

Hyehyun Han

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RESEARCH INTERESTS

- Modeling of deformable objects, Real-time simulation, Virtual reality
- 3D modeling and rendering from medical images

EDUCATION

KAIST, Daejeon, Korea Feb. 2012-Aug. 2020

- Ph.D. Candidate in Mechanical Engineering
(Expected Graduation Date: Aug. 2020)
- Thesis: Modeling and Simulation of Deformable Objects Using Iterative Updates of Local Positions
- Advisor: Prof. Doo Yong Lee

KAIST, Daejeon, Korea Feb. 2010-Feb. 2012

- M.S. in Aerospace Engineering
- Thesis: Analysis on Time Delay Estimation Method of GPS Signal in Multipath Channel Environment
- Advisor: Prof. Seung-Hyun Kong

Sogang University, Seoul, Korea Mar. 2004–Feb. 2008

- B.S. in Mechanical Engineering
- Honors: Magna cum laude

RESEARCH EXPERIENCE

Robotics and Simulation Lab., KAIST Mar. 2014-Oct.2020

- Development of virtual reality simulation for cardiovascular intervention
 - Modeled an interaction of the catheter and blood vessel for the real-time simulation
 - Modeled blood vessels and rendered virtual fluoroscopy from medical images
 - Implemented a plugin program of the Simulation Open Framework Architecture (SOFA)
- Development of deformable object modeling for the suture simulation
 - Developed a wire-shaped deformable model for the real-time simulation

Autonomous Vehicles and Electronics Lab., KAIST Feb. 2010-Feb. 2013

- Development of an algorithm for the fast GPS initialization using the peer-assisted method
 - Implemented a fast signal acquisition algorithm for the GPS receiver
- Research of super-resolution algorithm for the multipath channel model
 - Validated the performance of super-resolution algorithm

PUBLICATIONS

- **H. Han**, D. Y. Lee, “Deformable objects modeling with iterative updates of local positions,” *Computer Methods and Programs in Biomedicine*, vol. 190, July 2020. (Online published)
- **H. Han**, D. Y. Lee, “An Inextensible Wire-shaped Deformation Model for Catheter Simulation,” *Journal of Institute of Control, Robotics and Systems*, vol. 22, no. 8, pp. 610-614, 2016.

CONFERENCES

- **H. Han**, M. Kim, and D. Y. Lee, "A Lattice-Shaped Micro Active Catheter for Blood Vessels," in *Proceedings of the 34th Chinese Control Conference and SICE Annual Conference*, China, July 2015.
- S. Jeon, **H. Han**, D. Y. Lee, "Spline-based Guidewire Modeling and Control Point Optimization in Vascular Intervention Simulation," in *Proceedings of the 2018 KSME Conference*, Korea, Dec. 2018.
- **H. Han**, D. Y. Lee, "Rendering of Virtual Fluoroscopy Images Using Volume Ray-casting," in *Proceedings of the 2017 KSME Bio-Engineering Division Annual Spring Conference*, Korea, April 2017.
- **H. Han**, D. Y. Lee, "A Method to Constrain the Fixed Length in the Simulation of Wire-shaped Objects," in *Proceedings of the 2016 ICROS Conference*, Korea, Mar. 2016.
- **H. Han**, S. Kong, "Survey and Analysis of Wireless Localization Technology," in *Proceedings of the Korea Institute of Intelligent Transport Systems Conference*, Korea, Nov. 2012.
- **H. Han**, S. Kong, "Research for first arrival path detection performance of multipath using super-resolution algorithm," in *Proceedings of the Korean Society for Aeronautical and Space Sciences Conference*, Korea, April 2011.
- **H. Han**, S. Kong, "Performance Comparison of GPS L1 C/A Code Tracking Techniques in ITU-R P.681-7 Urban Channel Model," in *Proceedings of the Korean Society for Aeronautical and Space Sciences Conference*, Korea, April 2010.

PATENTS

- D. Y. Lee, **H. Han**, Y. J. Gu, S. G. Kang, M. Kim, C. J. Kim, Y. G. Jung, S. B. Kim, H. S. Lee, D. M. Lee, S. H. Park, J. H. Hwang, "Direction-controllable catheter using drug injection channel"
 - Korea - Registration No. 10-1547089
 - US - Patent No. US 10,363,395 B2
- D. Y. Lee, **H. Han**, "Single channel steering catheter with micro flow path for injecting medical liquid"
 - Korea - Application No. 10-2015-0071943

AWARDS & SCHOLARSHIPS

- **Excellent Paper Award** in the 2016 Institute of Control, Robotics and System (ICROS) conference, Korea.
- **Finalist** in the 2015 SICE annual conference poster presentation award, China.
- **Sogang University scholarship**, Korea. (2005-2007)

WORK EXPERIENCE

- **Samsung Electronics Mobile Division VE Group** Jul. 2008-May. 2009
 - Cost reduction work of the mechanical component of mobile phone

SKILLS

- **Programming Languages**
C/C++, MATLAB
- **Other Tools**
OpenGL, QT, Simulation Open Framework Architecture (Open-source framework for real-time medical simulation, Inria, France), Mimics, ANSYS, SolidWorks