Hyeongkeun KIM

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EDUCATION

B.S. in Mechanical Engineering and Bio-Brain Engineering   2013 – 2020 (Expected)
Korea Advanced Institute of Science and Technology (KAIST), Republic of Korea

- GPA 3.77/4.30, Dean's List for Creative Excellence (Fall 2014)
- Recipient of Korea Presidential Science Scholarship
- Mandatory civil service as a social service agent (2017-2019)

Foreign Exchange Student in Génie Mécanique Développement (GMD)   Spring 2015
Institut National des Sciences Appliquées de Lyon (INSA Lyon), France

- Recipient of Mirae Asset Scholarship for Overseas Exchange Students

RESEARCH INTEREST

Bio-inspired robotics, Lab-on-a-chip, Biosensors, and Laboratory automation

PROFESSIONAL EXPERIENCE

Full-time Research Intern   Aug. 2016 – Feb. 2017
NAVER LABS Robotics Group, NAVER LABS Corp., Republic of Korea
Advisor: Dr. Sangok Seok

- Designed and optimized an indoor service robot (TuskBot) that is compatible with most stairs in existence, regardless of their dimensions and morphology.
- Improved structural components and remote data collection system of the autonomous personal transporter.
- Work involved STM32F4 programming, SolidWorks/SolidEdge modeling, LabView (including FPGA), RTOS, Webots, Kinect-based point cloud processing, Qt toolkit, and MATLAB.

RESEARCH EXPERIENCE

Undergraduate Student Researcher   Jun. 2019 – Present
Biomicrofluidics Lab, Dept. of Mechanical Engineering, KAIST   Jun. 2016 – Aug. 2016
Advisor: Prof. Jessie S. Jeon

- Currently developing an organ-on-a-chip that remotely apply stimuli to cells using Surface Acoustic Wave.
- Designed an automated system that measures *in-situ* bacterial growth using vision marker. Using image processing to detect the blurring effect of the media, this quantified bacterial growth in microfluidic chambers.
- Developed a script for generating 3D printable models of master templates for lab-on-chip using a sandbox game 'Minecraft.' Demonstrated its equivalence to a conventional CAD system for building lab-on-a-chip.
- Work involved fabrication of lab-on-a-chip using soft lithography, MATLAB for image processing, Arduino programming for developing automated system and cell culture/banking, and photolithography.

Undergraduate Student Researcher
Neuro-Rehabilitation Engineering Lab, Dept. of Mechanical Engineering, KAIST   Dec. 2015 – Feb. 2016
Advisor: Prof. Hyung-soon Park

- Improved control performance on wearable gait assisting device in terms of data resolution and control speed.
- Work involved TI MSP430 series, pneumatic system, and rehabilitation system for patients with crouch gait.

TEACHING EXPERIENCE

Teaching Assistant, Introduction to Programming (CS101)   Fall 2015, Spring 2016
School of Computing, KAIST
-   Assisted with lab sessions, including QnAs. Graded homework assignments and exams.
-   This was the first time this class was taught with elice.io online programming platform. (Spring 2016)

Tutor, General Chemistry I (CH101), Introduction to Programming (CS101)   Spring 2014, Fall 2015
School of Freshman, KAIST   Spring 2019, Fall 2019

Robotics Extracurricular Class Instructor, Joint program with Midam Scholarship Committee   May. 2014 – Dec. 2014
Jungni Middle School, Daejeon, Republic of Korea
-   Responsible for the entire curriculum. Developed an introductory course for robotics and programming. Challenge was to teach the basic concept of programming and electronics into one semester.
-   Formulated an Arduino/Processing based curriculum for teaching basic robotics to gifted middle schoolers.

PUBLICATIONS

1. K. Kim*, J. Hyun*, **H. Kim**, H. Lim, H. Myung, "A Deep Learning-based Automatic Mosquito Sensing and Control System for Urban Mosquito Habitats" *Sensors* 19.12 (2019): 2785, doi: 10.3390/s19122785
2. K. Kim*, **H. Kim***, S. Kim, J. S. Jeon, "MineLoC: A Rapid Production of Lab-on-a-Chip Biosensors Using 3D Printer and the Sandbox Game, Minecraft" *Sensors* 18.6 (2018): 1896, doi: 10.3390/s18061896 (**Co-first Author**)
3. K. Kim, **H. Kim**, and H. Myung, "Bio-inspired robot swarm control algorithm for dynamic environment monitoring." *Advances in Robotics Research* 2.1 (2018):1-11 doi: 10.12989/arr.2018.2.1.001
4. K. Kim, D. Choi, H. Lim, **H. Kim**, J. S. Jeon, "Vision Marker-Based *In-Situ* Examination of Bacterial Growth in Liquid Culture Media." *Sensors* 16.12 (2016): 2179, doi: 10.3390/s16122179
5. K. Kim, **H. Kim**, H. Lim, H. Myung, "A Low Cost/Low Power Open Source Sensor System for Automated Tuberculosis Drug Susceptibility Testing." *Sensors* 16.6 (2016): 942, doi: 10.3390/s16060942

PRESENTATIONS

1. D. Choi, M. Kim**, H. Kim**, J. Choe, M. C. Nah, "Motion Planning of Autonomous Personal Transporter Using Model Predictive Control for Minimizing Non-Minimum Phase Behavior" in *15th International Conference on Ubiquitous Robots (UR 2018)*, Honolulu, HI, 2018, pp. 362-368. (**Best Application Paper Award**)
2. J. Choe*, U. Kwon*, M. C. Nah* and **H. Kim***, "'Design Analysis of TuskBot: Universal Stair Climbing 4-Wheel Indoor Robot" in *2017 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, Vancouver, BC, 2017, pp. 6908-6914. (**Corresponding Author**)
3. J. Choe*, M. C. Nah*, **H. Kim*** and U. Kwon*, "'TuskBot': Design of the Mobile Stair Climbing 2 By 2 Wheels Robot Platform with Novel Passive Structure 'Tusk'" in *2017 3rd International Conference on Control, Automation and Robotics (ICCAR)*, Nagoya, Japan, 2017, pp. 217-220. (**Co-first Author**)
4. U. Kwon, **H. Kim**, M. C. Nah, and J. Choe, "Rocker-Bogie with 'Tusk': Design of the mobile robot platform that can climb stairs with Tusk and rocker-bogie mechanism" in *12nd Korea Robotics Society Annual Conference*, Pyeongchang, 2017.
5. K. Kim, **H. Kim**, H. Roh, and H. Choi, "Flying BioLab: A CanSat platform for sampling and monitoring air bacteria in bio-hazardous area" in *Korea Society for Aeronautical & Space Sciences*, Jeju, Rep. of Korea, 2014.
6. **H. Kim**, J. Hyun, S. Jo, J. Choe, and S. Hong, "A Study on the Remote Swarm Robot Control based on Flexible Master/Slave Relationship Algorithm" in 2014 *Korea Computer Congress (KCC)*, Jeongseon, Rep. of Korea, 2014.
7. J. Hyun, **H. Kim**, S. Jo, J. Choe, and S. Hong, "A Design and Implementation of Auto Water Robot Module for Plant Care System" in *2014 Korea Computer Congress (KCC)*, Jeongseon, Rep. of Korea, 2014.

SELECTED HONORS & AWARDS

Presidential Science Scholarship, Korea Student Aid Foundation	Mar. 2013 – Mar. 2015
Mirae Asset Scholarship for Overseas Exchange Students, Mirae Asset Financial Group	Mar. 2015 – Aug. 2015
Dean's List for Creative Excellence (Fall 2014), College of Engineering, KAIST	Mar. 2015
Commendation, Military Manpower Administration Social Service Corps Training Center, Korea	Oct. 2018
Best Application Paper, 15th International Conference on Ubiquitous Robots (UR)	Jun. 2018
Creativity Prize (CEO of Intel Korea), 2015 Intel Edison IoT Contest	Oct. 2015
Third Place (CEO of SK Hynix Award), 2015 Korea Happy Science & Technology Contest	Jul. 2015
Grand Prize, World Embedded Software Contest 2014 (High-tech Medical Service)	Dec. 2014
Grand Prize (CEO of Samsung SDS), Samsung SDS Software Club Championship	Nov. 2014
Second Place (President of KAIST), Korea CanSat Competition 2014	Sep. 2014
Honorary Mention for Excellent Ideas, Korea Wearable Computer Contest 2013	Nov. 2013
Special Prize (Commissioner of Korean Intellectual Property Office), Korea STEAM Competition	Aug. 2013

ACTIVITIES

Lead Social Service Agent (Teacher assistant)   Mar. 2017 – Mar. 2019
Changwon Dongbaek School for Students with Disabilities
  - Assisted students with severe cerebral palsy, brain lesions and learning disabilities during school hours.
  - Managed IT infrastructure of the school, including troubleshooting, upgrading and deploying new systems.
  - Directed and coordinated duties and resolved issues for other social service agents as the lead agent.
  - **Commendation** by Military Manpower Administration Social Service Training Center for excellent performance as the lead agent.

Member, **Microrobot Research(Robotics Club), KAIST**   Mar. 2013 – Present
  - Co-founded Team W5, a team for interdisciplinary projects between robotics and bioengineering in 2014.
  - Over three years, Team W5 was awarded 15 prizes from various competitions, participated in 6 conferences in robotics, published five journal articles, and received national media coverage, including 2014 Intel Korea Year-End Press Conference.
  - Other projects include developing a gesture-based wearable computer system compatible with conventional Android smartphones, implementing a household plant care robot, and designing a ball-shaped caretaker robot for home surveillance.

SKILLS

  - Programming languages and mathematical packages: MATLAB, matconvnet, Python, PyTorch, C/C++/C#, OpenCV, LabView, JAVA, and embedded programming with STM32F4, MSP430 and AVR microcontrollers
  - Computer-aided design/engineering: SolidWorks, Solid Edge, and AutoCAD
  - Language: English(iBT TOEFL - 109, GRE - V166/Q169/W4.0), French (Basic)
  - Other: Linux (Ubuntu, Raspbian), Webots, OpenCV, and basic web service administration

REFERENCES

Dr. Sangok Seok	Professor Jessie S. Jeon	Professor Dongil Choi
CEO	Dept. of Mechanical Engineering	Dept. of Mechanical Engineering
NAVER LABS Corp., Rep. of Korea	KAIST, Rep. of Korea	Myongji Univ., Rep. of Korea
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