

XIANYI CHENG

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EDUCATION

- AUG 2019 - PRESENT PhD in MECHANICAL ENGINEERING
Carnegie Mellon University
Advisor: Matthew T. Mason and Howie Choset
- AUG 2017 - AUG 2019 Master of Science in ROBOTICS
Carnegie Mellon University
Advisor: Matthew T. Mason
- AUG 2013 - JUN 2017 Bachelor of Science in AEROSPACE ENGINEERING
Harbin Institute of Technology

PUBLICATION

- **Cheng, Xianyi**; Jia, Zhenzhong; Bhatia, Ankit; Aronson, Reuben M.; and Mason, Matthew T. (2018) *Sensor Selection and Stage and Result Classifications for Automated Miniature Screwdriving*. International Conference on Intelligent Robots (IROS). [PDF](#)
- **Cheng, Xianyi**; Jia, Zhenzhong; and Mason, Matthew T. (2019) *Data-Efficient Process Monitoring and Failure Detection for Robust Robotic Screwdriving*. International Conference on Automation Science and Engineering (CASE), (To appear). [PDF](#)
- **Cheng, Xianyi**; Hou, Yifan; and Mason, Matthew T. (2019) *Manipulation with Suction Cups using External Contacts*. International Symposium on Robotics Research (ISRR), (To appear).

RESEARCH EXPERIENCE

Current	Research Assistant, the Manipulation Lab , Carnegie Mellon University
OCT 2017	Dexterous Manipulation with Vacuum Grippers (ongoing project) <ul style="list-style-type: none">• Developing contact models and physical models for vacuum suction cups• Modeling suction cups as elastic joints to perform dexterous manipulation tasks• Planning vacuum gripper actions using hybrid force-velocity control Automation of Screwdriving Assembly Data-efficient Fault Detection and Process Monitoring System <ul style="list-style-type: none">• Developed realtime stage classification and result prediction system for mininature screwdriving assembly• Developed sensor reduction algorithms to select for minimal sensor set while achieving high prediction accuracy• Incorporated process models into hidden markov model for process monitoring to achieve data-efficiency Parallel Force Position Control of the Assembly Plane <ul style="list-style-type: none">• Built hardware and control system for xy compliance stage• Implemented parallel force position control to reduce the rate of screwdriving failure caused by alignment errors

JUN 2017	Research Assistant, Spacecraft System Research Center, Harbin Institute of Technology
JAN 2017	Indoor SLAM and 3D Object Segmentation <ul style="list-style-type: none"> Implemented RGB-D SLAM and 3D point cloud reconstruction using Kinect V2 camera Designed Object Segmentation algorithms on 3D point cloud using region growing method
SEPT 2016	Research Assistant, Pattern Recognition Lab, Harbin Institute of Technology
MAY 2016	Interactive Segmentation of Objects in Cluttered Environment <ul style="list-style-type: none"> Selected and tracked features using KLT feature tracking method. Segregated features into different clusters by their trajectories. Segmented object contours and identify objects given multiple fixations.

PROJECT EXPERIENCE

DEC 2018	Reasoning and Learning for Robot Construction
SEPT 2018	<ul style="list-style-type: none"> Developed a relational graph representation as the state representation for the robot construction problem Designed symbolic planning based on the relational graph representation Trained a visual learning system for pre- and post- condition prediction
DEC 2018	Stable Motion Planning under Multiple Contacts
SEPT 2018	<ul style="list-style-type: none"> Implemented RRT planning for object manipulation under multiple contacts Implemented kinematic analysis for finger contact selection and stability analysis
MAY 2018	Deep Learning for Video Game Music Generation
FEB 2018	<ul style="list-style-type: none"> Combined recurrent neural network with convolutional restricted Boltzmann machine for music generation (on tensorflow) Built a video game music dataset where all songs only composed of a main track and a drum track
AUG 2016	Handheld Detergent-free Ultrasonic Washer
DEC 2015	<ul style="list-style-type: none"> First Prize of the 9th National University Student Contest on Energy Saving and Emission Reduction Developed a series of prototypes for handheld ultrasonic washers Verified the effectiveness of ultrasound with mechanical vibration cleaning oil stains on the clothes without detergent

HONORS AND AWARDS

NOV 2016	The First Place in the 4th Start-up Competition in Harbin Institute of Technology
OCT 2016	Excellent Student Award in School of Astronautics
AUG 2016	First Prize of the 9th National University Student Social Practice and Science Contest on Energy Saving and Emission Reduction
JAN 2016	Selected in Outstanding Engineering Leader Program in Harbin Institute of Technology
APR 2015	People's Scholarship (awarded to top 5% students)

TECHNICAL SKILLS

Programming Languages: Python, C/C++, MATLAB
 Tools: ROS, PyBullet, Vrep, Mujoco, Tensorflow, OpenCV, Point Cloud Library, SolidWorks, AutoCAD, Multisim, Satellite Tool Kit