Hochul Hwang

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EDUCATION

University of Massachusetts Amherst — Amherst, MA, United States
M.S./Ph.D. in Computer Science — May.2021 - Present

Hanyang University — Ansan, Republic of Korea
B.S. in Robot Engineering, GPA: 3.91 / 4.5 (Cum Laude) — Mar.2013 - Jun.2019

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

RESEARCH EXPERIENCE

University of Massachusetts Amherst (Dynamic and Autonomous Robotic Systems Lab) — Amherst, MA, United States
Graduate Research Assistant / Advisor: Prof. Donghyun Kim — May.2021 - Present
Conducting research in developing control algorithms to mimic human-level athletic behavior in legged robotic systems

Korea Institute of Science and Technology (Center for Artificial Intelligence) — Seoul, Republic of Korea
Research Intern / Advisor: Dr. Ig-Jae Kim — Sep.2019 - Dec.2020
Developed a real-time human action recognition system with accuracy of 75% (90% in trimmed videos) and published a paper
- Task: Finetune deep learning algorithms with augmented synthetic action data for enhanced recognition performance
- Required skills: PyTorch, LaTeX

Ulsan National Institute of Science and Technology & Sungkyunkwan University (BCI Lab) — Ansan, Republic of Korea
Research Intern / Advisor: Prof. Sung-Phil Kim and Prof. Jeongwoo Sohn — Jul.2019 - Aug.2019
Setup an eye-tracking system for primate brain computer interface (BCI) system and developed code for task tools
- Required skills: MATLAB

The University of Texas at Austin (Human Centered Robotics Lab) — Austin, Texas, United States
Research Assistant / Advisor: Prof. Luis Sentis — Sep.2017 - Aug.2018
Participated in the process of developing, testing, and optimizing the 6DOF passive-ankled bipedal humanoid
- Task: Experiment protocol setup, dynamic biped balancing test, simulation data collection, figure generation
- Required skills: State estimation, sensor data analysis obtained from joint encoders, IMU, motion capture, and contact sensor; Data plot (Python), simulation (C++), and 3D printing

The University of Texas at Austin (Lu Research Group) — Austin, Texas, United States
Research Assistant / Advisor: Prof. Nanshu Lu — Apr.2018 - Jun.2018
Conducted independent research to measure lower limb prosthetic's inner stress distribution using flexible resistive force sensors
- Task: Resistive force sensor optimization, capacitive force sensor
- Required skills: Resistance/stress data analysis, LabVIEW, Silhouette Studio

Korea Institute of Industrial Technology (Culture Technology R&D Group) — Ansan, Republic of Korea
Research Intern / Advisor: Dr. Sangwon Lee — Dec.2016 - Mar.2017
Supported in two research projects: Ship video recording structure, autonomous stage for K-pop performances
- Task: Stewart platform analysis for ocean simulation and gimbal system design, stage assembly
- Required skills: MATLAB, SolidWorks

PUBLICATIONS

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

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

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

PRESENTATIONS

Session Presentation Institute of Electronics and Information Engineers, Jeju, Republic of Korea
"Improving Elderly Action Recognition Performance via Synthetic Data Training" Aug.19, 2020
- Validated RGB-based action recognition method by training on additional synthetic data on various experimental settings

Poster Presentation Clinically Applied Rehabilitation Engineering Research Symposium, Austin, TX
"Optimization in Prosthetic Socket Design" Apr.13, 2018
- Introduced a method to improve socket designs based on stress distribution data; collaborated with Hanger Clinic

HONORS AND AWARDS

CICS Jumpstart Fellowship Sep.2021 - May.2022

STEAM Open Embedded Contest, Creative Technology and Excellence Award Jun.2017 - Aug.2017
- Designed a robotic knee brace with CATIA and applied PI controller with Arduino

Hanyang University Scholarship, Academic Achievement Mar.2017 - Jun.2017

Haksan Foundation Scholarship, Academic Achievement Sep.2016 - Dec.2016

Futuristic Impressive Useful Display Competition, Finals Aug.2016 - Sep.2016
- Presented an idea of a tablet braille device applying carbon nanotube for braille readers

PROFESSIONAL EXPERIENCE

National Science Foundation Workshop Dell Medical School, UT, Austin, TX, United States
"Smart and Connected Health" Mar.11 - 14, 2018
- Participated in development of atrial fibrillation data distinguishing algorithm using MATLAB

Engineer Battalion of the South Korea Army The 17th Infantry Division of Korea, Incheon, Republic of Korea
Driver and repairer of the M9 Armored Combat Earthmover and bulldozer, squad leader Feb.2014 - Dec.2015
- Excavated and cleared areas suspected of land mine contamination
- Participated in the 2014 Asian Games and Asian Para-Games as a national flag bearer

SKILLS

Programming
(Good) Python, PyTorch, (Familiar) C/C++, ROS, MATLAB, TensorFlow

Operating System
(Good) Linux

Computer-Aided Design Software
(Good) CATIA, SolidWorks (Certified SolidWorks Associate), (Familiar) Blender

Editing Tool
(Good) LaTeX, (Familiar) Adobe Premiere Pro, Inkscape

EXTRACURRICULAR ACTIVITIES

Teaching Experience
Missionary Group Teacher SaRang Community Church, Seoul, Republic of Korea
- Taking care of young adults with intellectual disabilities Feb.2019 – May.2021

Knowledge factory Makerspace Instructor Hanyang University, Ansan, Republic of Korea
- Taught 3D printing process to undergraduate students Mar.2017 - May.2017

Hanmille International Mentor Hanyang University, Ansan, Republic of Korea
- Assisted two international engineering students with coursework and living Aug.2016 - Dec.2016

Startup Activities Capital Factory, Austin, Texas, United States
"Crash Cook-Off" team initial member Nov.2017- Jan.2018
- Built a team at 3 Day Startup, pitched ideas to investors, and actually provided a team-building service

Robotics Engineering Soccer Club Hanyang University, Ansan, Republic of Korea
Team Captain May.2013 - May.2017