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Md Omar Faruque Sarker

EDUCATION

Ph.D. Robotics (Multi-robot system), University of Wales, Newport, UK
Thesis: *Self-regulated Multi-robot Task Allocation*, 2010

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 (Full-time)
Cognitive Robotics Research Centre, University of Wales, Newport, UK (http://ril.newport.ac.uk)

05/2010 - 08/2010 Summer-of-code Student (Part-time), Google Inc. USA (http://socghop.appspot.com)

05/2009 - 08/2009 Summer-of-code Student (Part-time), Google Inc. USA (http://socghop.appspot.com)

08/2005 - 07/2007 Postgraduate Research Assistant/ Visiting Research Scientist (Full-time)
Center for Cognitive Robotics Research, Korea Institute of Sci. & Tech., S. Korea (humanoid.kist.re.kr)

03/2005 - 07/2005 Lecturer and Coordinator, Industrial Training Program (Part-time)
Dept. of CSE, Int'l Islamic University of Chittagong, Dhaka campus, Bangladesh (www.iiucdc.org)

10/2004 - 05/2005 Project Engineer (Full-time)
Institute of Info & Comm. Tech., Bangladesh Univ. of Engg. & Tech. (www.buet.ac.bd/iict)

05/2004 - 09/2004 Systems Engineer (Part-Time) Ektoo Ltd., Dhaka, Bangladesh (www.ektoo.net.bd)

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

04/2002–06/2004 Tutor (Part-time) Institute of Info & Comm. Tech., Bangladesh Univ. of Engg. & Tech.
10/2002–04/2004 System Administrator (Part-time) EasySoft Networks Ltd. Dhaka, Bangladesh.

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

Cloud Computing: *Distributed & parallel processing, optimization and security for clouds and large grids.*
AI: *Knowledge representation, reasoning, searching techniques, semantic web & intelligent grid technologies.*
Robotics: *Bio-inspired self-organized pattern formation, matching and task-allocation in multi-agent systems.*

TECHNICAL SKILLS/TOOLS

Programming/Scripting Languages:
- Proficient: *Python, C/C++, Prolog, Unix Shell scripts, HTML, PHP, XML, SQL, UML, LaTeX.*
- Familiar: *Java, RDF, SAPQL, CSS, AJAX, MATLAB, Tcl/Tk*

Open Source Tools/Frameworks:
- *Twisted, Nevow, Django* Python web frameworks
- *SciPy, NumPy, Matplotlib* Python scientific libraries
- Python *mock* testing abd d-bus interprocess communication libraries
- *Git, Darcs, SVN* revision control systems
- *Drupal, razorCMS, SkyBlueCanvas* content management systems
- *Boost, wxWidget* C++ libraries
- *Protégé-OWL* ontology editor, *CLIPS, FuzzyCLIPS* inference engines, *CORAL and XSB* deductive databases
- Popular Unix/Linux networking/database servers: e.g. *Apache, BIND, MySQL, SQUID, NFS, SAMBA etc.*
- *Linux Netfilter/IPTables* security package
- *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, *Bluez* Bluetooth stack, and TCP/IP sockets
- *SQLite/PostgreSQL RDBMS*
- *Tahoe-LAFS* distributed peer-to-peer file system
- *Dia and Umbrello* UML authoring tools.

COMPLETED SOFTWARE DEVELOPMENT PROJECTS

PhD Research Projects (http://github.com/roboshepherd)

[1] Project title: ***E-puck Robot's Centralized and Distributed Controller Development***
Achievements: Developed the task achieving behaviours of the e-puck robot (navigation, obstacle avoidance and homing) and integrated with SwisTrack tracker
Tools/Skills: Python, C/C++, DBus, Git (version control system).

[2] Project title: ***SwisTrack Multi-robot Tracker's Prosilica GigE Camera Driver and DBus Wrapper Development***
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
Tools/Skills: C++, Python, Git, OpenCV (computer vision library).

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)
Achievements: Designed, developed, tested and documented the community demanded fault-tolerant multiple-introducer scheme (ticket #68)
Tools/Skills: Python, Twisted/Nevow (web framework), Mock (code testing), Darcs (version control system).

[2] 2009 Project title: ***A One-Step Bluetooth Device Setup Wizard Using 2D Data-matrix symbol***
Organization: BlueZ (http://www.bluez.org)
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
Tools/Skills: C, Bluetooth specification version 2.1 EDR, 2D DataMatrix library (libdmtx), Git.

Masters Course Projects

[1] Project title: ***Application Development for Intelligent LEGO Home***
Achievements: Developed an inference engine, a Java client to Protégé and several UPnP devices
Tools/Skills: Java, Protégé/OWL ontology editor, CLIPS inference engine, and Intel UPnP authoring tools.
[2] Project title: ***Image Feature Extraction and Mobile Robot Path Planning***
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
Tools/Skills: MATLAB, Least square techniques, Hough transform, Gradient method.
[3] Project title: ***Human Face Recognition***
Achievements: Developed an algorithm for converting colour info from RGB to HSV colour space that made the face detection more robust in varying illuminations
Tools/Skills: C/C++, Tcl/Tk, Statistical histogram algorithm.
[4] Project title: ***Fourier 2D Transform tool***
Achievements: Developed a tool that can transform a 64x64 image
Tools/Skills: C, Tcl/Tk, Fourier transform algorithm.

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

[1] Project title: ***Application Development for Human-Centered Service Robots***
Achievements: Designed and developed Knowledge-based services and implemented two scenarios in an office and a hospital environment in Player/Stage mobile robot simulator
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.
[2] Project title: ***Intelligent Network Security System for Robots***
Achievements: A knowledge-based security architecture was implemented and simulated
Tools/Skills: Unix BASH shell, SQL, CORAL, CLIPS, C, Linux Netfilter IPTables, CORAL deductive database, Fuzzy inference system, MySQL.
[3] Project title: ***Real-Time Robot Control***
Achievements: Customized real-time IEEE 1394 device-driver in Linux for humanoid robot control
Tools/Skills: C, Linux/Xenomai RTOS, UML, Source-code-navigator.

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.