuo Takanishi

EDUCATION

Beijing Institute of Technology, China— Ph. D

September 2009 - June 2015

- Research area: Human-robot interaction for humanoid robots
- Supervisor: Prof. Yunhui Liu and Prof. Qiang Huang
- Thesis: Human-robot Friendly Interaction using Facial and Body Motion for a Humanoid Robot

Sichuan University, China — Bachelor

September 2005 - June 2009

- Major: Mechanical Designing Manufacturing and Automation
- Obtain scholarship every year

RESEARCH EXPERIENCE

Falling motion control of a humanoid robot

July 2014 - Present

- Research in the fall protection of humanoid robots and design a bio-inspired falling motion controller; [\[video\]](#)
- An “Arm Flexible Landing Strategy” for safe falling of a humanoid robot is presented and implemented; [\[video\]](#)
- Development of an innovative robotic arm to protect itself;
- Mechanical design especially an actuator design with high backdrivability.

Human-robot friendly interaction of a humanoid robot

September 2012 - June 2014

- Research in facial expression and propose an active drive points (ADPs) model for facial expression;
- Develop a robot head with a human-like appearance and facial expressions; [\[video\]](#)
- Develop a humanoid whole-body motion planner to enhance its natural interactive capability.

Compliance control of a 6-DOF manipulator

September 2010 - June 2012

- Implement a 6-DOF manipulator kinematics, inverse kinematics, Jacobian, and trajectory planning in real-time control system;
- Turn admittance control and impedance control into C code in real-time Linux; [\[video\]](#)
- Propose a new flexible controller that considers visual and force information interaction. [\[video\]](#)

A humanoid robot for table tennis

September 2009 - June 2010

- The design and development of a humanoid robot platform; [\[video\]](#)
- Electrical design including the design of a robot driver board and a measuring apparatus board;
- Turn CAN and socket communication into C code in real-time Linux;
- Assist the team leader for robot system integration and experiments.

SUPERVISION OF STUDENTS

Beijing Institute of Technology

- Advised 4 postgraduate students
- 1 student won outstanding thesis award from the university
- 1 student won a Ph. D scholarship

AWARDS

Academic

1. Japan Society for the Promotion of Science (JSPS) Fellowship for Overseas Researchers (Grant No. 15F15702)
2. Technological Innovation Funding of Beijing Institute of Technology (Grant No. 2012CX10009)
3. IEEE-ICIA Best Paper Finalist

General

4. Excellent Graduate of Beijing (Grant No. 201510007y110)
5. Excellent Student of Beijing Institute of Technology (Grant No. 2012020242)
6. Excellent Student of Sichuan University

ACADEMIC ACTIVITIES

Conferences

- Invited Speaker & International Technical Committees of ACIRS 2017, Wuhan
- Technical Program Chair of ACIRS 2016, Tokyo
- Workshop invited speaker of ICRA 2016, Stockholm
- Speaker of 8 international conferences

Peer reviewer

- Robotica
- Advanced Robotics
- IEEE/ASME Transactions on mechatronics
- IEEE ICRA 2014
- IEEE RO-MAN 2016
- IEEE HUMANOIDS 2016

Membership

- Institute of Electrical and Electronics Engineers (IEEE)
- IEEE Robotics and Automation Society (IEEE RAS)
- Australian Robotics and Automation Association (ARAA)

COLLABORATIVE RESEARCH

Academic collaboration

- Collaborating with Takanishi Laboratory, Waseda University, Japan
- Collaborating with LaBRI, University of Bordeaux, France
- Collaborated with Laboratory of Robotics and Mechatronics of DiMSAT, University of Cassino, Italy
- Collaborated with Networked Sensors and Robotics Laboratory, The Chinese University of Hong Kong
- Collaborated with Intelligent Robotics Institute, Beijing Institute of Technology, China

Industrial collaboration

- Collaborated with Xi'an ChaoRen Sculpture Research Institute

PEER-REVIEWED PUBLICATIONS

Journals

1. **Gan Ma**, Junyao Gao, Zhangguo Yu, et al., "Development of a Socially Interactive System with Whole-body Movements for BHR-4," *International Journal of Social Robotics*, vol. 8, no. 2, pp. 183-192, 2016. [[link](#)]
2. **Gan Ma**, Zhihong Jiang, Hui Li, et al., "Hand-eye Servo and Impedance Control for Manipulator Arm to Capture Target Satellite Safely," *Robotica*, vol. 33, no. 4, pp. 848-864, 2015. [[link](#)]
3. Zhangguo Yu, **Gan Ma**, Qiang Huang, "Modeling and Design of a Humanoid Robotic Face Based on an Active Drive Points Model," *Advanced Robotics*, vol. 28, no. 6, pp. 379-388, 2014. [[link](#)]
4. Zhangguo Yu, Qiang Huang, **Gan Ma**, et al., "Design and Development of the Humanoid Robot BHR-5," *Advances in Mechanical Engineering*, 2014. [[link](#)]
5. Xuechao Chen, Qiang Huang, Zhangguo Yu, Jing Li, **Gan Ma**, Libo Meng, "Realization of foot rotation by breaking the kinematic contact constraint," *Robotica*, vol. 34, no. 5, pp. 1059-1070, 2016. [[link](#)]
6. Zhangguo Yu, Fei Meng, Qiang Huang, Xuechao Chen, **Gan Ma**, Jing Li, "Omnidirectional Disturbance Rejection for a Biped Robot by Acceleration Optimization," *Intelligent Automation and Soft Computing*, vol. 20, no. 4, pp. 471-485, 2014. [[link](#)]

Conferences

7. **Gan Ma**, Kenji Hashimoto, Qiang Huang, Atsuo Takanishi, "Effect of the "Arm Flexible Landing Strategy" for

- Safe Falling of a Biped Humanoid Robot,” *Australasian Conference on Robotics and Automation (ACRA)*, Brisbane, Australia, 2016. [[link](#)]
8. **Gan Ma**, Qiang Huang, Zhangguo Yu, et al., “Bio-inspired Falling Motion Control for a Biped Humanoid Robot,” *IEEE International Conference on Humanoid Robots (HUMANOIDS)*, pp. 850–855, Madrid, Spain, 2014. [[link](#)]
 9. **Gan Ma**, Qiang Huang, Zhangguo Yu, et al., “Effect of the “Torso Protective Strategy” for Safe Falling of a Biped Humanoid Robot,” *IEEE International Conference on Robotics and Biomimetics*, pp. 1284–1289, Bali, Indonesia, 2014. [[link](#)]
 10. **Gan Ma**, Qiang Huang, Zhangguo Yu, et al., “A New Flexible Controller for a Humanoid Robot That Considers Visual and Force Information Interaction,” *IEEE International Conference on Robotics and Automation (ICRA)*, pp. 1036–1041, Hong Kong, 2014. [[link](#)]
 11. **Gan Ma**, Qiang Huang, Zhangguo Yu, et al., “Experiments of a Human-robot Social Interactive System with Whole-body Movements,” *CISM-IFTOMM Symposium on Theory and Practice of Robots and Manipulators*, pp. 501–508, Moscow, Russia, 2014. [[link](#)]
 12. **Gan Ma**, Qiang Huang, Zhangguo Yu, et al., “Hand-eye Servo and Flexible Control of an Anthropomorphic Arm,” *IEEE International Conference on Robotics and Biomimetics*, pp. 1432–1437, Shenzhen, China, 2013. [[link](#)]
 13. **Gan Ma**, Qiang Huang, Zhangguo Yu, et al., “Design and Admittance Control for a Humanoid Manipulator to Adapt to Environment,” *3rd IFTOMM International Symposium on Robotics and Mechatronics*, pp. 678–687, Singapore, 2013. [[link](#)]
 14. Malik Saad Sultan, Xiaopeng Chen, **Gan Ma**, et al., “Hand-eye 3D Pose Estimation for a Drawing Robot,” *IEEE International Conference on Mechanics and Automation*, pp. 1325–1331, Takamatsu, Kagawa, Japan, 2013. [[link](#)]
 15. Xuechao Chen, Yuhang Zhou, Qiang Huang, Zhangguo Yu, **Gan Ma**, Libo Meng, “Bipedal walking with toe-off, heel-strike and compliance with external disturbances,” *IEEE International Conference on Humanoid Robots (HUMANOIDS)*, pp. 506–511, Madrid, Spain, 2014. [[link](#)]
 16. Xuechao Chen, Qiang Huang, Zhangguo Yu, Jing Li, **Gan Ma**, Si Zhang, “Inverse dynamics control with acceleration optimization on a force-controlled bipedal robot,” *IEEE International Conference on Humanoid Robots (HUMANOIDS)*, pp. 278–283, Osaka, Japan, 2012. [[link](#)]

PATENTS

Granted

1. Qiang Huang, **Gan Ma**, Jing Li, Xuechao Chen, Zhangguo Yu, Weimin Zhang, Si Zhang. A method for anti-humanoid robot the ability to determine the disturbance. (CN103042525B)
2. Zhangguo Yu, Qiang Huang, **Gan Ma**, Xuechao Chen, Jing Li, Si Zhang, Weimin Zhang. An acceleration optimization of humanoid robot controller based on inverse dynamics. (CN103019096B)
3. Zhangguo Yu, Chenglong Tang, Xinran Guo, Qiang Huang, **Gan Ma**, Xuechao Chen. A method and apparatus for table tennis robot trajectory prediction. (CN103389738B)
4. Zhangguo Yu, Qiang Huang, Libo Meng, Xuechao Chen, Jing Li, **Gan Ma**, Weimin Zhang. Method and device for predicting ping-pong spin angle velocity of ping-pong robot. (CN103364579B)
5. Qiang Huang, Jing Li, Zhangguo Yu, Wei Xu, Xuechao Chen, **Gan Ma**, Si Zhang, Huaping Wang. Method and apparatus for compensating humanoid robot body posture angle error. (CN102717381B)

Pending

6. Qiang Huang, Jing Li, **Gan Ma**, Zhangguo Yu, Xuechao Chen, Si Zhang, Huaping Wang. Method and device for controlling to support foot of humanoid robot in single leg supporting period. (CN103042526A)
7. Zhangguo Yu, Weimin Zhang, Jing Li, Wei Xu, Xuechao Chen, **Gan Ma**, Qiang Huang. Control method for eliminating upper body posture shaking of double-foot humanoid robot. (CN101943912A)
8. Qiang Huang, Libo Meng, Zhangguo Yu, Xuechao Chen, **Gan Ma**, Weimin Zhang, Junyao Gao. Hand, leg and eye servo control device and method for humanoid robot. (CN104656676A)

REFERENCES

Prof. Atsuo Takanishi, Ph. D

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- Department of Modern Mechanical Engineering, Waseda University
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- Department of Mechanical Engineering, Beijing Institute of Technology
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