SAPTARSHI DAS

Electrical and Computer Engineering
Michigan State University
East Lansing, MI – 48824

Email: *dassapta (AT) msu (DOT) edu*
Webpage: www.egr.msu.edu/~dassapta
LinkedIn: http://www.linkedin.com/in/dassap

RESEARCH INTERESTS

Wireless Embedded Systems, Energy-efficient Networking, Energy Harvested Networked Systems, Continuous Structural Health Monitoring, Network Protocol Design (MAC, Routing)

EDUCATION

Michigan State University, East Lansing, USA — Fall 2013-Present
Doctoral Student in Electrical and Computer Engineering — GPA: 3.7 (Fall 2014)
(Passed Ph. D. Qualifier Exams)
Area: Wireless Networking and Embedded Systems,
Energy Harvested Networked Systems, Energy-Aware Protocol Design
Advisor: Prof. Subir Biswas

Heritage Institute of Technology, Kolkata, India — 2007-2011
B.Tech, Electronics and Communication Engineering — GPA: 8.88/10
Undergrad Project: Efficient Adaptive Color Demosaicing Algorithm

WORK EXPERIENCE

Networked Embedded and Wireless Systems Laboratory (NeEWS)
Michigan State University, East Lansing
Graduate Research Assistant — Aug 2013-Present

My current work involves design and implementation of networked, embedded sensing devices and energy-efficient network communication protocols. I have participated as a contributor in a variety of projects sponsored by the National Aeronautics and Space Administration (NASA) and the National Science Foundation (NSF).
The work in the NeEWS lab supplements my ongoing research pursuits in the area of energy efficient network protocol design for use in energy harvested embedded sensor networks. I am especially interested in coming up with lightweight and adaptive network communication protocol approaches that can be used for continuous structural health monitoring (as in aircraft wings, bridges etc.) powered by energy harvesting techniques.

Technical Exposure:
Substantial experience in programming on embedded platforms such as Mica2, IRIS, Cricket etc. using nesC programming language based on the TinyOS platform
Wrote and used a C++ based Discrete Event Simulation program for testing and evaluating developed network protocols
Designed and implemented programs for optimization of network protocols in dynamic network traffic conditions using Evolutionary Algorithms (NSGA-II inside ONE simulator) and Artificial Life (Avida platform)

Technologies used:
Java 1.7/C/C++(*General Purpose Programming*), MATLAB/Octave(*Computational*), TinyOS/ nesC (*Embedded Systems Programming*), awk/Bash (*Scripting*), Avida Evolutionary Platform and NSGA-II (*Genetic Algorithms*), Android SDK(*Mobile App Design*), Blender (*3D Printing and Design*)

Infosys Limited
Chennai, India and Mysore, India
Systems Engineer (2011-13) and **Systems Engineer Trainee** (2011) — Aug 2011-Aug2013

I worked in the Financial Services (banking) domain for about 2 years, delivering projects for one of the largest financial institutions in the U.S. and the world.
Developed software solutions on a variety of projects including automatic check image processing and handling, customer information, risk and offers management

Have been involved in all phases of the software development life cycle (design, coding, testing, maintenance) across my projects apart from taking up the responsibilities of Configuration Controller for my sizable project team

Technical Exposure:

Extensive experience on the Java platform with a good working knowledge on other languages (C, C++, Javascript, Groovy, Python) and programming paradigms (functional e.g. Scala / CLisp, scripting e.g. Bash, computational e.g. MATLAB, Octave)

Exposed to a wide range of established programming frameworks, tools and design patterns

Technologies used:

Java1.6 (*General Purpose Programming*), Groovy/JavaScript/Bash/Korn (*Scripting*), OracleDB/PL-SQL (*Databases*), Dozer/Drools/Spring/Java Reflection API/Apache ServiceMix/Apache Tomcat/JBoss/IBM WAS/SOAPUI (*Frameworks and Tools*), Windows/Linux/Unix (*Operating Systems*)

RESEARCH PROJECTS AND PRESENTATIONS

1. NASA Badge System for Behavioural Monitoring
(Funded by NASA - Collaboration with team from Psychology department, MSU)

I developed software components of a wireless, networked wearable badge system for behavioural monitoring of human subjects.

Data generated is used for analysis of team cohesion dynamics by Psychology researchers from MSU

Modalities captured by the badges include motion, position, heart rate, and other environmental conditions

Used nesC(TinyOS) for programming the embedded Cricket platform that forms the heart of the badges

Rudimentary familiarity with 3D printing and design of the badge cases using Blender

2. Ultrasonic Pulse Modems for Event Monitoring and Through-substrate communication
(Funded by SPG (MSU) and NSF – Collaboration with teams from Electrical and Civil Engineering)

I collaborated in the design of platform architecture for structural health monitoring using energy harvested networked sensing devices.

Developed an adaptive and energy-efficient networking protocol for energy harvested networked sensing devices and evaluated the same using simulation experiments

3. Network Protocol Optimization in Dynamic Traffic conditions using Evolutionary approaches
(Course Projects)

I developed an evolutionary algorithm based network protocol optimization using NSGA-II on the ONE simulator.

Working on development of artificial life based network protocol optimization in the Avida platform

4. Investigation of Bluetooth based RSSI fingerprinting for Indoor Localization (Course Project)

Developed an Android application for Bluetooth RSSI fingerprinting (Android SDK and Eclipse)

Performed Indoor Localization using Fingerprint data and statistical inference using Bhattacharya distance measure (programmed in MATLAB)

5. Final Year Project (Undergraduate):

Development of Efficient Adaptive Colour Demosaicing and Face Detection Algorithms for Image Processing

6. Technical Presentations:

Network Protocols for Energy Harvested Systems (PhD Qualifier Exam Fall 2014)

Radio Astronomy - Techniques of observing the universe in radio frequencies and the advantages thereof

Image Processing and applications e.g. gesture based interfaces (Sixth Sense)

TRAINING AND COURSES

1. Machine Learning

Completed an online offering of the Stanford University course on Machine Learning hosted on the Coursera Inc. platform and conducted by Prof. Andrew Ng, Associate Professor, Computer Science Department, Stanford University and Director of the Stanford Artificial Intelligence Lab (SAIL)

The course was graded using weekly online quizzes and programming assignments for each module. Programming assignments were focused on building practical ML systems like character recognition and

recommending systems by implementing the algorithms explained in lectures using Octave programming language.
Completed the course in November 2012 with a final grade of 88% and received a Statement of Accomplishment from Prof. Ng.

2. Artificial Intelligence
Participated in an online course on Artificial Intelligence by Prof Sebastian Thrun, Research Professor at Stanford University and Google Fellow, and Peter Norvig, Director of Research at Google Inc
The course included an introduction to Artificial Intelligence and discusses with practical examples how techniques such as Probabilistic inference, Unsupervised and Reinforcement Learning can be used to solve complex artificial intelligence problems in a variety of fields ranging from Computer Vision to Natural Language Processing.
The course also touched on theoretical topics such as Game Theory and discusses on filter designs such as Kalman filters, Particle Filters and Hidden Markov models which form the basis of most AI systems.

3. Embedded Systems and VLSI Design
Completed an industry-oriented training on Embedded Systems and VLSI Design organized by XESP Embedded Solutions under the guidance of Prof. Amitabha Sinha, Director, School of IT, West Bengal University of Technology, Salt Lake, Kolkata in the fall of 2010
Learnt the nuances of VLSI Design, Processor Architecture and Design, Programmable hardware and FPGA, RISC architecture and got practical experience of designing prototypes using VHDL and Verilog description languages

4. Micro-Controller based Design
Completed the Project Based Training on Micro-controllers at Electronics Regional Test Laboratory (East), Salt Lake, Kolkata held from 21st June to 16th July 2010
Practiced Assembly Language programming on the 8051 and implemented different applications like a password controlled door-locking system, automated time-keeping systems etc.

ACHIEVEMENTS

Won 2nd Prize in a business unit level quiz on the Java platform at my employer Infosys
Was made part of the Fast Track batch during training at Infosys Limited Mysore, graduating one month before the normal schedule for getting the best grades
Was consistently ranked in the top ten in my undergraduate class of over a hundred students on the basis of annual GPA

EXTRA-CURRICULAR ACTIVITIES

Actively participated in various charitable initiatives as part of my employer's Corporate Social responsibility team like the "Become a Santa" programme to help underprivileged children
Participated in amateur astronomy programmes like the Evening course in astronomy at the M.P. Birla Planetarium, Kolkata and helped to disseminate information and dispel popular superstitions about cosmic events through various awareness programs

HOBBIES AND INTERESTS

Amateur Astronomy, Cycling, Photography, Soccer, Open Source Software Development and Advocacy