Daniel Stonier

서울시 광진구 군자동 356-3. 우편번호 143-840
Seoul, Gwangjin-gu, Gunja-dong, #356-3, post code 143-840.
Phone: +82-10-5400-3296. Email: d.stonier@gmail.com
January 2013

Research/Work Interests

Work Interests

Moving from academia to a company environment has brought with it a first hand practical understanding of control theory and generated a genuine interest in the challenges associated with embedded control systems. I've been introduced into many fields over the last five years - of these I have a particular interest in embedded systems, manipulation and slam (special emphasis on vision slam). I've also been involved with the re-designing of our software frameworks, initially to standardise the control development environment on different robots and more recently the development of a framework for multi-robot-device and software authoring.

Research Interests

My research interests are on hold since beginning as a practicing engineer at Yujin Robot. Previously, I have been involved in a wide variety of projects, largely due to having moved from mathematics to engineering. In doing so, the focus naturally tended towards comparing models of naturally occuring systems with robotic systems from a dynamical/control perspective. Understanding nature will assist us in developing robots and in turn, robotic experiments may better help us understand nature.

Projects at Yujin have occasionally ventured into research areas - I've worked on tension spline algorithms for manipulator trajectory generators, a portable (from robot to robot) ros based control platform, a new ceiling corner based vision slam and recently a software framework for multi-robot-device systems.

If I was to return to a purely research role, my first choice would be to return to developing practical implementations of vision slam for robotics.

Education

University of Queensland (Brisbane, Australia)

Bachelor of Engineering	*1991-94,2004*

Electrical Engineering - first class honours.
Hons. Thesis - hardware/software implementation of a robotic vision system.

Bachelor of Science	*1991-94*

Mathematics - honours stream.

Deakin University (Melbourne, Australia)

Doctor of Philosophy (Mathematics)	*1996-2002*

Cocycle Theory - analysis of attractors in non-autonomous dynamical systems.
Non-Autonomous Stability - extending & integrating cocycle and classical theories.
Numerical Analysis - perturbations of automonous systems to non-autonomous systems.

Central Queensland University (Rockhampton, Australia)

Bachelor of Science (Hons.)	*1995*

Mathematics - first class honours.
Hons. Thesis - sliding mode control of robotic manipulators.

Yeppoon State High School (Yeppoon, Australia)

High School Certificate	*1986-90*
Junior and Senior Dux	*1988,1990*

Company Experience

Yujin Robot Co. Ltd (Seoul, Korea)

Lead Developer
2011-12

Management - Managing Yujin's control team.
Vision Slam - Preliminary design/testing of vision slam systems using bundle adjustment.
Robotics in Concert - A multi-robot-device framwork for control and software authoring.
Turtlebot - Software development for Willow Garage's turtlebot.
Kobuki - A mobile base research platform (hw and sw development).
Yujin Open Source - Maintainer/developer for win_ros, zeroconf_avahi, ecl, kobuki, rocon.
Catkin - Involved in the design and early prototyping of the nextgen ros build environment.
Ros on Windows - porting the ros build system and primary components thereof to windows.

Senior Control Engineer
2008-10

Vision Slam - a ceiling corner based vision slam running on an embedded arm core.
Visual Servoing - vision based feedback to manipulation tasks.
Yujin Control System - software platform for deployment of control modules, based on RoS.
Yujin Control Platform - development of a linux distribution for higher level control.
Yujin Control Library - cross platform robot control library (core,io,math,kinematics).
Device Manager - a robotic hardware abstraction layer implemented in software.

Control Engineer
2007-8

Motor Driver Network - development of a motor subsystem for lower level control.
Robot Arm Control - pendant & feedforward and jacobian control of 4-7 degree manipulators.

University Experience

Korean Advanced Institute of Science and Technology [Kaist] (Daejeon, South Korea)

Postdoctoral Fellow (Robot Intelligence Lab)
2005-6

Omnidirectional Robot Project - nonlinear slip dynamics and control.
Humanoid Robot Project - angular momentum postural balance, walking gaits.
Robot Soccer Project - fuzzy logic path planning techniques.

Central Queensland University (Rockhampton, Australia)

Associate Lecturer
2002-4

Mathematics - calculus, linear algebra, real analysis, control theory, advanced dynamics.
Computing Science - systems modelling.

Research Assistant
2000-1

Mathematics - sliding mode control theory.

University Tutor
1995,1998-2002

Mathematics - statistics, calculus, linear algebra, control theory, dynamics.

Deakin University (Melbourne, Australia)

University & College Tutor
1996

Mathematics - calculus, linear algebra.
Physics - first year courses.

University of Queensland - Cromwell College (Brisbane, Australia)

College Tutor
1993-4

Mathematics - engineering mathematics.

PUBLICATIONS

- Jihoon Lee, Daniel Stonier, Jaeyeong Lee, 'Kobuki, Introducing the New Turtle', *Proc. of Ubiquitous Robots and Ambient Intelligence*, Industrial Session, October 2012.
- Kang-Hee Lee, Younggeun Choi, Daniel Stonier, ' Evolutionary algorithm for a genetic robot's personality based on the Myers-Briggs Type Indicator', *Robotics and Autonomous Systems*, vol. 60, issue 7, July 2012.
- Daniel Stonier, 'ROS on Windows', *RosCon 2012*, May 2012.
- Bum-Joo Lee, Daniel Stonier Yong-Duk Kim, Jeong-Ki Yoo and Jong-Hwan Kim, 'Modifiable Walking Pattern of a Humanoid Robot by Using Allowable ZMP Variation', *IEEE Transactions on Robotics*, vol. 24, no. 4, pp. 917-923, August 2008.
- Kang Bok-Hyun, Daniel Stonier and KyungChul Shin, 'The develompent of a serving robot for restaraunt serving and guidance', *Proc. of the 17th World Congress, International Federation of Automatic Control (IFAC)*, Seoul, Korea, July 2008.
- Bum Joo Lee, Daniel Stonier, Yong-Duk Kim, Jeong-Ki Yoo and Jong-Hwan Kim, 'Modifiable Walking Pattern Generation using Real-Time ZMP Manipulation for Humanoid Robots,' *Proc. of the IEEE International Conference on Intelligent Robots and Systems*, San Diego, USA, November 2007.
- Daniel Stonier, Se-Hyoung Cho, Naveen Suresh Kuppuswamy, and Jong-Hwan Kim, ’Nonlinear Slip Dynamics for an Omniwheel Mobile Robot Platform', *Proc. of the IEEE International Conference on Robotics and Automation (ICRA)*, Rome, Italy, April 2007.
- Daniel Stonier and Jong-Hwan Kim, 'ZMP Analysis for Realisation of Humanoid Motion on Complex Topologies,' *Proc. of the IEEE International Conference on Systems, Man and Cybernetics(SMC)*, Taiwan, pp. 247-252, October 2006.
- Naveen Suresh Kuppuswamy, Se-Hyoung Cho, Daniel Stonier, Sung Lok Choi, and Jong-Hwan Kim, ’Design of an Omni-directional Robot for FIRA Robosot', *Proc. of 2006 FIRA Robot World Congress*, Dortmund, Germany, June 2006.
- Jong-Hwan Park, Jong-Hwan. Kim, B.H. Ahn, Daniel Stonier, 'Recombinant Rule Selection of Evolutionary Fuzzy Path Planning for Shooting in Robot Soccer', *29th Annual German Conference on Artificial Intelligence, Lecture Notes in Computer Science*, June 2006.
- Daniel Stonier and Russel Stonier, 'Obstacle Avoidance and Finite Time Tracking of Mobile Targets ", *2nd International Conference on Autonomous Robots and Agents (ICARA)*, Palmerston North, New Zealand, December 2004.
- Daniel Stonier and Russel Stonier, 'Handling Constraint Avoidance and Finite Time Switching Control for Simulated Mobile Robots', *2nd International Conference on Computational Intelligence, Robotics and Autonomous Systems (CIRAS)*, Singapore 2003.
- Daniel Stonier and Russel Stonier, 'Constraint Avoidance and Finite Time Control for Simulated Mobile Robots Using a Gradient Calculation', *Proc. of the PICS International Conference and Exhibition on Instrumentation and Control (PICS-ICEIC)*, Manilla, Phillipines, 2003.
- Daniel Stonier, 'Stability Theory and Numerical Analysis of Non-Autonomous Dynamical Systems', *PhD Thesis*, Department of Mathematics, Deakin University, Geelong, Victoria, Australia, 2003.
- Peter Kloeden and Daniel Stonier, 'Cocycle Attractors in Non-Autonomous Perturbed Differential Equations', *Dynamics of Discrete, Continuous and Impulsive Systems*, 4, pp. 211-226, 1998.

Technical Skills

- **Latex Document Editing**
- **C/C+ Programming**
  - *Vision Slam* - developed an ekf-slam algorithm for a corner based vision slam, recently bundle adjustment. [Yujin].
  - *Software Design* - generic configurable robot control framework based on RoS [Yujin/Willow].
  - *Qt* - cross platform robotic debugging and test applications on linux and windows [Yujin].
  - *Device handling* - robot device manager/hal [Yujin].
  - *Library development* - Embedded Control Library and many others [Open Source].
  - *Higher level control* - manipulation, navigation and Yujin's control system core [Yujin].
  - *Lower level control* - TI DSP motor control board [Yujin].
  - *Science libraries* - e.g. blitz, tvmet, gsl, opencv, eigen2, ros, orocos [Yujin].
  - *OpenGL* - robotic vision [UQ], humanoid simulation [Kaist]
  - *Numerical simulations* - mobile robot and manipulator simulations [CQU].
  - *EFL* - cross platform mobile robot simulation [CQU].
- **Python Programming**
  - *Higher Level Frameworks* - multi-robot frameworks, higher level control programs and state machines. [Yujin].
  - *RoS Tools* - scripting tools for the RoS [Yujin].
- **Matlab Programming**
  - *Numerical Simulations* - manipulators, humanoid balance, nonlinear slip dynamics [Kaist,Yujin]
  - *Simulink* - control applications [UQ].
  - *Fourier Transform Analysis* - determination of lyapunov exponents [CQU].
- **Embedded Programming**
  - *TI DSP* - motor control and mobile robot main processing unit [Yujin].
  - *PowerPC* - higher level control processor using ELDK linux [Yujin].
  - *Arm11* - cross-compilation for an arm based linux [Yujin].
- **General Programming**
  - *Android* - zeroconf jmdns ros interfaces [Yujin].
  - *Java* - swing gui development [Home].
  - *Pascal* - simple numrical simulations and neural network examples [CQU].
  - *Fortran* - sufficient knowledge to run and grade student code [CQU].
- **The Web Skills**
  - *Dokuwiki customisation* - installation and template/plugin development (Doku Doodles) [Home].
  - *Web course material delivery* - course notes and resources [CQU].
  - *Server Administration* - LAMP, Redmine, Wikis, Hudson/Jenkins, SVN/Git, File Servers [Home, Yujin].
  - *Perl IRC bot* - simple perl based irc bot for our club [Home].
- **Product Development**
  - *Kobuki* - a mobile research base [Yujin].
  - *Turtlebot 2* - a mobile research platform and software environment [Yujin/Willow].
- **Linux**
  - *Busybox Based Platform* - developed a minimal distribution for control on an intel atom [Yujin].
  - *Gentoo, Ubuntu, Fedora, Debian, Moblin* - knowledge of various distributions [Home,Yujin].
  - *Server Administration* - networking, apache, wiki, svn, redmine, routing [Home,Yujin].
  - *Scripting* -bash and perl scripting for automative tasks [Home,Yujin].
  - *Kernel Building* - for embedded and home (gentoo) systems [Yujin].
  - *Embedded Development* - using ELDK (ppc), Gentoo CrossDev, CMake, and the ECL [Yujin].
  - *RTOS* - development and use of linux RTOS (RTAI,Xenomai,Pre-emptible RT Kernel) [Yujin].
- **Languages**
  - *English* - native.
  - *Korean* - intermediate, currently living, studying and working in korea (5+years).
  - *German* - beginner, lived and studied in germany for one year.

Misc. Work Experience

Australia Post (Brisbane, Australia)

Technician's Assistant	*1992-3*

Electrician's Assistant - repairing fax machines, wiring a new warehouse.

Tradesman's Assistant	*1991-2*

Shop Floor TA - assistant for fitters and turners, carpenters and electricians.

Yeppoon Rural Area (Yeppoon, Australia)

Fruit Picking *1989-91*

Farmhand - macadamias, lychees, mangoes.

Non-Curricular Interests

- **Cycling**
    - *Fitness* - these days, due to lack of time, I am cycling just to maintain my fitness.
    - *Racing* - raced with the Rockhampton Cycling Club 1999-2004, Tour of the Tableland 2002.
    - *Official* - handicapper, commisaire & committee member for the Rockhampton Cycling Club 2000-4.
- **Chess** - whenever I can find an opponent.
- **Squash** - whenever I can find the time!

Company References

Sam Park

Vice President

Yujin Robot
#601 Namsung-Plaza
 345-30 Gasan-dong
Guemcheon-gu
Seoul, Korea
Telephone: 82–2-2104-0401
Fax: 82-2-2104-0450
Email sampark@yujinrobot.com

Lee Jae Yeong

Control Engineer

Yujin Robot
#601 Namsung-Plaza
 345-30 Gasan-dong
Guemcheon-gu
Seoul, Korea
Telephone: 82–18-2135-769
Fax: 82-2-2104-0450
Email jakan2@yujinrobot.com

Academic References

Dr Rob McDougall

Senior Lecturer, Head of School

School of Mathematics and Decision Sciences
Faculty of Informatics and Communication
Central Queensland University
Rockhampton, Queensland
Australia, 4702
Telephone: 61-7-4930 9486
Fax: 61-7-4930 9729
Email r.mcdougall@cqu.edu.au

Andrew Stacey

Senior Lecturer

Department of Mathematics and Statistics
Faculty of Applied Mathematics
RMIT, GPO Box 2476V
Melbourne, Victoria
Australia, 3001
Telephone: 61-3-9925 2280
Email stacey@rmit.edu.au