Hyeongkeun KIM

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EDUCATION

B.S. in Mechanical Engineering and B. S. in Bio and Brain Engineering *(Cum laude)*   Feb. 2013 – Feb. 2020
Korea Advanced Institute of Science and Technology (KAIST), Republic of Korea   Cumulative GPA: 3.78/4.30
- Recipient of Korea Presidential Science Scholarship: One of 123 students chosen by the President of Korea.
- Dean's List for Creative Excellence(Fall 2014): One of the top 1% students who have shown significant creativity.
- Exchange student at INSA Lyon under Mirae Asset Scholarship for Overseas Exchange Students. (Spring 2015)

PROFESSIONAL EXPERIENCE

NAVER Corp., NAVER LABS Robotics Group – Research Intern   Aug. 2016 – Feb. 2017
Advisor: Dr. Sangok Seok, current CEO of NAVER LABS Corp.; Dr. Dongil Choi   *Seongnam, Republic of Korea*
- Designed and optimized an indoor service robot (TuskBot), compatible with most stairs in existence.
- Improved structural components and remote data acquisition 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, OpenCV and MATLAB.
- Work was featured in the corporate developer conference (*DEVIEW 2017*), was presented in the *2017 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS 2017)*, and was approved for patent (2020).

RESEARCH EXPERIENCE

KAIST, Biomicrofluidics Lab – Research Assistant   Jun. 2016 – Present
Advisor: Prof. Jessie S. Jeon   *Daejeon, Republic of Korea*
- Currently developing an organ-on-a-chip that remotely applies stimuli to cells using surface acoustic waves.
- Designed an automated system that measures *in-situ* bacterial growth using vision markers.
- Developed a script for generating 3D printable models of master templates for lab-on-a-chips using a sandbox game 'Minecraft.' Demonstrated its equivalence to a conventional CAD system for building lab-on-a-chips.
- Work involved fabrication of lab-on-a-chips using soft lithography, MATLAB for image processing, Arduino programming for developing automated system and cell culture/banking, and photolithography.

KAIST, Neuro-Rehabilitation Engineering Lab – Research Assistant   Dec. 2015 – Feb. 2016
Advisor: Prof. Hyung-soon Park   *Daejeon, Republic of Korea*
- Optimized control performance on wearable gait assisting device for cerebral palsy patients with crouch gait.
- Improved sensor resolution from 10 to 14 bits and acquisition speed from 10kHz to 200kHz via the redesign.

TEACHING EXPERIENCE

KAIST School of Computing, Introduction to Programming (CS101) – Teaching Assistant   Fall 2015, Spring 2016
- Advised and mentored freshmen in lab sessions. Provided technical support, graded exams, and assignments.

KAIST School of Freshman, Introduction to Programming, General Chemistry 1 – Tutor   Spring 2014, Fall 2015,
- Tutored students on freshman subjects. Provided mentorship regarding major choice.   Spring 2019, Fall 2019

Jungni Middle School, Daejeon, Republic of Korea – Robotics Extracurricular Class Instructor   May. 2014 – Dec. 2014
- Responsible for the entire curriculum. Developed an introductory course for robotics and programming.
- Taught the basic concept of programming and electronics in only one semester.
- Formulated an Arduino/Processing based curriculum for teaching basic robotics to gifted middle students.

SELECTED 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**) [Link]
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**) [Link]
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**) [Link]
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. (**Presenter**)
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, 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, 2014. (**Poster**)

PUBLICATIONS AND PATENTS

1. U. Kwon*, **H. Kim***, M. C. Nah*, J. Choe*, S. Seok, "ROBOT APPARATUS FOR CLIMBING STAIRS", Republic of Korea Patent No. 10-2068239, Jan. 14, 2020. [Link]
2. 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 [Link]
3. 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 (**Co-first Author**) [Link]
4. 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 [Link]
5. 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 [Link]
6. 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 [Link]

SELECTED AWARDS

Commendation, Military Manpower Administration Social Service Corps Training Center, Korea	Oct. 2018
Best Application Paper, 15th International Conference on Ubiquitous Robots (UR 2018)	Jun. 2018
Creativity Prize (CEO of Intel Korea), 2015 Intel Edison IoT Contest	Oct. 2015
Grand Prize (High-tech Medical Service), World Embedded Software Contest	Dec. 2014
Grand Prize (CEO of Samsung SDS), Samsung SDS Software Club Championship	Nov. 2014
Honorable Mention, Korea Wearable Computer Contest	Nov. 2014
Second Place (President of KAIST), Korea CanSat Competition	Sep. 2014
Honorable Mention for Excellent Ideas, Korea Wearable Computer Contest	Nov. 2013
Special Prize (Commissioner of Korean Intellectual Property Office), Korea STEAM Competition	Aug. 2013

LEADERSHIP & ACTIVITIES

National Social Service Corps Program, Changwon Dongbaek School – Social Service Agent   Mar. 2017 – Feb. 2019
- Assisted elementary and middle school students with severe cerebral palsy, autism, and brain lesions.
- Managed IT infrastructure of the school, including troubleshooting, upgrading, and deploying new systems.
- Coordinated weekly meetings for all social service agents, worked as a liaison with the teachers and the administration as the lead agent.
- Awarded "Commendation" by the Military Manpower Administration of Korea for excellent service.

KAIST, Microrobot Research (Robotics Club) – Team Co-founder and Team Leader   Mar. 2013 – Present
- Co-founded Team W5, a team for interdisciplinary projects between robotics and bioengineering.
- Developed a fully-automated tuberculosis drug susceptibility testing device, reducing the cost by 87%.
- Team was awarded 13 prizes across robotics and bioengineering competitions, featured in the keynote for the 2014 Intel Korea Year-End Press Conference, presented in six robotics conferences, and published five papers.
- Team leader for Honorary mention in Korea Wearable Computer Contest 2014 sponsored by Samsung.

SKILLS

Programming: MATLAB, Python, JAVA, LabView with FPGA, embedded C/C++ with STM32F4, MSP430, and AVR series
Software: PyTorch, Matconvnet, OpenCV, COMSOL, SolidWorks, Solid Edge, AutoCAD, Linux, and Adobe InDesign
Mechanical/Electronics: Lathe, Mills, Laser cutter, 3D printing, Circuit board design/artwork, and Embedded systems
Laboratory Techniques: Soft lithography for microfluidics, mammalian cell culture, and biological image processing
Language: English (Fluent, iBT TOEFL - 109, GRE - V166/Q169/W4.0), Korean (Native), French (Basic)