

Educational Background

Queensland University of Technology, Brisbane, Australia (Advisor: Prof. Peter Corke)

Ph.D, Electrical Engineering and Computer Science.

08/2010 – 03/2013

Thesis topic: Shared Autonomy for Close Quarter Navigation and Control of a VTOL Platform

Abstract: My research topic is Shared Autonomy for Close Quarter Navigation and control of a vertical take-off and landing (VTOL) platform. Shared autonomy indicates that a computer accomplishes the major fraction of control. The operator's interventions for low-level control are prohibited but can still provide supervisory high-level control commands. Close quarters navigation represents navigation following specific geometries such as cables of bridges or the pole of a streetlight. This system would allow an unskilled operator to easily and safely control a quadrotor to examine locations that are difficult to reach. For example, this system could be used for practical tasks such as inspecting for bridge or streetlight defects.

Sung Kyun Kwan University, Suwon, KOREA (Advisor: Prof. Tae-Yong Kuc)

M.S, School of Electrical and Computer Engineering

08/2003 – 03/2005

Thesis: Implementation of Simultaneous Localization and Mapping using Intelligent Hybrid Modular control Architecture.

Researched SLAM based on custom architecture at the ICon (Intelligent Control Lab) and ISRC (The intelligent Systems Research Center)

Sung Kyun Kwan University

B.S, School of Information and Communication Engineering

03/1999 – 02/2002

Thesis: Design of Image Capture Board System using NET ARM.

Received Best graduation student paper award.

Sung Kyun Kwan University

B.S, Department of physics

03/1999 – 02/2002

Research Interests

- Intelligent Behavior: Artificial robot architecture, cognitive intelligence.
- Robot navigation: path planning algorithm, self-localization, obstacle avoidance, Mapping
- Multi-robot coordination: Robot soccer
- Sensor fusion and probabilistic position estimation.
- Real-time vision applications, visual odometry and visual compass

Background skills

- Specialty: Motion control of mobile robot and embedded system device driver development, robot hardware and software design.

Software programming Capabilities

- Embedded software-programming skills: Microprocessors (MCS96 family, 8051, AVR series, VHDL, ARMASSEMBLE, X86-ASSEMBLE).
- Embedded system development: WinCE, Windows Mobile, Linux, BREW, and Google Android platform, MAC OX.
- Electrical and electronic engineering: microprocessors, sensors, and digital and analog system design.
- Computer Language skills: C++, C, Java, other objective orient programming languages.
- ROS, PCL and OpenCV friendly.

Hardware programming Capabilities

- Microprocessor circuit design and A/D circuit design including FPGA.
- Hardware design skills: A variety of hardware design tool are available.

Academic Awards

- [24] The best student award from the first academic-industrial cooperation research conference by Samsung Techwin Co, Jan. 2009.
- [23] The best student award from 2007 Conference on Information and Control System(CICS2007), Oct. 2007
- [22] The second prize in the SAMSUNG ELECTRONICS Robot Design contest by Samsung Electronics Co, July.2006
- [21] The second prize in Altera NIOS Embedded system design contest by Altera, Nov.2006
- [20] Third prize in the software competition of KOREA hosted by IPAK, Dec.2005
- [19] The first prize in the intelligent creative robot contest hosted by CHUNGNAM National University, Dec.2005
- [18] The first prize in the intelligent robot contest (IRC) hosted by POSTECH,Oct.2005
- [17] The first prize in the Korea Intelligent Robot Contest at KyungNam University, May.2005
- [16] Received popularity award, Microsoft Imagine Cup 2005 from Microsoft, Feb.2005
- [15] Third prize in Dept. of Information and Communications, GIST contest by GIST, Aug. 2004,
- [14] Third prize in Intelligent Electronics competition by KIPE, July.2004
- [13] The first prize in the national wireless internet software and contents contest hosted by KIPA(Korea SW industry Promotion Agency) and Juseong University, Jun.2004
- [12] Third prize in the 1st KOREA micro-controller competition from Comfile Technology Inc. , April.2004
- [11] The first prize in the central part Robot Soccer mirosot league by KRSA (Korea Robot Soccer Association) and KangNam University, Feb.2004
- [10] The first prize in 2003 FIRA Robot Soccer World Championship Middle League by FIRA (Federation of International Robot Soccer Association), Oct.2003
- [9] The first prize in 2003 FIRA Robot Soccer World Championship Large League by FIRA (Federation of International Robot Soccer Association), Oct.2003
- [8] The first prize in 2003 FIRA KOREA CUP Robot Soccer competition by KRSA (Korea Robot Soccer Association), Aus.2003
- [7] The first prize in 3rd the central part Robot Soccer mirosot league from KRSA (Korea robot soccer association) and Chung-ang University, July.2003
- [6] The best student award from the president of Sung Kyun Kwan University at the graduation, Feb.2003
- [5] Third prize in 2002 FIRA Robot Soccer World Championship by FIRA (Federation of International Robot Soccer Association), May.2002
- [4] The second prize in 2002 FIRA-POSCO Cup National Robot Soccer competition by KRSA(Korea Robot Soccer Association), Jan.2002
- [3] The Best paper award in the 2002 FIRA-POSCO Cup National Robot Soccer Conference by KRSA, Jan.2002
- [2] The first prize in Robot Soccer competition for commemoration of national athletic conference hosted by KRSA and Chung-Chung Namdo, Oct.2001
- [1] Manner prize in the first central part Robot Soccer competition hosted by KRSA and Sung kyun Kwan University, Aus.2001

Publications

Conferences

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- [12] Sa, I and Corke, P, System Identification, Estimation and Control for a Cost Effective Open-Source Quadcopter, 2012 IEEE International Conference on Robotics and Automation
- [11] Sa, I and Corke, P, Estimation and control for an open-source quadcopter, In Proceedings of the Australasian Conference on Robotics and Automation 2011, Monash University, Melbourne, Vic
- [10] Sa, I and Corke, P, 3D sensing and estimation for indoor quadcopter flight, 2011 IEEE International Conference on Robotics and Automation workshop.
- [9] In-Kyu Sa, Ho Seok Ahn, Kwang Moo Yi, Jin Young Choi, "Implementation of Home Automation System Using a PDA based Mobile Robot." IEEE ISIE 2009 International Symposium on Industrial Electronics, July, 2009.
- [8] Ho-Seok Ahn, In-Kyu Sa, Back-Young Min, Jin-Hee Na, U-Sung Kang, Jin-Young Choi, "Design of Reconfigurable Heterogeneous Modular Architecture for Service Robot," IROS2008, pp. 1313-1318, Sep., 2008.
- [7] Beck-Young Min, Ho-Seok Ahn, In-Kyu Sa, Min-yo Lee, Chang-Kyun Lee, Tae-Hyun Kim, Jun-Young Choi, "Vision-Based Robot Manipulator for Grasping Objects," International Conference on Advanced Robotics (ICAR 2007), pp. 164-169, Aug., 2007.
- [6] In-Kyu Sa, Sung-Min Beck, Tae-Young Kuc, "A Robust Real-Time Mobile Robot Self-Localization with ICP Algorithm" SICE-ICASE International Joint Conference 2005 (ICCAS 2005), Jun., 2005.
- [5] In-Kyu Sa, Ho-Seok Ahn, Jun-Young Choi, "A Robust Real-Time Mobile Robot Self-Localization with ICP Algorithm", Korea Robotics Society Annual Conference, June. 2009.
- [4] In-Kyu Sa, Ho-Seok Ahn, Hyung-Kyu Lee, Jun-Young Choi, "A real-time face tracking method using fuzzy controller." 2008 Conference on Information and Control System(CICS2008), pp. 333-334, Oct., 2008.
- [3] In-Kyu Sa, Ho-Seok Ahn, Hyung-Kyu Lee, Jun-Young Choi, "A real-time path planning method for efficient movement of a mobile robot." 2008 Conference on Information and Control System(CICS2008), pp. 331-332, Oct., 2008.
- [2] In-Kyu Sa, "Implementation of Frame grabber board using Net ARM Processor" Sung Kyun Kwan University graduation, B.S degree thesis, Feb., 2004. (**Best Student Paper Award**)
- [1] In-Kyu Sa, "Implementation of Simultaneous Localization and Mapping using Intelligent Hybrid Modular Control Architecture", Sung Kyun Kwan University graduation, M.S degree thesis, Feb., 2006.

Journal

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- [1] Ho-Seok Ahn, In-Kyu Sa, Jin-Young Choi "PDA based mobile robot system with remote monitoring for home environment," Transaction on consumer electronics, Sep., 2009.

Book capter

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- [2] In-Kyu Sa, Ho-Seok Ahn, "Implementation of Home Automation System Using a PDA based Mobile Robot - PBMoRo" Cutting Edge Robotics 2009
- [1] Ho-Seok Ahn, In-Kyu Sa, Back-Young Min, Jin-Young Choi, "Intelligent Unmanned Store Service Robot PartTimer," Service Robotics, i-Tech Book, July, 2008.

Technical reports

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- [4] The trend of domestic Home network service market, Electronics Information Center, Oct.11 2005.
- [3] A prospect of the trend of Domestic and international technique and market of sensor industry, Electronics Information Center, Jun.16 2005.
- [2] An analysis of the trend of Domestic and international technique and market of a small size high accuracy motor control, Electronics Information Center, Jun.10 2004.
- [1] An analysis of the trend of Domestic and international technique and market of intelligent robots, Electronics Information Center, Apr.1 2004.

Projects

[2012] Shared Autonomy for Close Quarter Navigation and Control of a VTOL Platform

Description: See page 1

[2009] Samsung first Google android phone GT-I7500(GSM850/GSM900/DCS1800/PCS1900) for Bouygues in France.

Description:

- WIFI device driver engineer, Sensor Hardware Abstraction Layer implementation on linux platform.
- Development Term: July.2007 ~ July.2009.
- Research Institute: Samsung Electronics CO

[2008] HSPA (Y3100) device development

- Development description : USB device driver engineer, Windows-XP and VISTA platform.
- Development Term: May.2008 ~ November.2008.
- Research Institute: Samsung Electronics CO

[2008] Mobile projector development (MBP-200).

- Development description : Developed battery device driver, Windows CE 5.0 platform
- Development Term: July.2008 ~ November.2008.
- Research Institute: Samsung Electronics CO

[2007] CDMA&WCDMA Terminal devices development

- Development description: Wireless Internet Platform for Interoperability (WIPI) engineer, V9000,W290,W2900,W240 mobile phones development, BREW platform
- Development Term: June, 2006 ~ July, 2007.
- Research Institute: Samsung Electronics CO.

[2005] Human robot Interaction

- Development description: cognitive interaction, multimodal user identification, Windows platform
- Development Term: July.2005 ~ December.2005.
- Research Institute: ISRC, ETRI.

[2005] DNW modification and USB device driver.

- Development description: Modification of DNW Tool memory dumping and debugging, WINDOWS DDK platform.
- Development Term: July.2005 ~ October.2005.
- Research Institute: Samsung Electronics System LSI.

[2005] Store manager robot system development

- Development description: Motion planning and navigation, design robot, Windows platform.
- Development Term: January.2005 ~ December.2005.
- Research Institute: Samsung software membership.

[2004] Robot soccer system development.

- Development description: Small, middle and large league robot soccer design and controller programming, C and IAR IDE platform.
- Development Term: July.2000 ~ March.2004.
- Research Institute: Sung Kyun Kwan Univ. Institute of Robot.(SIOR)

[2004] 21C FRONTIER project

- Development description: Development of Human Living Assistant Intelligent Robot, Windows platform.
- Development Term: November.2003 ~ March.2004.
- Research Institute: 21C Frontier Project Group, ISRC, Advisor: Suk-Han Lee, Tae-Yong Kuc.

[2004] Gas sensor detector and analysis system development

- Development description: Hardware design and firmware programming.
- Development Term: July.2004 ~ November.2004.
- Research Institute: Samsung electronics Digital appliance department.

[2004] A small size mobile robot system development.

- Development description: Robot control and low level hardware programming. Windows platform and IAR IDE
- Development Term: February .2004 ~ April.2004.
- Research Institute: Sung Kyun Kwan Univ. Institute of Robot.(SIOR)

[2004] Wireless Mobile Robot System development.

- Development description: Motion planning and low level motor control, Robot Hardware design Windows platform.
- Development Term: January.2004 ~ December.2004.
- Research Institute: Samsung software membership.

[2001] Embedded vision system development.

- Development description: Embedded vision-monitoring system on the purpose of security.
- Development Term: April.2001 ~ December.2001.
- Research Institute: Samsung software membership.

Language Capabilities

- Korean (Native), English