Lucas Hyunin Lee

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Education

U.C. Berkeley — CA, United States
M.S./Ph.D. in Mechanical Engineering — *Aug. 2022 –*

Seoul National University — Seoul, Rep.of.Korea
B.S in Mechanical Engineering; summa cum laude — *Mar. 2015 – Feb. 2022*

Research interest

Optimization, Machine Learning

Publications

[1] Explainable Deep Learning Model for EMG Based Finger Angle Estimation Using Attention. **H. Lee**, D. Kim, Y. Park. *IEEE Transactions on Neural Systems and Rehabilitation Engineering.* vol. 30, pp. 1877-1886 2022. **[pdf]**

Research Experience

Soft Robotics & Bionics Lab — Mar. 2021 – Nov. 2021
Research Intern — *Seoul National University*

- Develop explainable deep learning algorithm to predict 14 finger angles based on muscle activation on forearm using Python
- Familiar with EMG sensor, NLP deep learning algorithm, and designing human experiment

Sports Engineering Lab — Jun. 2019 – Feb. 2020
Research Intern — *Seoul National University*

- Analyze lowerlimb muscle synergy while walking, running, sprinting using Matlab
- Analyze local stability of mathematical human walking model using Matlab
- Familiar with motion capture system, force plate, data analysis (NMF, ICA)

Robot Learning Lab — Sep. 2020 – Jun. 2021
Research Intern — *Seoul National University*

- Develop DQN reinforcement learning algorithm that utilize VAE-GAN as a reward function using Python **[pdf]** **[video]**
- Develop vision based multi-task deep learning algorithm of Baxter robot arm using Python and C++
- Familiar with reinforcement learning algorithm, Baxter robot

Biorobotics Lab — Mar. 2020 – Dec. 2020
Undergraduate Thesis — *Seoul National University*

- Manufactured the one-legged jumping robot
- Build dynamic simulation of one-legged jumping robot using Matlab

Work Experience

Knowledge AI — Jul. 2021 – Present
AI scientist — *Boston,MA*

- Develop an algorithm that quantifies students' understanding on each math topic using python
- Suggest and build problem-recommendation deep learning algorithm on Math online learning system using python
- Improved Jordan students' performance who use math online learning system by implementing my algorithm

Scholarships and Honors

Kwanjeong Abroad Scholarship | *Kwanjeong Educational Foundation* Fall 2022 – Present
Berkeley Fellowship for Graduate Study | *Graduate Division* Fall 2022 – Present
National Science & Technology Scholarship | *Korea Student Aid Foundation* Spring 2017, Fall 2019 Spring 2020, Fall 2020
Certificate of Appreciation (AI Tech Play) | *Dean, college of Engineering, Seoul National University* Jun. 2021
Scholarship to Academic Excellence | *Seoul National University* Spring 2015, Fall 2015 Spring 2016, Fall 2016

graduate courses

Stochastic Control and Reinforcement Learning (grade: A+)
Biologically Inspired Robotics (grade: A+)
Optimization Theories in Human Movements (grade: A0)
Optimization Theory and Application (grade: A0)
Biomechanics of the Lower Extremities (grade: A0)
Robot Mechanics (grade: A0)
Advanced Mechanical Engineering Analysis (grade: A+)

Technical Skills

Languages: Python (Advanced), MatLab (Advanced), C++, SolidWorks
Developer Tools: Visual Studio, PyCharm
Software library, platform : Pytorch (Advanced), Tensorflow, ROS, gazebo, openAI gym

Class Projects

Mechanical Product Design Mar. 2017 – Jul. 2017
- Topic : reverse engineering of RC car powered by 2-cylinder engine
- Fatigue analysis of the RC car/ Design the optimal seat absorber robust against various terrain topology / FFT analysis of engine sound / Optimal design of the car shape that minimize the air viscous force

Material and Manufacturing Processes | Best Project Award Sep. 2019 – Dec. 2019
- Topic : build novel mass in mass structure made up with SMA material that shows broad stopband of propagating wave.

Robot Mechanic Sep. 2019 – Dec. 2019
- Topic : constrained motion planing of the KUKA arm
- Implement control law for specific task with kinematic constraints.

Convex Optimization Sep. 2019 – Dec. 2019
- Topic : mathematical condition of stable walking of torso-included human walking model

Introduction to Intelligent System Sep. 2020 – Dec. 2020
- Topic : path planning of the RC car
- Implement PID controller, RRT, RRT-star, SLAM, AMCL algorithm in C++ and simulate on Gazebo, Rviz

Teaching Experience

Teaching Tutor, Math and Physics for Freshman Spring 2019, Spring 2020
Teaching Assistant, Dynamic Fall 2019
Teaching Assistant, Mechanical Product Design Fall 2020

open courses

MIT 18.065 Matrix Methods in Data Analysis, Signal processing, and Machine learning
Caltech CS156 Learning from Data
MIT 6.832 Underactuated Robotics
UCB CS294 Deep Reinforcement Learning
HSE University Deep Bayes 2019 Summer School
Cousera University of Alberta Reinforcement Learning

Extra Curricular

AI Tech Play (KAIT foundation) | *Non-Profit Organization for AI education* Mar. 2021 – Aug. 2021

- Serve as Author : publish a first autonomous car python coding practice book in South Korea
- Serve as Organizer : organize the "The 1st Autonomous Driving Mini Car Coding and Contest"

SNU-XCORPS | *SNU research program* Apr. 2021 – Dec. 2021

- Research program under National Research Foundation of Korea funded by the Korean government
- Research topic : Attention based RNN for finger angle estimation based on EMG

SNUSV | *Venture club of Seoul National University* Mar. 2015 – Jul. 2016

- Launch mentoring service for high school students

STEM | *Honor Society of Seoul National University, College of Engineering* Sep. 2019 –Feb. 2021

- Serve as leader of academic department
- Launch seminar : Optimization in Human Movement / AI inspired from how human learns : deep dive into reinforcement learning