Md. Shaifur Rahman

CONTACT INFORMATION

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RESEARCH INTERESTS

Wireless Sensor Network, Systems & Networking, VLSI Layout Design, Artificial Intelligence

EDUCATION

M.Sc. in Computer Science & Engineering
Bangladesh University of Engineering & Technology
CGPA: 3.75/4.00 Scale
Expected Graduation Date: January 2013

B.Sc. in Computer Science & Engineering, 2009
Bangladesh University of Engineering & Technology
CGPA: 3.92/4.00 Scale
Position: Ranked 4th in a class of 127 students

HONORS AND AWARDS

- Deans List Award for academic excellence in all levels of B.Sc.
- University Merit Scholarship for academic excellence in all levels of B.Sc.
- Dhaka Education Board Scholarship for excellence in higher secondary certificate exam, 2003
- Dhaka Education Board Scholarship for excellence in secondary certificate exam, 2001
- Junior Scholarship (1^{st} position), 1998

RESEARCH EXPERIENCE

1. **Path Planning Algorithm for Mobile Data Collector in Wireless Sensor Network**

[2011 to Present] Working with Dr. Mahmuda Naznin and Dr. Yusuf Sarwar Uddin to minimize the tour-length of a mobile data collector that ferries data from sensor nodes to a sink in a network. Our algorithm takes as input a TSP-tour, generates a *Label-covering* tour and contracts the path by linear-shortcutting method up to a point where one or more points in the tour that are called critical point, can never be skipped. The complexity of the algorithm except the computation of the TSP tour is $O(n^3)$ where n is the number of nodes covered by the data collector. The resulting tour reduces path length, improves data delivery latency and increases network lifetime. An extensive simulation in Castalia framework of OMNET++ simulator validates our claim. We also tweaked the MAC layer protocol for communication between the mobile element and static sensor node to save energy.

2. **Application of Ant Colony Optimization in Energy-efficient Dynamic Source Routing in WSN**

[2008 – 2009] Worked with Dr. Mahmuda Naznin to test performance of different ACO algorithms to create on-demand routing paths in WSN for energy-efficient source routing. Simulation result in NS-2 showed that overloading the computation with a lot of system parameters does not render much gain in network lifetime. Instead, the naive ACO algorithm with few simple parameters to reduce the number of cross-road nodes in the routing paths outperforms all other versions in increasing network lifetime.

Publications

1. Md. Shaifur Rahman and Mahmuda Naznin, "Shortening the Tour-length of a Mobile Data Collector in the WSN by the Method of Linear Shortcut". In Proceedings of the 2^{nd} *International Workshop on Data Management for Emerging Network Infrastructure (DaMEN 2013)*, Sydney, Australia (to be published in *LNCS, Springer*)

2. (Under Review) Md. Shaifur Rahman and Mahmuda Naznin, "A Novel Framework for Energy-efficient Path-planning of Mobile Data Collector in a WSN". *Journal of Ad Hoc Networks, Elsevier.*

Graduate Coursework

- ❑ VLSI Layout Algorithms
- ❑ Advanced Database Systems
- ❑ Bioinformatics Algorithms
- ❑ Wireless Resource Management
- ❑ Wireless Ad Hoc Networks
- ❑ Neural Networks

Professional Experience

Bangladesh University of Engineering & Technology *May, 2009 to Present*
Lecturer
Department of Computer Science & Engineering.

Teaching Experience

Theory Courses Taught: VLSI Design, Artificial Intelligence, Theory of Computation
Lab Courses Instructed: Technical Writing & Presentation, Artificial Intelligence, Operating Systems, VLSI Design, Database, Microprocessor, Digital Logic Design, Pattern Recognition etc.

Training & Workshop

• Cisco CCNA Instructor's Program for Module 1, 2, 3 & 4 conducted by the Cisco Networking Academy in BUET.
• Teacher's Appreciation Program conducted by Directorate of Advisory, Extension & Research Services, BUET.

Organizing Experience

• Member of Organizing Committee, Workshop on Algorithms & Computation- WALCOM-2010 & WALCOM-2012
• Trainer & Organizer of Automated SQL Learning & Evaluation workshop 2012, sponsored by Ministry of Education, Bangladesh
• Trainer of short-courses in Bangladesh-Korea Information Access Center, BUET
• Trainer of Advanced Networking Training Program(Cisco ICND-1 & ICND-2) for employees of IT department, Bangladesh Central Bank

Projects Completed in Undergraduate Class

3D Golf Game in OpenGL & C++
As part of the project assigned in the Graphics Lab, we implemented 3D Golf Game with picturesque terrain of grass, pond, mud etc. and projectile physics and collision detection for game score.
Cellphone-based Voice-controlled Operation of Home Appliances
We implemented it as part of the project assigned in the Interfacing Lab. We captured the voice from cellphone and analyzed it using Microsoft's relevant MSDN library. Using ATmega32 micro-controller, different home appliances like light-bulb, fan, heater etc was turned on/off and their intensity of operation was controlled.
Inventory Management System of Onik Ltd.
We studied the system of cellphone selling company, developed extensive UML and prototype based on it, validated the design and completed the development of the system using ASP,NET, Oracle and Crystal Report.
4-bit Microprocessor
A simple microprocessor that was simulated in Circuit-maker and later implemented

in hardware. The feature included execution of 28 instructions of 80×86 processor family, memory protection, multiprogramming etc.

NACHOS Virtual OS Implementation

As part of the task in the operating system lab, we implemented Multiprogramming, Process Management, Console, and elementary system calls of virtual operating system NACHOS.

C Compiler

We implemented a complete compiler for *C* program using *Lex* and *Yacc* as part of the task in compiler lab.

Project Management Software for Software Developers

Our developed software included features like task division, assignment, assessment, scheduling, Gantt chart, cost estimation, resource management etc.

Skills

Programming Language

C/C++, C#, Java, Assembly, Prolog, Python

Web Development

PHP, JSP, ASP.NET

Database

Oracle, MySQL

Other Tools

OpenGL, PSPICE, Microwind, Verilog HDL

Technical Writing & Simulation Tools

LaTeX, GNUPlot, Network Simulator-3, OMNET++, OPNET

Co-curricular Activities

Debating: Participated in Model United Nations Debate - 2002, National Debate Championship - 2000, 2001 & 2002

AIDS Awareness Campaign: Participated in Countrywide AIDS Awareness Campaign for Youths 2002–2004, sponsored by UNICEF.

References

Dr. Mahmuda Naznin
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Bangladesh University of Engineering & Technology.
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Dr. Mahbubur Rahman Syed
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