SeYeong Im

Control Logic Engineer · Firmware Engineer

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"We see as much as we know."

Summary

I'm Seyeong Im, who want to become Control Logic Engineer. My research interests is Control theory. I think that undergraduate course(4 years) is too short to learn about control. So I want to study this field more after graduating university.
I hope to know more and see more.

Research Interest

Control Theory Robust Control, Disturbance Observer...

Motor Control DC, BLDC, PMSM

Education

KwangWoon University *Seoul, S.Korea*

B.S. in School of Robotics *Mar. 2016 - Feb. 2023(Expected)*

- **Total GPA:** 4.38/4.50 **Major GPA:** 4.42/4.50
- **Club:** BARAM(Robotics Academic Group) - [2021 Club director of Planning]

Work Experience

MRL(Magnetic Robotics Lab, Kwangwoon University) *Seoul, S.Korea*

Student Researcher *Jan. 2021 - present*

- Research on Magnetic navigation system
- Research on Magnetic capsule robot control in human gastrointestinal tract & blood vessel
- Research on Permanent magnet localization

Kwangwoon University *Seoul, S.Korea*

Teaching Assistant *Mar. 2021 - Dec. 2021*

- engineering mathematics 1
- electromagnetics 1
- circuit theory 1
- circuit theory 2

Skills

Programming C/C++, Matlab

Tool Solidworks, Inventor, Pspice, AVR, IAR, Altair Flux, MPLAB

Languages Korean, English, Japanese

Publication

INTERNATIONAL JOURNAL

2022.07 **Electrical Optimization Method Based on a Novel Arrangement of the Magnetic Navigation System with Gradient and Uniform Saddle Coils**, *Seonsors*

Sungjun Kim, Mingyu Cho, Seyeong Im, Yunjoong Ho and Jaekwang Nam

DOMESTIC CONFERENCE

2022.06 **Control of Human Interaction-Based Wheelchair Simulator System's Slope Using Disturbance Observer**, *ICROS 2022*

Seyeong Im, Chanhyuk Kim, Hoseok Lee, Sungjun Kim and Juhoon Back

Honors & Awards

AWARDS

2021.10 **Dean's List**, Academic Excellence Award — *Seoul, S.Korea*

2022.05 **Dean's List**, Academic Excellence Award — *Seoul, S.Korea*

HONORS

2016.08 **Half tuition Scholarship**, Academic Excellence Schloarship — *Seoul, S.Korea*

2017.02 **Half tuition Scholarship**, Academic Excellence Schloarship — *Seoul, S.Korea*

2020.08 **Half tuition Scholarship**, Academic Excellence Schloarship — *Seoul, S.Korea*

2021.02 **Quarter tuition Scholarship**, Academic Excellence Schloarship — *Seoul, S.Korea*

2021.08 **Half tuition Scholarship**, Academic Excellence Schloarship — *Seoul, S.Korea*

2022.02 **Half tuition Scholarship**, Academic Excellence Schloarship — *Seoul, S.Korea*

Projects

Two Wheel Balancing Robot — *Seoul, S.Korea*

Personal Project — *Aug. 2020 - Nov. 2020*

- The goal of this project is to know what is control
- To get Robot's state(degree, angular velocity), i used encoder and IMU
- Using cascade pd(pos), pi(angular velocity)

Micro Robot Control In Human Blood Vessel — *Seoul, S.Korea*

MRL Project — *Jan. 2021 - Jun. 2021*

- A magnetic navigation system (MNS) for the wireless manipulation of micro-robots in human blood vessels is a possible surgical tool for coronary artery disease
- To generate uniform magnetic field & gradient, MNS composed of one conventional pair of Maxwell and Helmholtz coils and one newly developed pair of gradient and uniform saddle coils
- In the MNS, the microrobot can move with 5 degrees of freedom.

Sensor analysis & filtering — *Seoul, S.Korea*

Personal Project — *Mar. 2021 - Jun. 2021*

- The goal of this project is to know filters and frequency analysis
- To apply filters, I analyzed the frequency of sensors's output
- Using First Order RC Filter, MAF, IIR, FIR, kalman

Maxon DCX35L Motor Control — *Seoul, S.Korea*

Personal Project — *Oct. 2021 - Dec. 2021*

- Simulation (simulink&ode) and applied to real motors
- Using cascade pd(pos), pi(angular velocity), pi(current)
- As the system operates in simulation(ode), the real system operates

Position Control of SPMSM Using LQR & Full-order Estimator — *Seoul, S.Korea*

Personal Project — *Nov. 2021 - Dec. 2021*

- Simulation project using matlab,simulink
- To use LQR, linearized the SPMSM's system mtx(nonlinear mtx)
- Using full-order estimator, to get states
- Verified using MCLV-2 Development Board

Development of Magnetic navigation System(MNS) and & Control method — *Seoul, S.Korea*

MRL Project — *Jul. 2021 - Present*

- Project in preparation for paper(1st author)
- Miniaturized MNS by using a scalar robot and a C-type electromagnet to replace the existing large and heavy MNS
- Using FEM analysis to create a system that generates the maximum magnetic field within limited conditions (maximum output of the power supply and payload of the robot)
- To reduce eddy current loss, Manufactured by stacking 30PNF1600 from POSCO
- To compensate design & measurement error, using DOB(disturbance observer)

Wheelchair Simulator — *Seoul, S.Korea*

Capstone Project — *Jan. 2022 - jun.2022*

- We realize real track in VR
- Realize gravity's load using force control
- To realize track's slope, we control system's degree using DOB(disturbance observer)& fuzzy PID