Hochul Hwang

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EDUCATION

University of Massachusetts Amherst   Sep.2021 - Present
M.S./Ph.D. in Computer Science
Research area: Robotics, Human-Computer Interaction, Computer Vision

Hanyang University ERICA   Mar.2013 - Jun.2019
B.S. in Robot Engineering, GPA: 3.91 / 4.5 (Cum Laude)

The University of Texas at Austin   Aug.2017 - May.2018
Exchange Program, Electrical and Computer Engineering

RESEARCH EXPERIENCE

Graduate Research Assistant, Dynamic and Autonomous Robotic Systems Lab   May.2021 - Present
Leading the guide dog robot project to support mobility for the visually impaired individuals (video, w/ audio, news)
- Designed IRB-approved qualitative research and analyzed data to define an optimal guiding system
- Evaluated object detection and segmentation algorithms for safe autonomous navigation in sidewalk environment
- Collaboratively implemented a visual representation learning based planning algorithm in Go1 using ROS
- Generated custom visual navigation data in real-world and synthetic data using Unreal Engine 4 and NVIDIA NDDS
- Led the Mobility and Vision Assistive System integration for two tasks in CYBATHLON Challenges 2023

Research Intern, Center for Artificial Intelligence @ KIST   Sep.2019 - Dec.2020
Deep learning researcher in human action recognition for developing eldercare robot's perception system
- Finetuned several deep learning algorithms with synthetic data to enhance action recognition performance
- Developed a real-time human action recognition system with accuracy of 75% (90% in trimmed videos)

Research Intern, BCI Lab @ UNIST   Jul.2019 - Aug.2019
- Developed MATLAB interface for primate BCI tasks and setup an eye-tracking system with MonkeyLogic

Undergraduate researcher, Human Centered Robotics Lab @ UT Austin   Sep.2017 - Aug.2018
Participated in the cycle of developing, testing, and optimizing the 6DOF passive-ankled biped robot
- Setup experiment protocol and supported dynamic biped balancing test
- Wrote python code for plotting sensor (joint encoder, IMU, motion capture, and contact) and state estimation data
- Designed mechanical components using CAD, 3D printing, and laser cutting

Undergraduate researcher, Lu Research Group @ UT Austin   Apr.2018 - Jun.2018
Conducted research to measure lower limb prosthetic's inner stress distribution using flexible resistive force sensors
- Manufactured and optimized resistive force sensor (Silhouette Studio) by analyzing resistance/stress using LabVIEW

Undergraduate researcher, Culture Technology R&D Group @ KITECH   Dec.2016 - Mar.2017
- Designed parts for a gimbal-based video recording structure and assembled a smart K-pop performance stage

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PUBLICATIONS

System Configuration and Navigation of a Guide Dog Robot: Toward Animal Guide Dog-Level Guiding Work
<u>H. Hwang</u>[†], T. Xia[†], I. Keita, K. Suzuki, J. Biswas, S. I. Lee, and D. Kim,
International Conference on Robotics and Automation (**ICRA**) **2023**

Highly Sensitive Capacitive Pressure Sensors over a Wide Pressure Range Enabled by the Hybrid Responses of a Highly Porous Nanocomposite
K. H. Ha, W. Zhang, H. Jang, S. Kang, L. Wang, P. Tan, <u>H. Hwang</u>, and N. Lu
Advanced Materials 2021

ElderSim: A Synthetic Data Generation Platform for Human Action Recognition in Eldercare Applications
<u>H. Hwang</u>, C. Jang, G. Park, J. Cho, and I.J. Kim
IEEE Access 2021

Control Scheme and Uncertainty Considerations for Dynamic Balancing of Passive-Ankled Bipeds and Full Humanoids
D. Kim, S. J. Jorgensen, <u>H. Hwang</u>, and L. Sentis
International Conference on Humanoid Robots (**Humanoids**) 2018

Computationally-Robust and Efficient Prioritized Whole-Body Controller with Contact Constraints
D. Kim, J. Lee, O. Campbell, <u>H. Hwang</u>, and L. Sentis
International Conference on Intelligent Robots and Systems (**IROS**) 2018

PATENTS

Human behavior recognition system and method using hierarchical class learning considering safety
J. Cho, I. J. Kim, and <u>H. Hwang</u>
U.S. Patent Application (17/565,453) 2022

HONORS AND AWARDS

University of Massachusetts Amherst CICS Jumpstart Fellowship   Sep.2021 - May.2022
STEAM CUP Creative Technology and Excellence Award   Jun.2017 - Aug.2017
  - Designed a robotic knee brace with CATIA and applied PI controller with Arduino

SKILLS

Programming: Python, C++, MATLAB, ROS, PyTorch, TensorFlow
Mechatronics: SOLIDWORKS (Certified SolidWorks Associate), CATIA, Onshape

TEACHING EXPERIENCE

Teaching Experience
Teaching Assistant   University of Massachusetts Amherst
  - Robotics   Spring 2023
  - Introduction to Robotics - Mechanics, Dynamics, and Control   Fall 2022
Student Research Mentor   University of Massachusetts Amherst
  - Advised an undergrad for an honors thesis and participated as a committee   Oct.2022 – May.2023
  - Advised a MS student to implement a path planning algorithm in GO1 robot   Jun.2022 – Jan.2023
  - Advised two undergraduate students for CAD designing   Jan.2021 – May.2022
Leadership   Amherst, MA
UMass Korean Graduate Student Association (KGSA) President   May.2022- Jun.2023