# PORTFOLIO

**Su-bin Kim**
Gyeongsang National University in Republic of Korea (South)
Undergraduate Major : Mechanical engineering

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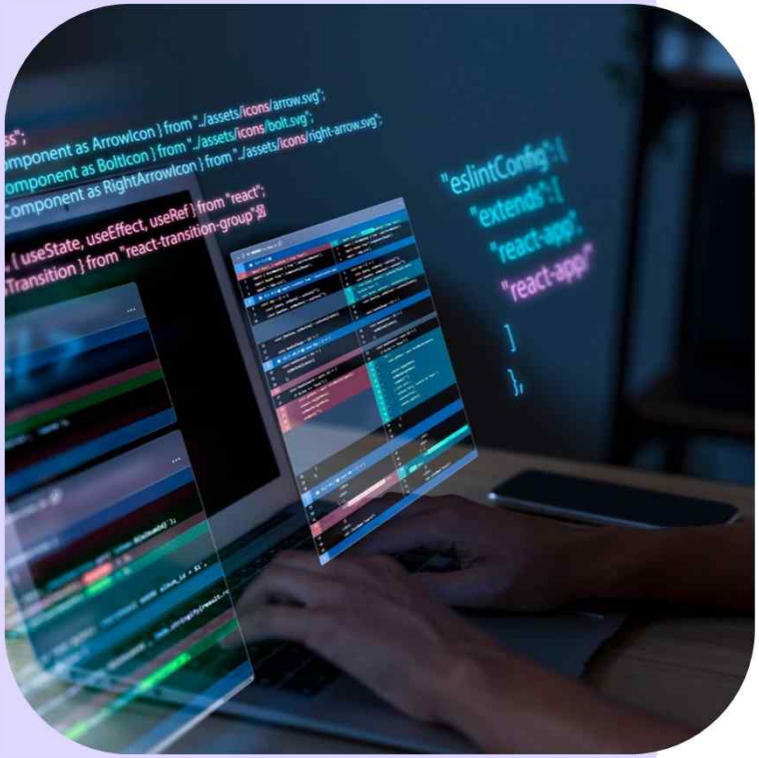



# Resume

# Subin Kim

**+82 10-8768-9075**
**subinkimcs99@gmail.com**

"I always strive for **development** with **Collaboration** with peers. Enjoying the **challenge** giving me sense of living"

## EXPERIENCE

**2023-Winter** — **Undergraduate Research Student -> Research Intern** — Intelligence and Interactive Robotics Lab, GNU, Jinju, Republic of Korea.

- Ankle Mobility Assistance Robot Utilizing Reinforcement Learning
- Adapting and Enhancing the Reinforcement Learning Algorithm in the Atari Game and Mario Game
- A Mobility Assistance Module for Visually Impaired Individuals

**2022-2022** — **Undergraduate Research Student** — Safe Search Lab, GNU, Jinju, Republic of Korea.

- F1Tenth Autonomous Driving
- "F1Tenth Autonomous Driving Global Education and Race," LINC 3.0 Capstone Design Conference in Suwon-si, Republic of Korea, 2022
- The 1st F1Tenth Korea Championship, 2022: Second Prize (Sonnet.ai Proprietor Award)

**2021-2022** — **Vacation Lab** — Composite Structure Lab, GNU, Jinju, Republic of Korea.

- Fabrication of carbon fiber-reinforced polymers (CFRP) and performing a tensile measurement

## Education

**2017- 2023** — **B.S., Gyeongsang National University (GNU), Jinju, Republic of Korea.**
**Discipline: Mechanical Engineering**

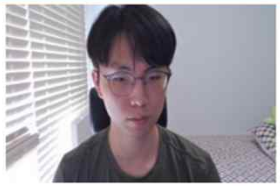
- ME
- CS

**English Proficiency :**
**Toefl(home toefl IBT) : 85**
**Duolingo test : 115**

ETS TOEFL iBT

# Test Taker Score Report

**Name:** SUBIN, KIM
Last (Family/Surname) Name, First (Given) Name Middle Name
**Email:** kubera1504@naver.com
**Gender:** Male
**Date of Birth:** January 10, 1999
**Appointment Number:** 6444 4102 3908 0347
**Test Date:** October 10, 2023



SUBIN, KIM
11, Ena-ro 175beon-gil, Jinju-si, Gyeongsangnam-do, Rep
402-2101
Jinju-Si, 52855
Korea, Republic of

| Inst. Code | Dept. Code |
|---|---|
| | |

**Country of Birth:** Korea, Republic of
**Native Language:** Korean
**Test Center:** STNRPKOR - Home Edition
**Test Center Country:** Korea, Republic of

Security Identification

**ID Type:** PASSPORT **ID No.:** xxxxxxxxxxxxxxxxxxxx5514 **Issuing Country:** Korea, Repub

**THIS IS A PDF SCORE REPORT, DOWNLOADED AND PRINTED BY THE TEST TAKER.**

## October 10, 2023 Test Date Scores

**Total Score**
85
out of 120
0 — 120

| | | |
|---|---|---|
| Reading: | 22 | 0 — 30 |
| Listening: | 23 | 0 — 30 |
| Speaking: | 19 | 0 — 30 |
| Writing: | 21 | 0 — 30 |

## *MyBest*® Scores

Your highest section scores from all valid test dates, as of October 13, 2023.

**Sum of Highest Section Scores**
94
out of 120

| | | | |
|---|---|---|---|
| Reading: | Test Date: Oct 01, 2023 | 30 | 0 — 30 |
| Listening: | Test Date: Oct 10, 2023 | 23 | 0 — 30 |
| Speaking: | Test Date: Oct 01, 2023 | 20 | 0 — 30 |
| Writing: | Test Date: Oct 10, 2023 | 21 | 0 — 30 |

*A total score is not reported when one or more sections have not been administered.*
Expired scores are not included in ***MyBest*®** calculations.

55-82





## KIM, SUBIN

2023년 12월 2일

duolingo english test

# 115 종합

다양한 상황과 모드에서 영어를 구사할 수 있는 시험 응시자의 능력입니다.

10 — 160

익숙하지 않은 주제에 대해서도 대부분의 의사소통을 수행할 수 있습니다.

구체적이고 추상적인 글의 주요 논점을 모두 이해할 수 있습니다.

능숙한 언어 구사자와 쉽게 의사소통할 수 있습니다.

## 125 Literacy

응시자의 읽기 및 쓰기 능력.

10 — 160

## 110 Comprehension

응시자의 읽기 및 듣기 능력.

10 — 160

## 95 Conversation

응시자의 듣기 및 말하기 능력.

10 — 160

## 105 Production

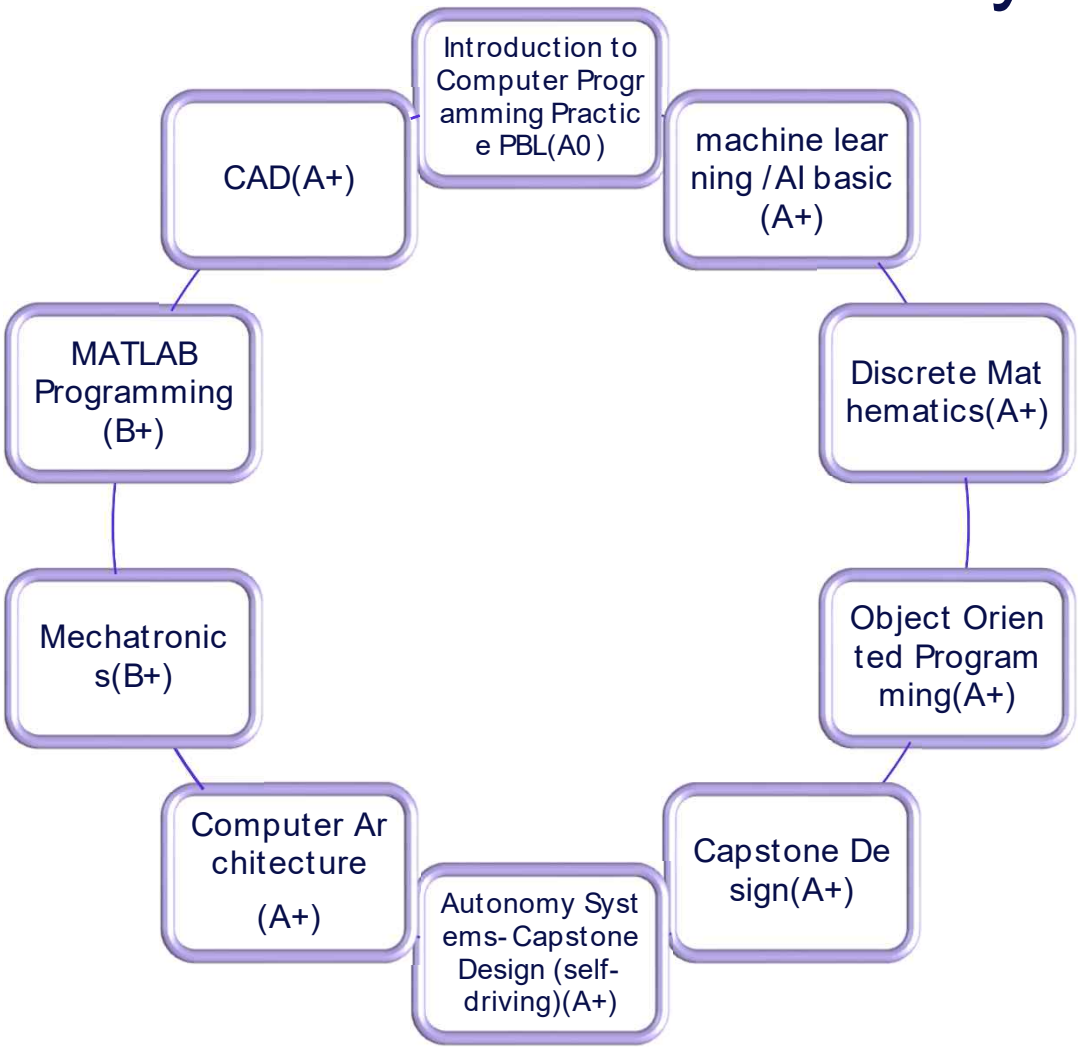
응시자의 쓰기 및 말하기 능력.

10 — 160

■ 귀하의 점수 ■ 점수 범위

자세히 알아보기: englishtest.duolingo.com/scores

# My skills




## CS Skills

| | |
|---|---|
| Python | 90 |
| Kotlin | 30 |
| C | 30 |
| MATLAB | 30 |

## ME Skills

| | |
|---|---|
| CATIA | 90 |
| Workbench 2022 R1 | 30 |
| COMSOL | 30 |

# My Project


./logo.svg';
css';
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assName="App-head
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de>src/App.js</co
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e="App-link"
ps://reactjs.org'
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act
nent as ArrowIcon
as BoltIcon } fr
as RightArrow
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"ex
"re
center;

# Project_01

Mid-Term project
machine learning / AI basic

# Dice Game

Python

Tkinter

PIL

- This is a game where two characters, a user and a computer player, roll a die to determine how many spaces they move forward.
- Start game with key ‘Space’
- After pressing 'Space,' both the user and computer player are placed at the starting point.
- In the center, a dice automatically rolls, and each character moves a number of spaces corresponding to the roll of the dice.
- The game concludes when either the user or the computer character completes one lap around the board, signaling the end of the game.

Achievement

1st in machine learning / AI basic

https://github.com/MrHeadshot99/Dice-game

# Project_02

Final- Term project
machine learning / AI basic

**Reinforcement Learning in Atari game Pong_v0**

Python

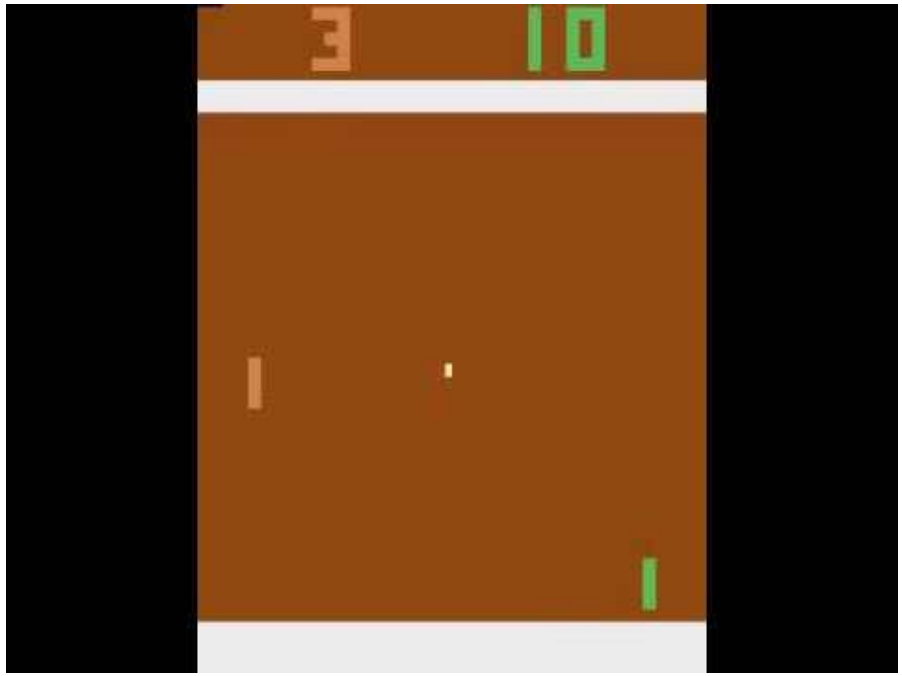
Tensorflow 2x

Gym

CV2

Achievement
1st in machine learning / AI basic

- A game between computer and agent. The first to score 21points wins




https://github.com/MrHeadshot99/Reinforcement-Learning-in-Atari-game-Pong_v0

# Project_03

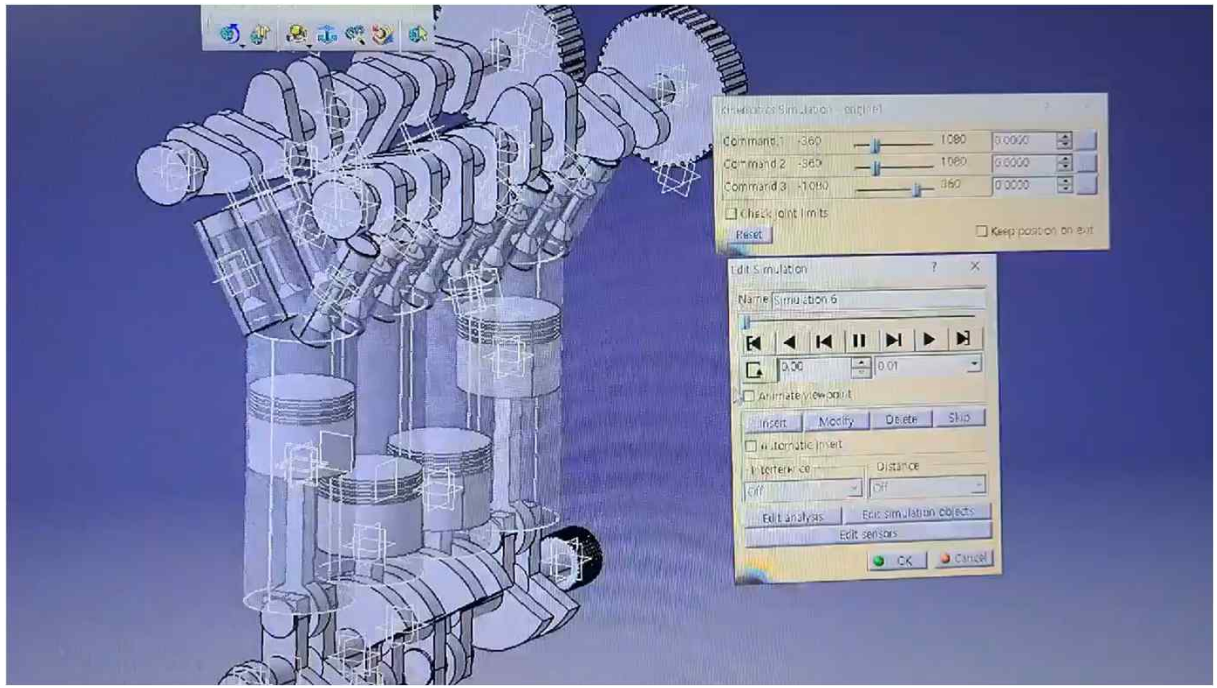
Final-Term project
CAD

## 4-Stroke Engine

CATIA V5

Kinematics

- Implemented the 4-Stroke Engine used in car with Kinematics without any design



https://youtu.be/l1p4-6W3ew

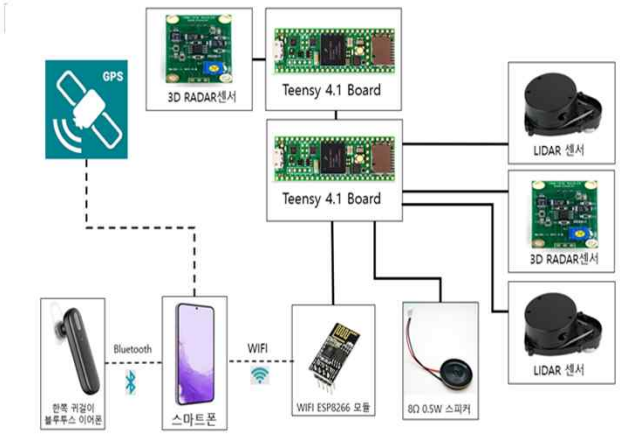
# Project_04

2022 GNU Creative Challenge Design-Based Idea Competition

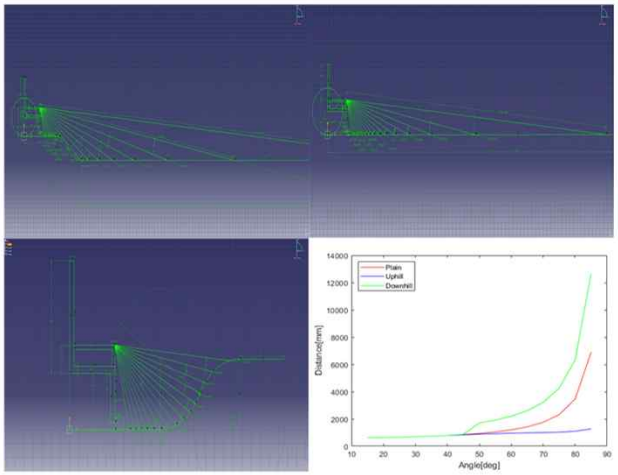
**Second Prize (College of Engineering Dean's Award)**

## A mobility Assistance Module for visually impaired individuals

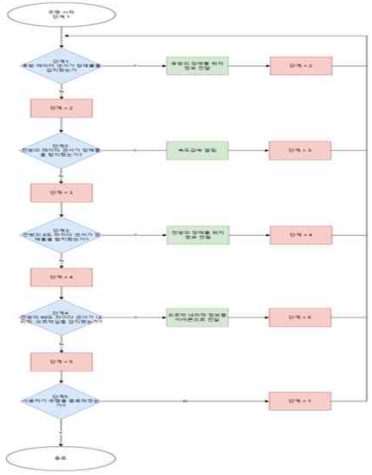
MATLAB



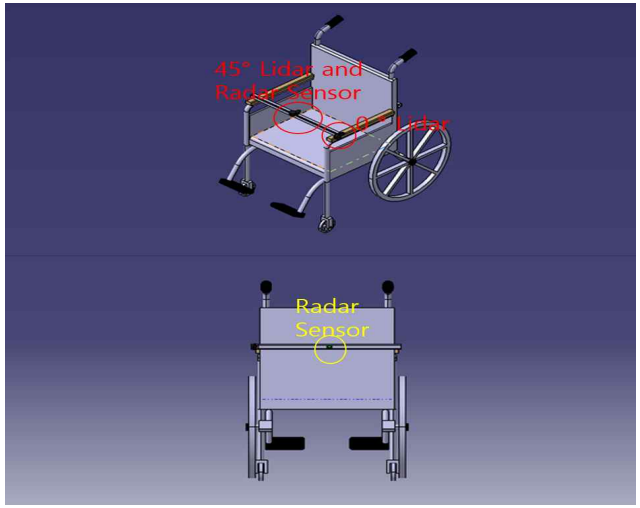

- Designing total concept and hardware with Teensy 4.1Boards, YDLIDAR X3 Arduino kits, digital Radar modules (TRM-121A), a speaker, and an ESP8266 Wi-Fi module.




- Principle of gradient recognition algorithm



- Control Diagram




- Expected product

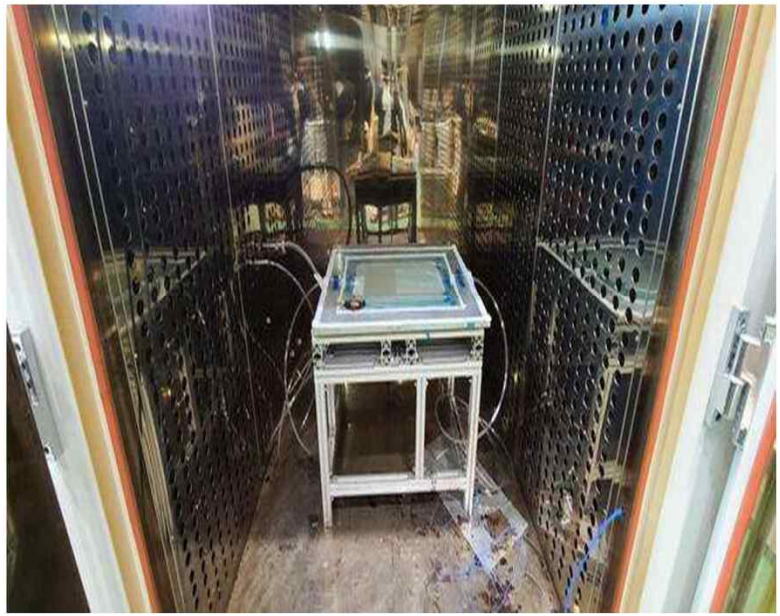
# Experiences in several Labs

This experiences is a collection of my undergraduate life. **Let them inspire you!**

# Vacation Lab in Drs. Jin ho Choi's Composite Structure Lab during one month.

Make Resin

Make CFRP(carbon Fiber+Resin)



# Vacation Lab in Drs. Jin ho Choi's Composite Structure Lab

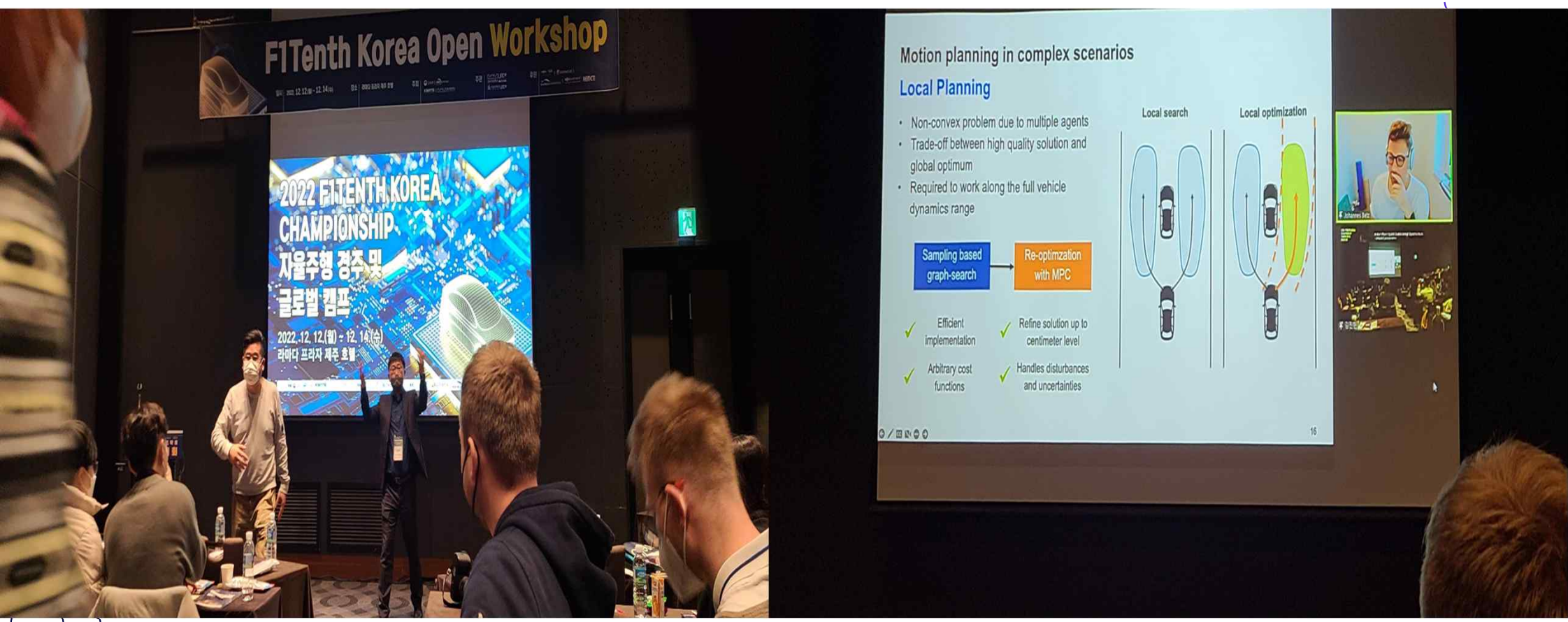


For the first time, I could verify what I learn from Mechanics of Solids from this tensile test.

# Seminar in Safe Search Lab about F1/10th Autonomous Driving

# Working on a poster presentation and at local conference
# F1/10th Autonomous Driving

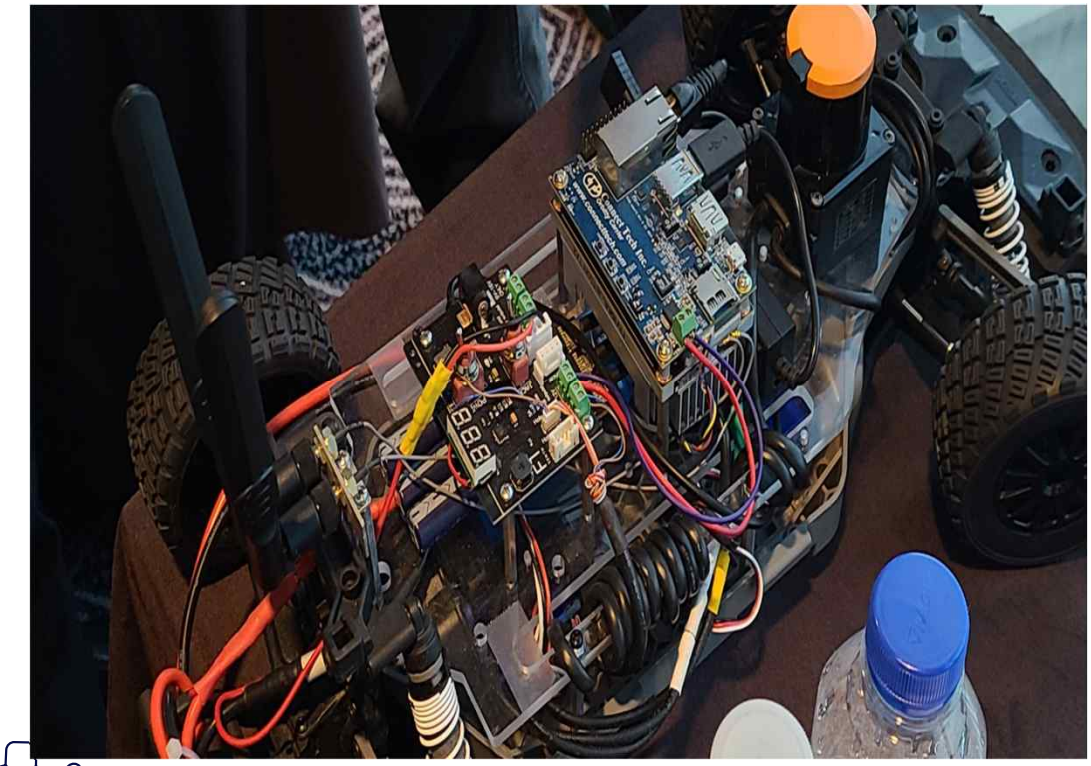
# F1Tenth Korea open Workshop




In this workshop, I can get an information about recent research field in autonomous driving from U-pen and Google researchers

# 2022 FITENTH KOREA CHAMPIONSHIP

# 2022 F1TENTH KOREA CHAMPIONSHIP




I won the second prize in this competition with my team

# Our racing in 2022 F1TENTH KOREA CHAMPIONSHIP

https://youtu.be/aa0cbGCfRA0

제2022-0426호

GYEONGSANG NATIONAL UNIVERSITY

# 상 장

Certificate of Achievement

2 위
2nd Place

Team Name
Affiliation : Gyeongsang National University
Department:Department: School of Mechanical, Aerospace and Information Engineering
Name: Subin Kim

팀 명: ACE
소 속: 경상국립대학교
과 명: 기계항공정보융합공학부
명: 김수빈

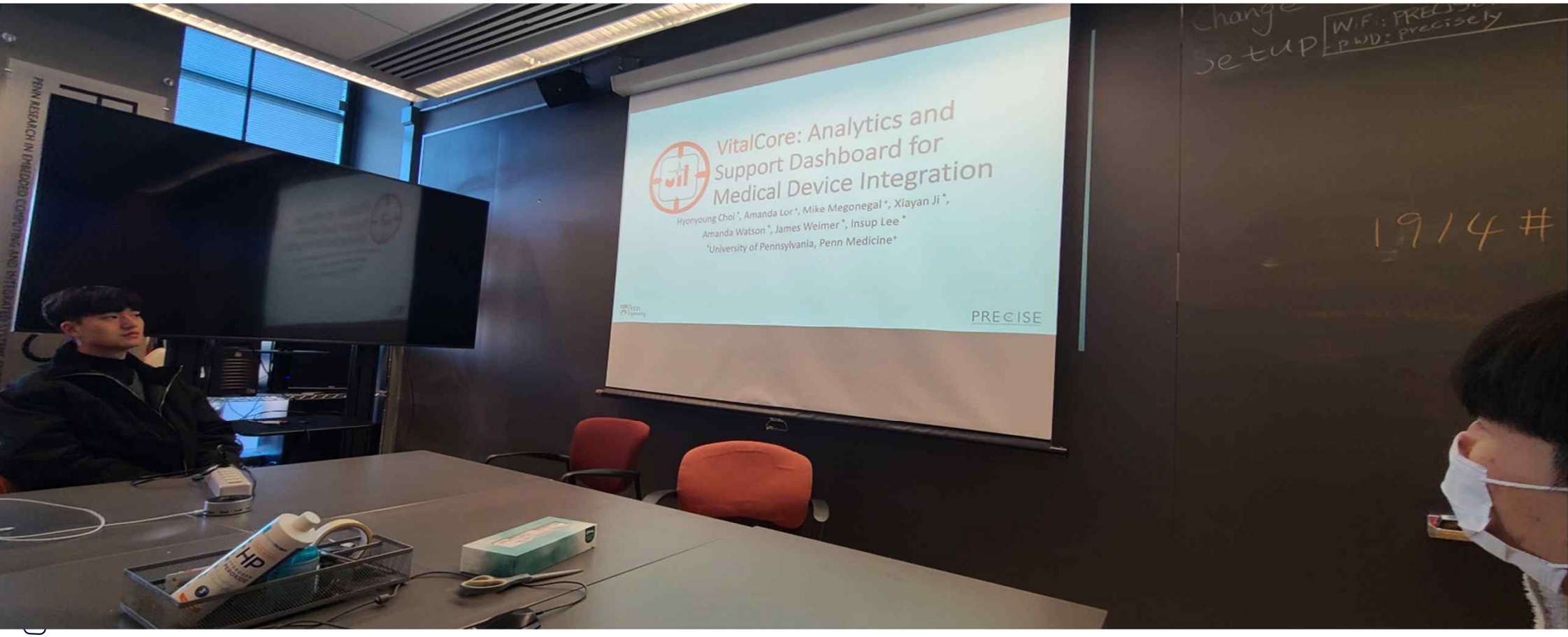
위 사람은 경상국립대학교 LINC 3.0 사업단에서 주관한 『2022 F1Tenth Korea Championship 자율주행 및 글로벌 캠프』에서 위와 같은 성적으로 입상하였기에 이 상장을 수여함.

This certificate is awarded to the above person for achieving the aforementioned ranking in the 2022 F1Tenth Korea Championship Autonomous Driving and Global Camp, hosted by the LINC 3.0 Project Team of Gyeongsang National University.

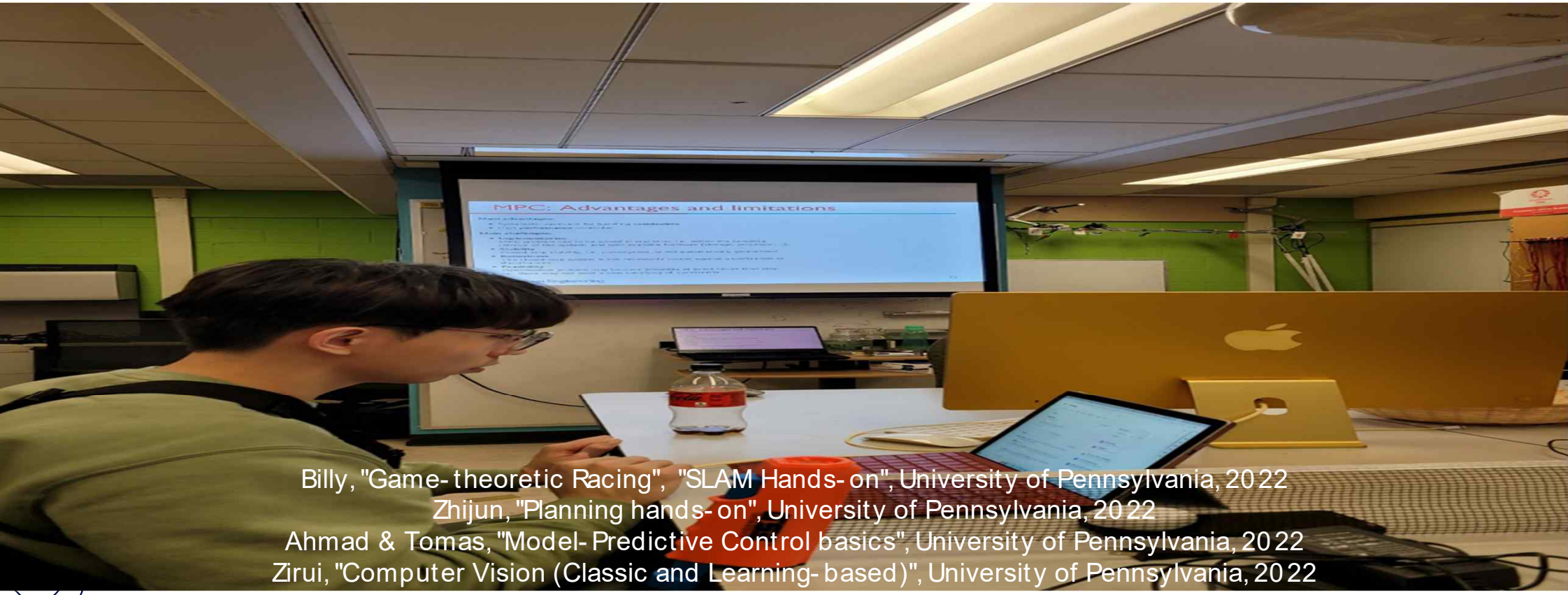
2022. 12. 14.

경상국립대학교총장
President of Gyeongsang National University

# First seminar : Project with Penn Medicine in Precise Lab Of University of Pennsylvania



# GNU-UPenn Collaborative Academic Research Seminar Series




Billy, "Game-theoretic Racing", "SLAM Hands-on", University of Pennsylvania, 2022
Zhijun, "Planning hands-on", University of Pennsylvania, 2022
Ahmad & Tomas, "Model-Predictive Control basics", University of Pennsylvania, 2022
Zirui, "Computer Vision (Classic and Learning-based)", University of Pennsylvania, 2022

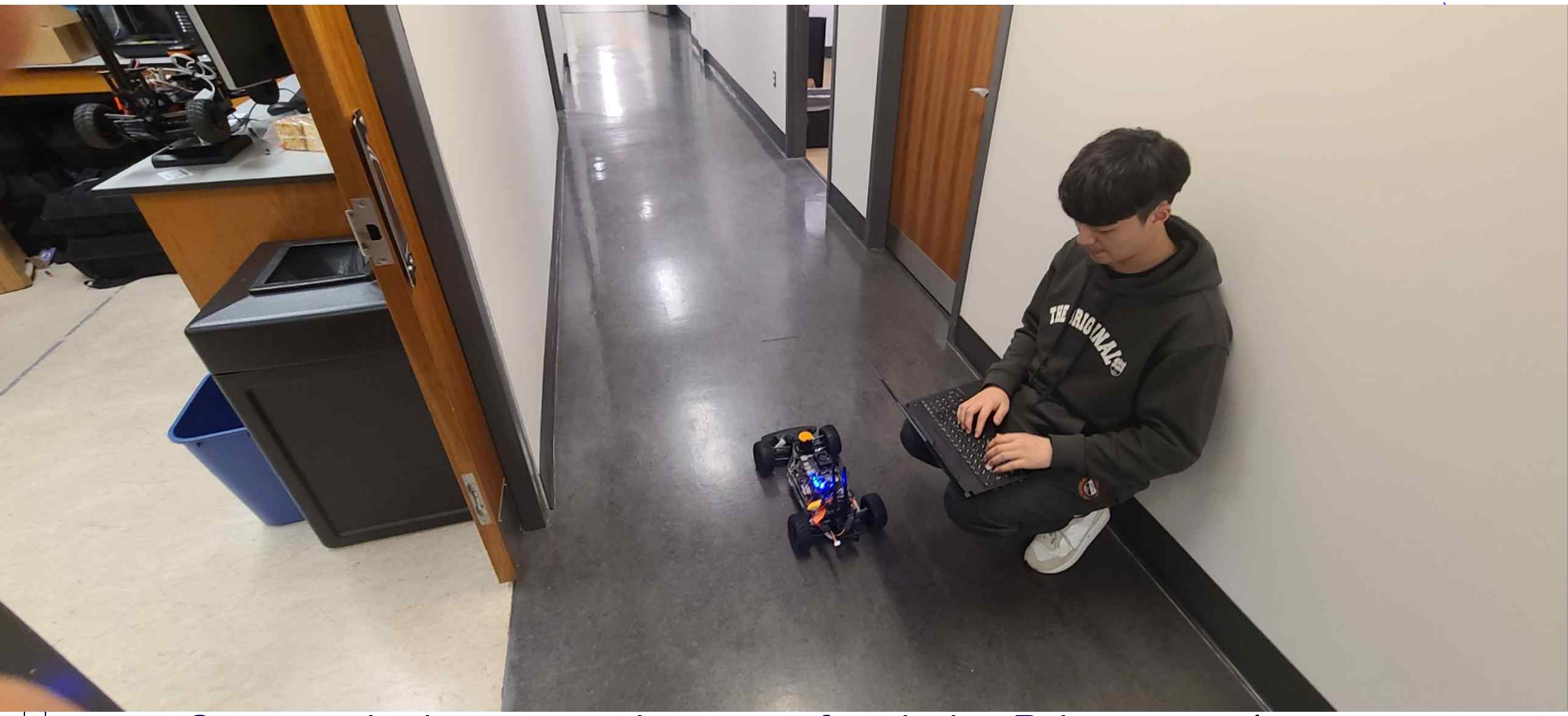
# Lecture about Tini ML


I took a lecture  about Tini ML in U-Pen until three times

# Applying the new technology in our F1Tenth car

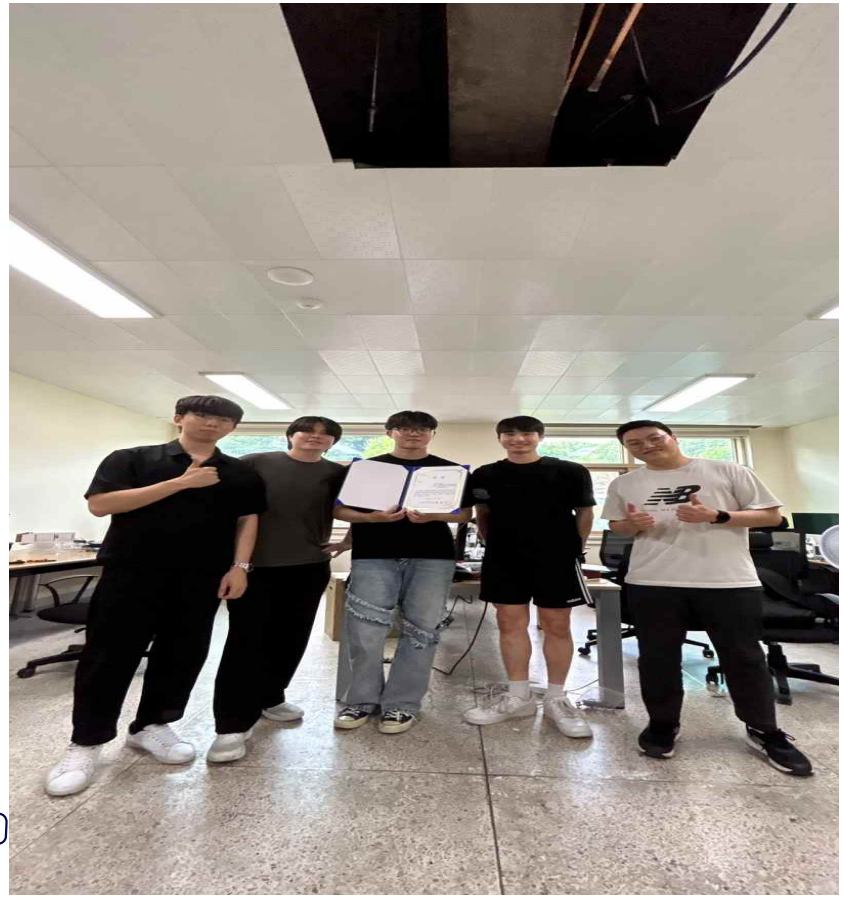
Our team had tried to update our car into ROS2 version

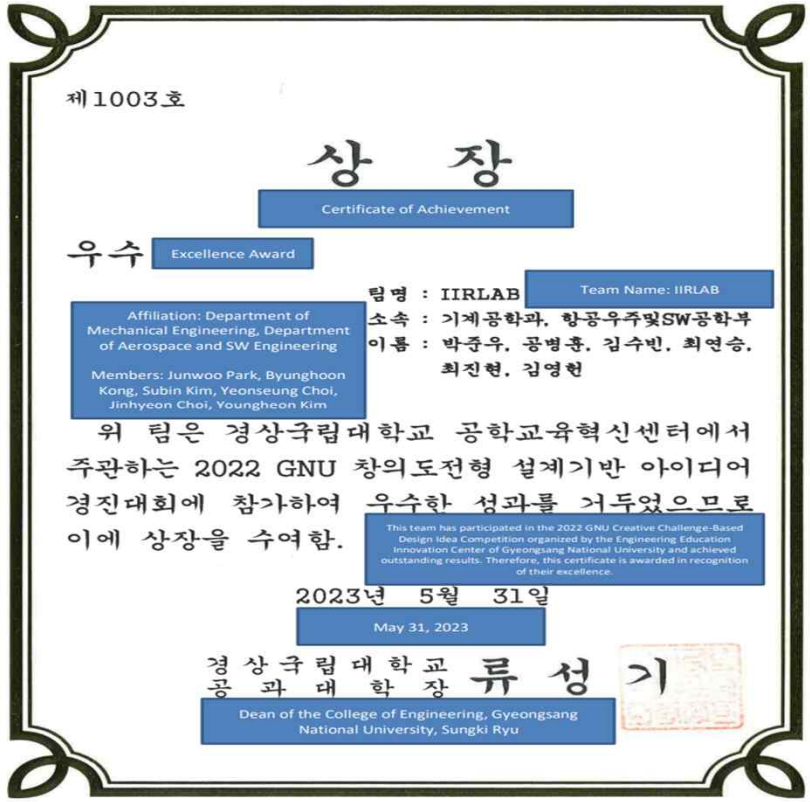
# Mapping U-pen's passage through Slam ToolBox of ROS2



Our team had a success in terms of updating Robot control system

# A Mobility Assistance Module for Visually Impaired Individuals In Intelligence and Interactive Robotics Lab





제1003호

상 장

Certificate of Achievement

우수 Excellence Award

팀명 : IIRLAB Team Name: IIRLAB

소속 : 기계공학과, 항공우주및SW공학부

이름 : 박준우, 공병훈, 김수빈, 최연승, 최진현, 김영헌

Affiliation: Department of Mechanical Engineering, Department of Aerospace and SW Engineering

Members: Junwoo Park, Byunghoon Kong, Subin Kim, Yeonseung Choi, Jinhyeon Choi, Youngheon Kim

위 팀은 경상국립대학교 공학교육혁신센터에서 주관하는 2022 GNU 창의도전형 설계기반 아이디어 경진대회에 참가하여 우수한 성과를 거두었으므로 이에 상장을 수여함.

This team has participated in the 2022 GNU Creative Challenge-Based Design Idea Competition organized by the Engineering Education Innovation Center of Gyeongsang National University and achieved outstanding results. Therefore, this certificate is awarded in recognition of their excellence.

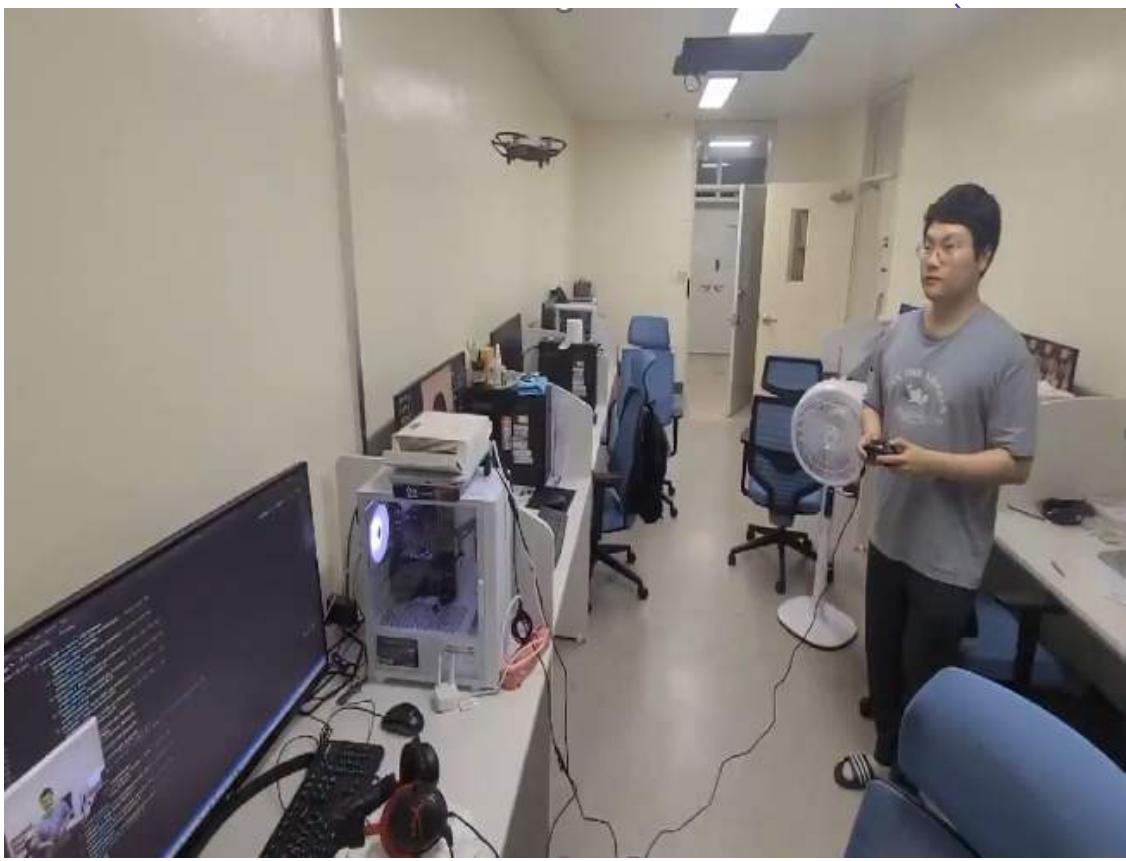
2023년 5월 31일

May 31, 2023

경상국립대학교 공과대학장 류 성 기

Dean of the College of Engineering, Gyeongsang National University, Sungki Ryu

# Intelligence and Interactive Robotics Lab

Mechatronics - drone (youtube.com)

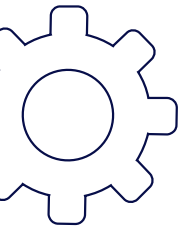
# Recent PROJECT

## Assistance Robot

“Training a computer simulation Environment (OpenSim +OpenSim-RL) ”

## **Reinforcement Learning**

“fine-tuning the motor's parameters in the robot using reinforcement learning (Proximal Policy Optimization Algorithm) to aid patients with impaired mobility”



# The necessity of separating control policy network and environment network learning can be addressed in Limitation 3

"Low-pass filter technique "used to smooth signals or data by removing high-frequency component

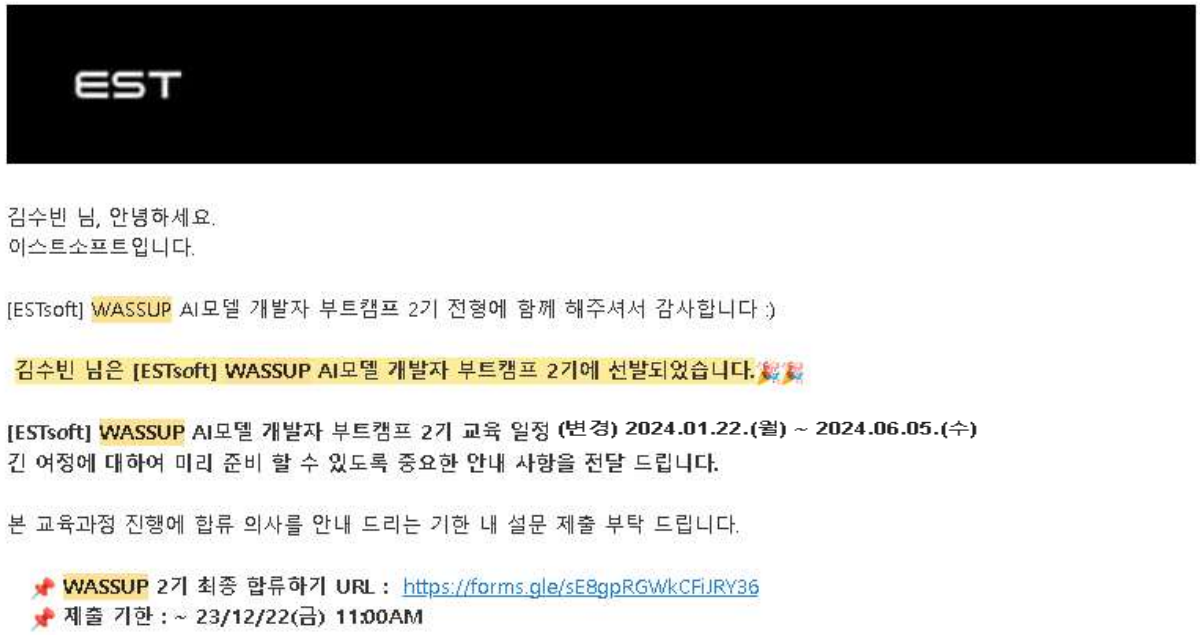
- **Output of Control Policy Network:** : Firstly, the control policy network generated by the reinforcement learning algorithm outputs the target positions for the joints. This determines where the robot's joints should move.
- **Application of the Second Low-pass Filter** : However, the output of the control policy network can have very rapid changes. These rapid changes can make the robot's movements abrupt and unstable. To address this, a filtering step called the "second low-pass filter" is added to smooth out these rapid changes.
- **Frequency Adjustment and Linear Interpolation(선형 보간)** : frequency adjustment regulates the speed of control updates to match the environment, while linear interpolation fills in between adjusted control points, resulting in smooth and consistent motion. This allows the robot to follow the desired path without abrupt or unrealistic movements
- **the preprocessed motion calculation**: Additionally, at each time step, two consecutive low-pass-filtered motion values are taken and linearly interpolated to create a smooth motion, ensuring the robot's movements are stable.
- **PD 목표 설정과 최종 PD 기반 토크 계산**: 선형 보간된 사전 처리된 동작 값을 받아서 PD 목표로 설정합니다. 그리고 PD 제어를 사용하여 관절에 적용되는 최종 토크를 계산합니다. 이로써 로봇의 움직임은 더 부드럽고 안정적으로 조절될 수 있습니다.

It will be possible to solve the previous limitation 3 without 'Multi-Agent Reinforcement Learning'

Initiated the concept and set up initial the environment for a robotic orthosis project. And I handed over the research to the successor for further studies and left the laboratory.

# Latest Activity

To complement my knowledge and experience in AI and CS, I have been actively studying Deep Learning, and I am planning to participate in an AI bootcamp.



EST

김수빈 님, 안녕하세요.
이스트소프트입니다.

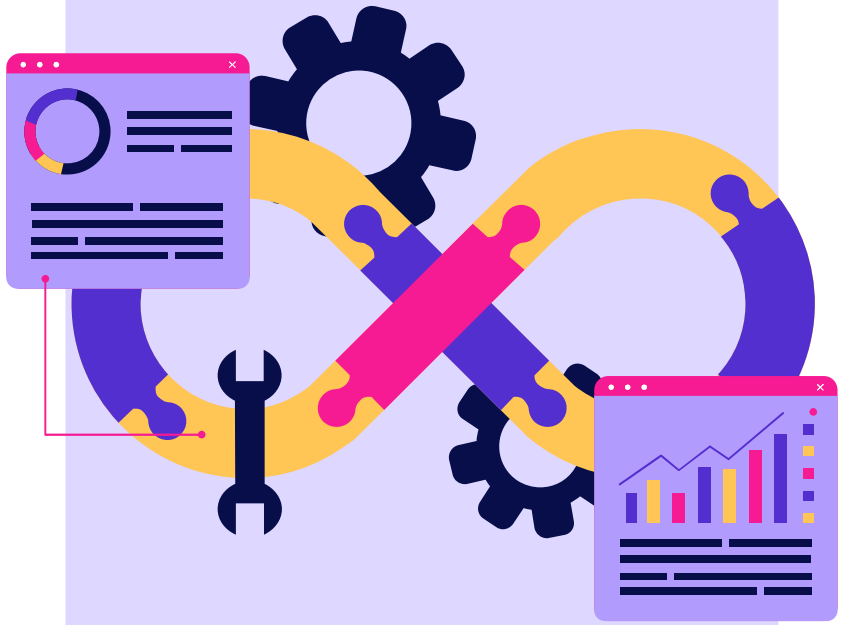
[ESTsoft] WASSUP AI모델 개발자 부트캠프 2기 전형에 함께 해주셔서 감사합니다 :)

**김수빈 님은 [ESTsoft] WASSUP AI모델 개발자 부트캠프 2기에 선발되었습니다.🎉🎉**

**[ESTsoft] WASSUP AI모델 개발자 부트캠프 2기 교육 일정 (변경) 2024.01.22.(월) ~ 2024.06.05.(수)**
**긴 여정에 대하여 미리 준비 할 수 있도록 중요한 안내 사항을 전달 드립니다.**

본 교육과정 진행에 합류 의사를 안내 드리는 기한 내 설문 제출 부탁 드립니다.

📌 **WASSUP 2기 최종 합류하기 URL :** https://forms.gle/sE8gpRGWkCFiJRY36
📌 **제출 기한 : ~ 23/12/22(금) 11:00AM**



# THANKS!

**Do you have any questions?**

+82 10-8768-9075
subinkimcs99@gmail.com