DAEWON LEE

Post Doctoral Researcher. E-mail: lee.daewon@gmail.com
Flight Dynamics and Control Laboratory.
Mechanical & Aerospace Engineering, School of Engineering and Applied Science,
The George Washington University, Washington, DC, USA.

Education

- Dec.2012-present Postdoc researcher
  Flight Dynamics and Control Laboratory,
  Mechanical & Aerospace Engineering, School of Engineering and Applied Science,
  The George Washington University, Washington, DC, USA.
- Mar.2012-Nov.2012 Postdoc researcher
  Intelligent Control Systems Laboratory
  Seoul National University, Seoul, South Korea
- Aug.2005-Feb.2012 Ph.D. in Mechanical and Aerospace Engineering
  Intelligent Control Systems Laboratory
  Seoul National University, Seoul, South Korea
- Mar.2001-Aug.2005 B.S. in Mechanical and Aerospace Engineering
  Seoul National University, Seoul, South Korea

Projects

- Dec.2009 - Nov.2012 **Study on Vision-based Collision Avoidance**
  - Designed an image-based collision avoidance algorithm for a fixed-wing UAV using nonlinear model predictive controller.
- Mar.2010 - Nov.2012 **Context-adaptive Control Technology for Energy-efficiency and Safety**
  - Integrated UAV and UGV platforms and designed its control system.
- May.2009 - Nov.2012 **Image-based visual servoing with adaptive control for an under-actuated quadrotor helicopter**
  - Designed a nonlinear adaptive controller for a quadrotor.
  - Designed an adaptive visual servo guidance.
  - Integrated the controller and image-based visual servo guidance.
  - Implemented a test environment and validated the proposed algorithm.
- Mar.2007 - Nov.2012 **Development of Automatic Take-off/Landing Techniques for UAVs**
  - Proposed vision-based autonomous landing algorithm for fixed- and rotary-wing UAVs.
  - Validated the algorithms with experiments.
- Dec.2009 - Nov.2011 **Study on distribution system of multiple unmanned aerial vehicles**
  - Designed a cooperative control algorithm for multi-UAV.
  - Validated the algorithms with experiments.
- Sep.2005 - Aug.2007 **Study on Autonomous Landing on a Moving Platform for UAV**
  - Developed nonlinear controller for a quadrotor UAV.

Experience

- Aug.2005-Dec.2007 *Member*, in charge of vision-based navigation
  SNUACE (the UAV team of FDCL/ICSL)
  Seoul National University, South Korea.

- Dec.2004-Jan.2005 *Internship*, INUS Technology, Inc. (http://www.3dscanning.co.kr)

- Mar.2001-Dec.2002 *Member*, Sigma Intelligence (a club for mechatronics and programming)
  Dept. of Electrical Engineering, ***Seoul National University***

Publications

International Journal

[1] H. Jin Kim, Mingu Kim, Hyon Lim, Chulwoo Park, Seungho Yoon, **Daewon Lee**, Gyeongtaek Oh, Jongho Park, and Youdan Kim, " Fully-Autonomous Vision-based Net-Recovery Landing System for a Fixed-Wing UAV", *IEEE Transactions on Mechatronics*, under review.

[2] Hyon Lim, Jaemann Park**, Daewon Lee** and H. Jin Kim, "Open-Source Projects for Quadrotor Unmanned Aerial Vehicles," *IEEE Robotics and Automation Magazine,* Vol. 19 No.3, pp. 33-45, September 2012.

[3] **Daewon Lee**, Hyon Lim, H. Jin Kim and Youdan Kim, "Adaptive Image-based Visual Servoing for an Under-actuated Quadrotor System," *AIAA Journal of Guidance, Control, and Dynamics*, Vol. 35, No. 4, 2012, pp. 1335-1353.

[4] **Daewon Lee**, H. Jin Kim, and Shankar Sastry, "Feedback Linearization vs. Adaptive Sliding Mode Control for a Quadrotor Helicopter," *International Journal of Control, Automation, and Systems*, Vol. 7, No. 3, June 2009, pp. 419-428.

International Conference

[1] **Daewon Lee**, Asad Ullah Awan, Suseoung Kim and H. Jin Kim, "Adaptive Control for a VTOL UAV Operating Near a Wall," *AIAA Guidance, Navigation, and Control Conference*, Minneapolis, MN, USA, Aug. 13-16, 2012.

[2] **Daewon Lee**, Tyler Ryan, H, Jin Kim, "Autonomous Landing of a VTOL UAV on a Moving Platform Using Image-based Visual Servoing," *IEEE International Conference on Robotics and Automation (ICRA)*, St. Paul, MN, USA, May 14-18, 2012.

[3] **Daewon Lee**, Hyon Lim, H, Jin Kim, "Obstacle Avoidance Using Image-based Visual Servoing Integrated with Nonlinear Model Predictive Control," *IEEE Conference on Decision and Control and European Control Conference (CDC-ECC)*, Orlando, FL, USA, Dec. 12-15, 2011.

[4] Suseong Kim, **Deawon Lee** and H. Jin Kim, "Image Based Visual Servoing for an Autonomous Quadrotor with Adaptive Backstepping Control," *International Conference on Control, Automation and Systems*, KINTEX, Korea, 2011.

[5] Mingu Kim, **Daewon Lee**, Jaemann Park, Chulwoo Park, H. J. Kim, and Y. Kim, " Vision-based Hardware-In-the Loop Simulation Test of Vision-Based Net-Recovery for Fixed-wing Unmanned Aerial Vehicles, " *Asia-Pacific International Symposium on Aerospace Technology (APISAT-2011),* Melbourne, Australia, Feb. 28-March 3, 2011.

[6] **Daewon Lee**, H. Jin Kim, "Adaptive Visual Servo Control for a Quadrotor Helicopter," *International Conference on Control, Automation and Systems*, KINTEX, Korea, 2010.

Doctoral Dissertation

Image-Based Visual Servo Control for a Quadrotor UAV, Feb. 2012.
Committee: Prof. Youdan Kim (Chairman of Committee), Prof. H. Jin Kim (Advisor), Prof. Changdon Kee, Prof. Nam Ik Cho and Prof. Min Jea Tahk

※ **Video clips of my research can be seen at** http://www.youtube.com/user/MrDaewonLee

Awards

- Oct. 2006 **The 3rd prize**
  The 5th Korea Robot Aircraft Competition Member of the only team awarded nation-wide from 36 participant teams.
- Oct. 2005 **The 4th prize**
  The 4th Korea Robot Aircraft Competition Member of one of three teams awarded nation-wide from 25 participant teams.
- Sep. 2003 **Leadership and Community Service Award**
  One of approximately fifteen awarded department-wide from over eight hundred students.

Honors

- Sep.2008-Aug.2009 **National Research Fellowship for Science and Engineering**
- Mar. 2007-Aug.2008 **Lecture & Research Scholarship**
- Aug.2006 **Superior Academic Performance**
- Mar.2006 **Scholarships granted by each college**
- Sep.2003-Aug.2005 **Departmental Fellowship (SNU MAE)**

Presentations

- **Daewon Lee (2012),** Adaptive Control for a VTOL UAV Operating Near a Wall, Paper presented at AIAA Guidance, Navigation, and Control (GNC) Conference, Minneapolis, MN, USA.
- **Daewon Lee (2012),** Autonomous Landing of a VTOL UAV on a Moving Platform Using Image-based Visual Servoing, Paper presented at IEEE International Conference on Robotics and Automation (ICRA), St. Paul, MN, USA.
- **Daewon Lee (2011),** Obstacle Avoidance Using Image-based Visual Servoing Integrated with Nonlinear Model Predictive Control, Paper presented at IEEE Conference on Decision and Control and European Control Conference (CDC-ECC) at Orlando, FL, USA.
- **Daewon Lee (2010),** Adaptive Visual Servo Control for a Quadrotor Helicopter, Paper presented at International Conference on Control Automation and Systems at KINTEX, Gyeonggi do, Korea.
- **Daewon Lee (2009),** Vision-Based Guidance Design for a Fixed-Wing UAV, Paper presented at Korea Automatic Control Conference at BEXCO, Busan, Korea.

Skills

- Programming Languages
  - Experience in C/C++
  - Experience in OpenCV and ARToolKit library
- Software
  - Experience in Matlab
  - Experience in SolidWorks.
- Hardware
  - Experience in quadrotor design and production
  - Experience in quadrotor manual flying
  - Experience in fixed-wing UAV field experiment.
  - Experience with VICON motion capture system
  - Experience in vision-integrated hardware-in-the-loop simulation (HILS) system design and setup

Language Competencies

- Korean : fluent
- English : conversational
- Japanese: beginner
- Chinese: beginner

References

- **H. Jin Kim**, *Associate Professor*, Department of Mechanical and Aerospace Engineering, Seoul National University, Seoul, South Korea.
  Tel: 82-2-880-9252 Email: hjinkim@snu.ac.kr
- **Youdan Kim**, *Professor*, Department of Mechanical and Aerospace Engineering, Seoul National University, Seoul, South Korea.
  Tel: 82-2-880-7398 Email: ydkim@snu.ac.kr
- **Changdon Kee**, *Professor*, Department of Mechanical and Aerospace Engineering, Seoul National University, Seoul, South Korea.
  Tel: 82-2-880-1912 Email: kee@snu.ac.kr