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Md Omar Faruque Sarker

EDUCATION

Ph.D. Technology (Robotics), University of Wales, Newport, UK, (expected to finish 10/2010)
Thesis: *Self-regulated Multi-robot Task Allocation*

M.Eng. HCI & Robotics, Korea Institute of Science & Technology,
University of Science & Technology, South Korea, 2007
Thesis: *A Knowledge-Based Service Approach for Human-Centered Robots*
Graduate courses: *Human Machine Interaction, Intelligent Control, Mobile Robotics, Computer Vision, Advanced Symbolic AI Techniques* and *Information Security*. CGPA: 4.18/4.5

B.Sc. Mechanical Engineering, Bangladesh University of Engineering and Technology, 2005
Final-year elective courses: *Mechatronics* and *Bio-Engineering*

EMPLOYMENT

10/2007 - present PhD Student/ Research Assistant
Cognitive Robotics Research Centre, University of Wales, Newport, UK.

08/2005 - 07/2007 Postgraduate Research Assistant/ Visiting Research Scientist
Center for Cognitive Robotics, Korea Institute of Science & Technology, S. Korea

03/2005 - 07/2005 Lecturer and Coordinator (Industrial Training Program)
Dept. of CSE, International Islamic University of Chittagong, Dhaka campus, Bangladesh

10/2004 - 05/2005 Network Engineer
Institute of Info & Communication Tech., Bangladesh University of Engineering & Technology

05/2004 - 09/2004 Systems Engineer (Part-Time)
Ektoo Limited, Dhaka, Bangladesh

11/2002 - 04/2004 Associate Editor (Part-Time)
Technology Today Ltd., Dhaka, Bangladesh.

04/2002–06/2004 Tutor (Part-time)
Institute of Info & Communication Tech., Bangladesh University of Engineering & Technology

AWARDS

10/2010 - Present University of Wales, Newport, UK Research Support Grant

10/2007 - 09/2010 EPSRC, UK PhD Studentship (Grant ref. EP/E061982/1)

05/2010 - 08/2010 Google Summer of Code Open-source Software Development Sponsorship for Tahoe-LAFS

05/2009 - 08/2009 Google Summer of Code Open-source Software Development Sponsorship for Bluez

09/2005 - 08/2007 Korea Institute of Science & Technology - Int'l R & D Academy Postgraduate Scholarship

07/2000 - 06/2004 Bangladesh University of Engineering & Technology Technical Scholarship

1997 District Commissioner's Gold Medal Honour for the Best Student of the Year

1996 Prime Minister's Award for Merit List Position in SSC Examination

1995 International Friendship Award, Scouts Invitation Program, Boy Scouts of Nippon, Japan

RESEARCH INTERESTS

AI and Robotics: *Bio-inspired decentralized control of multi-robot systems and application in search and rescue.*
Networking & communication systems: *Scalable distributed processing for complex networks and clouds.*
Computer vision and image processing: *Multi-agent tracking and real-time image processing.*

TEACHING INTERESTS

Computer Networks, Information Security, Network Programming, Artificial Intelligence, Mobile Robotics, Intelligent Control, Applied Computer Vision and Multi-agent Systems.

TECHNICAL SKILLS/TOOLS

Proficient Programming Languages: *C/C++, Python, Unix shell scripts, Prolog, LaTeX.*
Tools: *Git and Darcs revision control system, OpenCV computer vision library, SwisTrack multi-robot tracker, Epuck, Myro and Player/Stage robot control frameworks, NetLogo multi-agent simulator, Xenomai Linux based real-time OS, popular Unix/Linux network servers (e.g. Apache, MySQL), Linux Netfilter IPTables security package, CORAL, XSB , FuzzyCLIPS deductive databases and logic programming knowledge-based systems.*

Familiar: *Java, MATLAB, Tcl/Tk, HTML/XML, CSS, PHP, Bluez Bluetooth stack, Tahoe-LAFS, Drupal (CMS).*

PUBLICATIONS

Book Chapters

[1] Sarker M. O. F. and Dahl T. S. A Robotic Validation of the Attractive Field Model: An Inter-disciplinary Model of Self-regulatory Social Systems. *Swarm Intelligence, Lecture Notes in Computer Science* , 6234:24–35, 2010.

[2] Sarker M. O. F. Kim C. Sadi M. G. and You. B-J. Developing Knowledge-Based Security-Sense of Networked Intelligent Robots. *Lecture Notes in Computer Science*, 4251:874–881, 2006.

Conference Papers

[3] Sarker, M. O. F. and Dahl, T. S. Flexible Communication in Multi-robotic Control System Using HEAD: Hybrid Event-driven Architecture on D-Bus. In *Proc. of the UKACC International Conference on Control, CONTROL 2010, Coventry, UK*, pages 926–931, September 7-10, 2010.

[4] Sarker M. O. F. and Dahl T. S. Communication strategies for self-regulated division of labour in robot society. In *Proceedings of the 2009 European Conference on Complex Systems (ECCS'09), Warwick, UK*, pages 157–158, September 21-25, 2009.

[5] Sarker M. O. F. Park, J-M. Kim C. and You. B-J. A Knowledge-Based Service Approach for Human-Centered Robots. In *In Proc of the 16th IEEE International Symposium on Robot and Human interactive Communication, 2007. RO-MAN 2007*, pages 582–587, 2007.

[6] Sarker M. O. F. Kim C. Baek S. and You. B-J. An IEEE-1394 Based Real-time Robot Control System for Efficient Controlling of Humanoids. In *In Proc of the 2006 IEEE/RSJ International Conference on Intelligent Robots and Systems IROS 2006*, pages 1416–1421, 2006.

[7] Sarker M. O. F. Kim C. Cho J-S. and You. B-J. Development of a Network-based Real-Time Robot Control System over IEEE 1394: Using Open Source Software Platform. In *In Proc of the IEEE International Conference on Mechatronics, ICM 2006*, pages 563–568, 2006.

Technical Report and Thesis

[8] Sarker, Md Omar Faruque. Emergent Self-regulation in Social Robotic Systems. Technical report, University of Wales, Newport, UK, November 2008. *Submitted as PhD Transfer Report*.

[9] Sarker, Md Omar Faruque. A Knowledge-Based Service Approach for Human-Centered Robots. Technical report, University of Science and Technology, South Korea, August 2007.

Submitted/Accepted for Publication

[10] Sarker M. O. F. and Dahl T. S. Bio-inspired Communication for Self-regulated Multi-robot Sytems. Accepted for publication in Multi-Robot Systems, Trends and Development, ISBN 978-953-7619-X-X, 2010.

[11] Sarker M. O. F. and Dahl T. S. Self-regulated Multi-robot Task Allocation: A Taxonomy and Comparison of Centralized and Local Communication Strategies. In submission to *Elsevier Robotics and Autonomous System*, 2010.

COMPLETED SOFTWARE DEVELOPMENT PROJECTS

PhD Research Projects (source code available from http://github.com/roboshepherd)

[1] Project title: ***E-puck Robot's Centralized and Distributed Controller Development***

Tools/Skills: Python, C/C++, DBus, Git (version control system)

Achievements: Developed the task achieving behaviours of the e-puck robot (navigation, obstacle avoidance and homing) and integrated with SwisTrack tracker.

[2] Project title: ***SwisTrack Multi-robot Tracker's Prosilica GigE Camera Driver and DBus Wrapper Development***

Tools/Skills: C++, Python, Git, OpenCV (computer vision library)

Achievements: Developed GigE camera driver using Prosilica's Linux-SDK and OpenCV. Implemented SwisTrack's DBus server component for broadcasting position information to robot controllers.

Google Summer-of-Code Projects (http://socghop.appspot.com)

[1] 2010 Project title: ***A Publish/Subscribe Style Decentralized Introduction***

Organization: Tahoe-LAFS (http://tahoe-lafs.org/trac/tahoe-lafs/ticket/68)

Tools/Skills: Python, Twisted/Nevow (web framework), Mock (code testing), Darcs (version control system)

Achievements: Designed, developed, tested and documented the community demanded fault-tolerant multiple-introducer scheme (ticket #68).

[2] 2009 Project title: ***A One-Step Bluetooth Device Setup Wizard Using 2D Data-matrix symbol***

Organization: BlueZ (http://www.bluez.org)

Tools/Skills: C, Bluetooth specification version 2.1 EDR, 2D DataMatrix library (libdmtx), Git

Achievements: Tested the feasibility developing a user-friendly one-step setup wizard and integrating short-range wireless NFC technology with Bluez's Linux-Bluetooth-stack.

Masters Research Projects (http://humanoid.kist.re.kr/new/eng/)

[1] Project title: ***Application Development for Human-Centered Service Robots***

Tools/Skills: C++/Java, Prolog, and XML, Java-Player client library, XSB deductive database, XML-RPC, Evolution Robotics SDK, Wxwidget Library, Boost C++ Multi-thread library

Achievements: Designed and developed Knowledge-based services and implemented two scenarios in an office and a hospital environment in Player/Stage mobile robot simulator.

[2] Project title: ***Intelligent Network Security System for Robots***

Tools/Skills: Unix BASH shell, SQL, CORAL, CLIPS, C, Linux Netfilter IPTables, CORAL deductive database, Fuzzy inference system, MySQL

Achievements: A knowledge-based security architecture was implemented and simulated.

[3] Project title: ***Real-Time Robot Control***

Tools/Skills: C, Linux/Xenomai RTOS, UML, Source-code-navigator

Achievements: Customized real-time IEEE 1394 device-driver in Linux for humanoid robot control.

Masters Course Projects

[1] Project title: ***Image Feature Extraction and Mobile Robot Path Planning***

Tools/Skills: MATLAB, Least square techniques, Hough transform, Gradient method

Achievements: Applied weighted and non-weighted least-square techniques, Hough transform for efficient line extraction. Implemented the gradient method for mobile robot path planning with wave-front propagation algorithm.

[2] Project title: ***Application Development for Intelligent LEGO Home***

Tools/Skills: Java, Knowledge-engineering tool Protege, CLIPS inference engine, and Intel UPnP authoring tools.

Achievements: Developed the inference engine, a Java client to Protege and several UPnP devices.

[3] Project title: ***Human Face Recognition***

Tools/Skills: C/C++, Tcl/Tk, Statistical histogram algorithm

Achievements: Developed an algorithm for converting colour info from RGB to HSV colour space that made the face detection more robust in varying illuminations.

[4] Project title: ***Fourier 2D Transform tool***

Tools/Skills: C, Tcl/Tk, Fourier transform algorithm

Achievements: Developed a tool that can transform a 64x64 image.