Resume of Yajia Zhang

Education

Ph.D. in Computer Science 2014 (Expected)
Indiana University Bloomington, USA GPA 3.98

M.S. in Computer Science 2010
Indiana University Bloomington, USA GPA 3.93

B.E. in Software Engineering 2008
Nankai University, China GPA 81/100

Positions Held

Jun.2012 – current **Research Assistant**
Jan.2012 – May.2012 **Associate Instructor** (Introduction to Python, Indiana University)
Sep.2011 – Dec.2011 **Associate Instructor** (Introduction to Python, Indiana University)
Sep.2010 – May.2011 **Research Assistant**

Academic Interest

Robotics and Artificial Intelligence, Algorithms, Machine Learning

Publications

Conferences and Journals

[1] **Y. Zhang**, J. Luo and K. Hauser. Sampling-based Motion Planning with Dynamic Intermediate State Objectives: Application to Throwing. IEEE Int'l Conference on Robotics and Automation (ICRA), St. Paul, MN, USA, 2012

[2] J. Johnson, **Y. Zhang** and K. Hauser. Minimizing Driver Interference under a Probabilistic Safety Constraint in Emergency Collision Avoidance Systems. IEEE Intelligent Transportation Safety Conference, Anchorage, AK, USA, 2012

[3] **Y. Zhang**, K. Hauser and J. Luo. Unbiased, Scalable Sampling of Closed Kinematic Chains. IEEE Int'l Conference on Robotics and Automation (ICRA), Karlsruhe, Germany, 2013

[4] **Y. Zhang**, J. Luo, K. Hauser, R. Ellenberg, P. Oh, H. A. Park, M. Paldhe and C. S. G. Lee. Motion Planning of Ladder Climbing for Humanoid Robots. IEEE Int'l Conference on Technologies for Practical Robot Applications (TePRA), Boston, MA, USA, 2013

[5] **Y. Zhang**, K. Hauser. Unbiased, scalable sampling of protein loop conformations from probabilistic priors. BMC Structural Biology 2013, 13(Suppl. 1):S9, doi:10.1186/1472-6807-13-S1-S9 (impact factor 2.10)

[6] J. Luo, **Y. Zhang**, K. Hauser, H. A. Park, M. Paldhe, C. S. George Lee, M. Grey, M. Stilman, J. H. Oh, J. Lee, I. Kim, P. Oh. Robust Ladder-Climbing with a Humanoid Robot with Application to the DARPA Robotics Challenge. IEEE Int'l Conference on Robotics and Automation (ICRA), Hong Kong, China, 2014

[7] **Y. Zhang**, J. Luo, K. Hauser, H. A. Park, M. Paldhe, C. S. G. Lee, R. Ellenberg, B. Killen, P. Oh, J. H. Oh, J. Lee, I. Kim. Motion Planning and Control of Ladder Climbing on DRC-Hubo for DARPA Robotics Challenge. [Video submission] IEEE Int'l Conference on Robotics and Automation (ICRA), Hong Kong, China, 2014

Workshops

[8] **Y. Zhang** and K. Hauser. Driver Interference and Risk in Semiautonomous Braking Under Uncertainty. Intl. Workshop on Collaborative Robots and Human Robot Interaction, Philadelphia, PA, USA, 2011

[9] J. Johnson, **Y. Zhang**, and K. Hauser. Semiautonomous Longitudinal Collision Avoidance Using a Probabilistic Decision Threshold. IROS Workshop on Perception and Navigation for Autonomous Vehicles in Human Environments, San Francisco, CA, USA, 2011

[10] **Y. Zhang** and K. Hauser. Unbiased, Scalable Sampling of Constrained Kinematic Loops. BIBM Workshop on Computational Structural Bioinformatics, Philadelphia, PA, USA, 2012

[11] **Y. Zhang**, J. Luo, K. Hauser. Planner-aided Design of Ladder Climbing Capabilities for a DARPA Robotics Challenge Humanoid. IEEE ICRA Workshop on Progress and Open Problems in Motion Planning and Navigation for Humanoids, Karlsruhe, Germany, 2013

[12] K. Hauser and **Y. Zhang**. Planning-Aided Robot Design: Unified Optimization of Form, Physics, and Motion. ICRA Workshop on Task-based Optimal Design of Robots, Hong Kong, China, 2014

Selected Research Projects

DARPA Robotics Challenge (DRC) – Ladder Climbing Event

Sep.2012 – Dec.2013 Supervisor: Dr. Kris Hauser and Dr. C. S. George Lee

Summary: Development of a motion planning and control framework for humanoid DRC-Hubo climbing an industrial ladder.

Result of DRC Trials: DRC-Hubo climbed 8 out of 9 steps in DARPA Robotics Challenge Trials in Dec. 2013 which is the 3rd overall performance among 16 teams in Task Ladder.

Related publications: [4][6][7][11][12]

Project website: http://www.indiana.edu/~motion/drc/index.html

Kinematic Chain Configuration Sampling

May.2012 – Aug.2012 Supervisor. Dr. Kris Hauser and Dr. Predrag Radivojac

Summary: Development of a new Markov chain Monte Carlo method - Sub-Loop Inverse Kinematics Monte Carlo (SLIKMC) that generates configurations of a kinematic chain according to probabilistic structural priors.

Related publications: [3][5][10]

Project website and SLIKMC software package: http://www.iu.edu/~motion/slikmc/

Semiautonomous Vehicle Safety System

Sep.2010 – May.2012 Supervisor: Dr. Kris Hauser

Summary: Development of a safety enhancement system that applies longitudinal control to the subject vehicle to avoid/mitigate collision with front objects. We use an extended Kalman filter to estimate the vehicle/environment state in the presence of sensing and control errors and environment uncertainty. A new probabilistic decision rule is developed for controlling the subject vehicle according to the collision risk level.

Related publications: [2][8][9]

Robot Arm Grasping and Throwing

Jan.2010 – Sep.2010 Supervisor: Dr. Kris Hauser

Summary: Development of a sampling-based motion planner for robot arms (Puma, TX90) to perform grasping and throwing task under kinematic and dynamic constraints.

Related publications: [1]

Project website: http://www.iu.edu/~motion/throwing/

Programming Languages and Systems

Languages: C++*, Java*, Python#

Operating systems: Windows, Linux

*: proficient

#: familiar

Graduate Level Courses

Artificial Intelligence and Robotics: Elements in Artificial Intelligence**,** Principles of Intelligent Robot Motion

Statistics & Machine Learning: Machine Learning, Statistical Computing

Algorithms: Advanced Data Structure, Advanced Algorithms Analysis, Theory of Computing, Topics in Bioinformatics, Topics in Applied Logic

Systems: Computer Networks

Other Courses: Programming Language Foundation, Compiler Design, Scientific Computing, Advanced Scientific Computing, Parallel Programming