WANWEN CHEN

EDUCATION

Carnegie Mellon University, the Robotics Institute **Pittsburgh, PA**
M.S. in Robotics *Aug 2021*
- GPA: 4.17/4.33
- Thesis: Robotic Lateral Manipulation in Robotic Needle Steering (Advisor: Dr. John Galeotti)
- Relevant courses: Computer Vision, Medical Image Analysis, SLAM, Deep Learning

Peking University, College of Engineering **Beijing, China**
B.S. in Theoretical and Applied Mechanics *Jul 2019*
- GPA: 3.78/4.0 (Award for Excellent Graduate)
- Thesis: Sensor Fusion for Attitude Measurement Based on Quaternions and Kalman Filter (Advisor: Dr. Qining Wang)
- Cross-disciplinary Scholars in Science and Technology (CSST) Research Program, University of California, Los Angeles, Sep 2018
- Relevant courses: Information Theory, Applied Stochastic Processes, Circuits and Electronics, Principles of Automatic Control, Medical Imaging, Machine Learning

RESEARCH EXPERIENCE

Biomedical Image Guidance Lab & Biorobotics Lab, CMU **Pittsburgh, PA**
Research Assistant, Advisor: Dr. John Galeotti *Oct 2019 to present*
- Researching vision-based tracking for autonomous robotic needle insertion in collaboration with a research group and physicians.
- Developing a novel optical-flow based tissue motion segmentation algorithm for needle localization.
- Designing a needle tracking algorithm that fuses ultrasound-based needle detection algorithms and robotics kinematics to track the needle robustly under various visibility.
- Building a real-time bent needle C++/Python binding tracking algorithm.

The Robotics Research Group, Peking University **Beijing, China**
Advisor: Dr. Qining Wang *Sep 2017 to May 2019*
- Researched inertial sensors-based human motion measurement and human locomotion mode recognition algorithms for prosthesis and wearable robots.
- Designed a joint angle measurement algorithm for swimming strokes measurement based on inertial sensors in Matlab and C which achieved a matched performance with an optical motion capture system.
- Analyzed the patterns of knee joints in four swimming strokes, and built machine learning models to classify swimming strokes.
- Designed a deep learning model with Tensorflow to classify locomotion mode using signals from a strain gauge in prosthesis.
- Developed a C program for on-board neural network training and classification system for real-time locomotion mode recognition in robotic transtibial prostheses.

Biomechatronics Lab, UCLA **Los Angeles, CA**
Advisor: Dr. Veronica J. Santos *Jul 2018 to Sep 2018*
- Researched discovering human hand motion primitives during search and retrieval of a buried object in sand.
- Calibrated an inertial measurement units network with 18 sensors and created an animation framework for displaying hand movement in Python.
- Used machine learning methods to cluster primitive movement patterns and classify motion intentions.

PUBLICATIONS

Chen, W., Mehta K. N., Bhanushali B. D., Galeotti, J. Ultrasound-based Tracking of Partially In-plane, Bending Needle. (Submitted to 2021 IEEE International Symposium on Biomedical Imaging (ISBI)).

Hung, A. L. Y., **Chen, W.**, Galeotti, J. Ultrasound Confidence Maps of Intensity and Structure Based on Directed Acyclic Graphs and Artifact Models (Submitted to 2021 IEEE International Symposium on Biomedical Imaging (ISBI)).

Wang, Q., Zhou, Z., Zhang, Z., Lou, Y., Zhou, Y., Zhang, S., **Chen, W.**, Mao, C., Wang, Z., Lou, W. and Mai, J., 2020. An Underwater Lower-Extremity Soft Exoskeleton for Breaststroke Assistance. IEEE Transactions on Medical Robotics and Bionics, 2(3), pp.447-462.

Feng, Y., **Chen, W.** and Wang, Q., 2019. A strain gauge based locomotion mode recognition method using convolutional neural network. Advanced Robotics, 33(5), pp.254-263.

Mai, J., **Chen, W.**, Zhang, S., Xu, D. and Wang, Q., 2018, October. Performance analysis of hardware acceleration for locomotion mode recognition in robotic prosthetic control. In 2018 IEEE International Conference on Cyborg and Bionic Systems (CBS) (pp. 607-611). IEEE.

PRESENTATIONS

Human hand motion primitives during haptic search and retrieval of buried objects in sandbox **Los Angeles, CA**
CSST Research Program, UCLA *Sep 2018*
- Presented in Mechanical and Aerospace Engineering Peer Seminar and awarded for Outstanding Research and Presentation.
- Presented in a poster presentation for final presentation of CSST research program.

TEACHING EXPERIENCE

College of Engineering, Peking University **Beijing, China**
Tutor for Mathematics in Engineering *Feb 2019 to Jun 2019*
- Provided classes and support to sophomores for concepts clarification and exam reviews.

College of Engineering, Peking University **Beijing, China**
Tutor for Introduction to Computation *Sep 2018 to Jan 2019*
- Provided classes and supports to freshmen for concepts clarification and C program debugging.
- Advised freshmen on their academic development.

AWARDS

- Excellent Graduate, Peking University, Jun 2019.
- Outstanding Project in Undergraduate Student Research, College of Engineering, Peking University, Jun 2019.
- Outstanding Research and Presentation at the Mechanical and Aerospace Engineering Peer Seminar, CSST Program, UCLA, Sep 2018.
- Meritorious Winner in Interdisciplinary Contest In Modeling, COMAP, Apr 2018.

SKILLS

Programming: Python, Matlab, C, C++, OpenCV, PyTorch, CMake, Tensorflow
Languages: Mandarin, English, Cantonese