HANEOL SKY KIM

Senior Researcher, Samsung Healthcare

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Skill Overview

Excellence in problem solving and rapid prototyping
Proficient in implementing Windows and embedded software
Experiences in medical image processing and machine learning
Strong interests in disability, rehabilitation, physical therapy

Education

Gwangju Institute of Science and Technology — Gwangju, Korea
M.S. in School of Mechanical Engineering — 2011
Distributed Control and Autonomous Systems Laboratory (DCAS Lab)
Thesis: Multiagent Cooperative Reinforcement Learning: Convergence Proofs and Applications
Advisor: Professor Hyo-Sung Ahn

University of Seoul — Seoul, Korea
B.S. in Electrical and Computer Engineering and Physics — 2009

Experience

Samsung Healthcare — Seongnam, Korea
Senior Research Engineer — 2013 – present

- Proposed the cutting-edge and creative ideas and preliminary research related to medical equipment
- Developed 3D advanced rendering techniques such as specular reflection, virtual endoscopy and navigation, lesion segmentation and its visualization
- Proposed tablet-based control panel and its applications in ultrasound equipment such as image streaming, responsive web service
- Proposed deep learning projects in 2D/3D ultrasound imaging such as multi-organ classification, desired plane detection, style transfer image enhancement, fetal skull segmentation in 3D ultrasound
- Developed embedded firmware programming and driver programming for Windows on ultrasound probe automatic recognition system
- Participated in clinical research with many hospitals and medical institutions
- Patents: 4 Grant, 1 Application

Seoul National University — Seoul, Korea
Research Engineer — 2011 – 2012

- Developed model-based control system simulator like MATLAB and LabVIEW
- Lead software developer managing a team of engineers
- Conducted hardware-based projects such as quadrotor and inverted pendulum simulator
- Advisor: Professor Wook-hyun Kwon

Gwangju Institute of Science and Technology — Seoul, Korea
Researcher — 2009 – 2011
Participated in bio-insect project applying multiagent Q-learning algorithm for robot-insect interaction

Korea Institute of Science and Technology — Seoul, Korea
Intern — 2005 – 2006
Designed a phosphorescent detection system using microcontroller

Hackathon — Seoul, Korea
Lead Software Engineer

- VOMI - Virtual reality (VR) device and image processing application for low-vision — 2015
- Eye-Stick – Image-to-Speech system for legal blindness on CNN-based image classification model — 2016
- NUKEYMED – CNN-based diagnosis tool for glaucoma detection using fundus images of the eye — 2016
- Go-Breath – Respiratory rehabilitation device for lung disease and pulmonary complications — 2017
    - Received Winner for Samsung Electronics Creative Lab Competition in 2017

Private Research

REGO Research (regoresearch.github.io) — Korea
- Support healthcare information and open source rehabilitation service related to rehabilitation and physical therapy for patients who have neurological diseases (spinal cord injury and stoke) — 2019 – present

pcFRAME — Korea
- Supported basic PC assembly service with a QnA service and tutorial videos — 2002 – 2012

Publications

- Doory Kim, **Han-Eol Kim**, Chang-Hong Kim, "Development of a Blue Emitting Calcium-Aluminate Phosphor", PLoS ONE, 2016
- Doory Kim, **Han-Eol Kim**, Chang-Hong Kim, "Effect of Composition and Impurities on the Phosphorescence of Green-emitting Alkaline Earth Aluminate Phosphor", PLoS ONE, 2016
- **Han-Eol Kim**, Bong-hee Seo, Kwang-jin Kim, “CEMStudio: model-based simulation software for general-purpose signal processing”, KMMS 2012, Seoul, Korea *(*Best Award Paper)*
- **Han-Eol Kim**, Huy Bien, Kwang-Jin Kim, Jun-Ha Kim, “seaHERO: Modeling and Simulation Software for Seawater Desalination Plant”, 4th International Desalination Workshop 2011, Jeju, Korea
- Young Wook Kwon, **Han-Eol Kim**, Wook-hyun Kwon, Soohee Han, "Golf swing simulation using a double inverted pendulum", IEIE 2011, Jeju, Korea
- **Han-Eol Kim**, M.S. Thesis, "Multiagent Cooperative Reinforcement Learning: Convergence Proofs and Applications", School of Information and Mechatronics, Gwangju Institute of Science and Technology, 2011.
- **Han-Eol Kim**, Hyo-sung Ahn, “Convergence of Multiagent Q-Learning: Multi Action Replay Process Approach”, IEEE ISIC 2010, Yokohama, Japan
- **Han-Eol Kim**, Hyo-sung Ahn, “Multi-agent cooperative reinforcement learning for heterogeneous mobile robots”, ICMIT 2009, Gwangju, Korea
- **Han-Eol Kim**, Hyo-sung Ahn, “A review on Q-Learning convergence theorem”, KACC 2009, Busan, Korea
- **Han-Eol Kim**, Doory Kim, Chang-Hong Kim, "Energy Transfer between Two Phosphorescent Phosphors", Korean Chemical Society 2007, Daegu, Korea

Patents

- **Han-eol Kim**, Ultrasound diagnosis apparatus and method of displaying ultrasound image, December 10, 2019, US Patent 10499881, **Grant**.
- **Han-eol Kim**, Ultrasound diagnosis apparatus and method of operating the same, October 15, 2019, US Patent 10441249, **Grant**.

- **Han-eol Kim**, Dong-hoon Oh, Ultrasound diagnosis apparatus and method, September 10, 2019, US Patent 10405832, **Grant**.
- Dong-Yoon Park, **Han Eol Kim**, Dong Hoon Oh, Dong Gyu Hyun, Input apparatus and medical image apparatus comprising the same, January 29, 2019, US Patent 10191632, **Grant**
- Nam Du JEON, **Han Eol KIM**, Dong Gyu HYUN, WIRELESS ULTRASONIC PROBE AND ULTRASONIC APPARATUS HAVING THE SAME, July 14, 2016, US Patent 20160199028, Application
- **Han-Eol Kim**, Chang-hong Kim, Doory Kim, “Enhancement of long persistent phosphorescence by chemical mixing of two or more phosphorescent phosphors with spectral overlap”, KR Patent 2020090009795, Application
- Doory Kim, Chang-hong Kim, **Han-Eol Kim**, "Fluorescent lamp with phosphorescent mold cover", KR Patent 10-2006-0071858, Application

Honors and Awards

2019	**Certificate**, Human Rights & Philanthropy Speaker	Center for Disability Rights in Seongnam
2017	**Winner**, Creative Lab (C-Lab) Competition	Samsung
2017	**Very Good Grade**, Employee Evaluation	Samsung Healthcare
2016	**Best Idea**, Samsung 7th Bluehack Hackathon	Samsung Healthcare
2015	**Silver Medal**, Creative Idea Contest	Samsung Healthcare
2014	**Excellent Grade**, Employee Evaluation	Samsung Healthcare
2011	**Best Paper Award**, Oral Session	Korea Multi-Media Society
2010	**Bronze Medal**, GIST Science Camp	GIST
2009 – 2011	Government Full Scholarship	GIST
2005 – 2008	Seoul Citizen and Academic Full Scholarship	University of Seoul

Teaching Experience

2010	GIST Science Camp (Instructor)	Gwangju, Korea
2019	Human Rights and Disability Lecture at Wirye Hanbit Middle School	Seongnam, Korea

Skills

- Programming Language — C, C++, C#, Python, MFC, Delphi
- Volume Rendering — DirectX (HLSL)
- Firmware Programming — ARM, AVR, CCS
- Microcontroller — ARM Cortex M3 (CC2650)/M4 (TM4C123), AVR (ATmega16, 128)
- Web Programming — HTML5, JAVASCRIPT, PHP
- Medical Image Processing — OpenCV, numpy, VTK, ITK, dcmtk. ImageJ, DICOM
- Simulation Tool — MATLAB, Simulink, LabVIEW
- Artificial Intelligence — Caffe, TensorFlow, Keras, scikit-learn
- Operating System — Windows, Linux

References

Hyo-sung Ahn	Professor at Gwangju Institute of Science and Technology M.S. advisor	hyosung@gist.ac.kr
Wook-Hyun Kwon	Emeritus Professor at Seoul National University Research advisor	whkwon@snu.ac.kr