

Huan Weng

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Education

Northwestern University

M.S. in Mechanical Engineering, GPA: 3.84/4.0

Evanston, IL

Sep. 2015 - PRESENT

Beihang University (BUAA)

B.E. in Mechanical Engineering, Cumulative GPA: 86.3/100, Core GPA: 87.2/1000

Beijing, China

Sep. 2010 - Jun. 2014

Interests

Robotic manipulation, autonomous systems, control and mechatronics.

Publications

In-hand Sliding Manipulation with Spring-Sliding Compliance

J. Shi, H. Weng, K. M. Lynch

In preparation

Present

Divergence in Time Apportionments of Tongue Protraction and Retraction Phases for Feeding Drones and Workers of Honeybees

* J. Wu, * H. Weng, S. Yan, Y. Zhao. * contributed equally

Submitted

Present

Experimental Research about Effect of Wheel Hub Bearing Preloads on the Natural Frequency

Q. Cao, Z. Weng, S. Chen, D. Huang, S. Shen, H. Weng. In *Light Industrial Machinery*

Published

May. 2014

Honors & Awards

2016 **1st Place in Northwestern Tech Cup**, highest-level design and programming competition of graduate students

Northwestern Univ.

2013 **Excellence Prize in 5th National College Students Innovation and Entrepreneurship Contest**,

Beihang Univ.

highest-level student innovation competition in China

2013 **3rd Place in "Fengru Cup" Science and Technology Competition**, Awarded to top 10% students

Beihang Univ.

2012 **Honor of Outstanding Student**, Awarded to top 2.5% students

Beihang Univ.

2012 **Scholarship for Learning Excellence (2 times)**, Awarded to 10 out of 200 students

Beihang Univ.

2011 **2nd Place in "Fengru Cup" Creativity Competition**, Awarded to top 8% students

Beihang Univ.

2011 **3rd Place in 11th Odyssey of the Mind Competition**, Awarded to top 2% students

Beihang Univ.

Research Experience

In-hand Sliding Manipulation with Spring-Sliding Compliance

Northwestern Univ.

Department of Mechanical Engineering. Advisor: Prof. Kevin Lynch, Chair

Jul. 2016 - Present

- Modelled the spring-sliding compliant grasp and derived the contact motions given finger anchors and object motions.
- Set up the specific planar system. Experimented in-hand finger repositioning using proposed modelling and compared the result with simulations.
- Developed the impedance controller of Allegro Hand for the experiments.

Master thesis: Contact Force Control for Dexterous Manipulation

Northwestern Univ.

Department of Mechanical Engineering. Advisor: Prof. Kevin Lynch, Chair

Jan. 2016 - Present

- Developed the model for Allegro Hand and realized position control using kinematic Jacobian.
- Controlled forces at the fingertips of an Allegro Hand using Optoforce force sensors
- Implemented controllers in ROS using force sensor feedback and feedforward compensation of the manipulator dynamics.

Analysis of Energy-saving Strategies in Honeybee Feeding

Tsinghua Univ.

Department of Mechanical Engineering. Advisor: Prof. Shaoze Yan

Jul. 2014 - Jan. 2015

- Observed the movements of honeybee tongues while feeding and analyzed the motion characteristics of related tiny organs and microstructures of the appendages.
- Introduced a physical model to reveal the energy-saving strategies embedded in the nectar-feeding behavior.
- Analyzed the functional diversities of feeding behavior among bees of different species and sexes to investigate the evolutionary-related adaptability to environment constraints.

Upper Limb Robot Exoskeleton

Beihang Univ.

Robotics Institute. Advisor: Prof. Peijiang Yuan, Vice Director

Mar. 2011 - Jul. 2014

- Developed the mathematical model of the exoskeleton, designed the structure based on mechanical simulation.
- Developed a robot exoskeleton to provide extra force for workers to lift some heavy things, or to be used in patient rehabilitation.
- Led the group to complete the entire research process, including conducting surveys, choosing materials, mechanical simulation, arranging circuits, writing STM32 program, assembling and debugging.

Bachelor thesis: Analyses of Scanning Mode in Inverse-geometry Volumetric Computered Tomography

Beihang Univ.

Department of Mechanical Engineering. Advisor: Prof. Jian Fu

Jan. 2014 - Jun. 2014

- Reviewed the basic concepts and algorithms of computered tomography (CT) and of inverse-geometry volumetric computered tomography (IGCT).
- Simulated the IGCT system and its reconstruction algorithm via Matlab.
- Analyzed the reconstruction results to determine how to optimize its performance in future implementations.

Development of a New Physical Examination System

Beihang Univ.

Robotics Institute. Advisor: Prof. Peijiang Yuan, Vice Director

Jun. 2013 - Oct. 2013

- Created a household monitoring system to sense the temperature, humidity and noise of the environment to notify users' phones over Bluetooth of conditions that could be harmful to their health.
- Responsible for writing STM32 program, connecting sensors, and testing; developed hardware functions using STM32, and found appropriate information transmitting frequency.

Analysis of Preloads on Wheel Bearing Natural Frequency

Zhejiang Univ. of Tech.

Department of Mechanical Engineering. Advisor: Prof. Zeyu Weng

Mar. 2011 - Oct. 2011

- Project designed to determine how the preload effects the natural frequency of a wheel hub bearing to increase safety in vehicles.
- Set up the frequency sweep excitation technique testing system, to test different preloads and determine their effect on the natural frequency.

Academic Experience

Android Line Follower Mobile Robot

Northwestern Univ.

Course: Advanced Mechatronics

Apr. 2016 - Jun. 2016

- Designed and fabricated the mobile robot using a 3D printer and laser cutter.
- Developed an Android application to control the robot using the camera as a line detector and sending data to a PIC32 microcontroller by the serial port.
- Designed the PCB for the PIC32 and developed the motor controller code in embedded C.

DC Motor Control with PIC32 and Matlab

Northwestern Univ.

Course: Intro. to Mechatronics

Jan. 2016 - Mar. 2016

- Wrote a motor position controller on a PIC32 that included inner loop PID feedback on the current supplied to the motor using PWM as well as outer loop position feedback using encoder feedback.
- Realized serial communication between Matlab (client) and PIC32 (server) and plotted the trajectory results.

A Matlab Library for Robotic Manipulation

Northwestern Univ.

Course: Robotic Manipulation

Sep. 2015 - Dec. 2015

- Developed the library including functions from basic transformation of coordinates to dynamic trajectory planning.
- Plotted and Simulated the motion planning using Matlab.

Simulation of One-arm Basketball Shooting

Northwestern Univ.

Course: Machine Dynamics

Sep. 2015 - Dec. 2015

- Analysed the motion of both arm and basketball using geometry and kinematics in Lagrangian mechanics.
- Developed Mathematica program to simulate the process of shooting and made the 3D animation.

Skills

Proficient in C/C++, ROS, MCU, Solidworks/Simulation, AutoCAD, Matlab, Mathematica, \LaTeX , Adobe Illustrator

Familiar with Python, Java, Adams

Core Graduate Courses

Robotic Manipulation, Machine Dynamics, Feedback Systems, Intro to Mechatronics, Advanced Mechatronics, System Theory.