Research Scopes in Computer Science and Engineering (CSE), North South University

CLOUD COMPUTING AND DISTRIBUTED SYSTEMS

Overview

Cloud Computing and Distributed Computing are emerging research area among the researchers of North South University. Â The current interest covers :

- Cloud for resource constraint devices
- Cloud Federation Techniques
- Cloud Scheduling Algorithms
- Application of Cloud Computing
- Distributed Sensing Systems

COURSES

- CSE 323 Operating Systems Design
- CSE 438 Data Communication & Network

DATA NETWORKING AND INFORMATION SECURITY

Overview

- System monitoring and control using low energy (ZigBee) wireless networks
- Security and reliability of cloud computing infrastructures
- Resource scheduling and load balancing in cloud computing infrastructures

COURSES

- CSE 338 Data Communication & network
- CSE 422 Modelling and Simulation
- CSE 438 Data Communication & Network
- CSE 482 Internet and Web Technology
- EEE 331 Data Communications & Networks
- EEE 421 Stochastic Signals and Systems
- ETE 423/EEE 423 Principles of Telecommunication Network

MOBILE, WIRELESS AND WEB APPLICATIONS DEVELOPMENT

Overview

Mobile, Wireless and Web Application area covers a wide array of work that ranges from a diverse set of subtopics such as:

- Healthcare System
- Utility System
- Transportation Support System
- Intelligent System
- Power Aware System

COURSES

- CSE 486 Mobile and Wireless Application Development
- EEE 331 Data Communications & Networks
- EEE 424 Mobile and Wireless Communication System

ARTIFICIAL INTELLIGENCE & ROBOTICS

COURSES

- CSE 419 Data Mining
- CSE 440 Artificial Intelligence
- CSE 445 Machine Learning
- CSE 446 Introductions to Bioinformatics
- CSE 465 Pattern Recognition and Neural Network
- CSE 467 Digital Image Processing
- CSE 468 Computer Vision
- CSE 470 Theory of Fuzzy Systems
- EEE 432 Artificial Intelligence
- EEE 433 Pattern Recognition and Neural Network
- EEE 436 Theory of Fuzzy Systems
- EEE 453 Microprocessor Interface and Embedded System
- EEE 468 Computer Vision

DATABASE AND INFORMATION SYSTEMS

Overview

The long term objective of database and information systems group is to develop principles, and techniques of database design, methodologies for knowledge discovery, extracting, organizing, exploring facts from structured, semi-structured, textual, biomedical, social media data sources. Our approach to achieve the goal is by applying the concepts, models from different areas such as data mining, machine learning, social network analysis. We explore and work with various data management technologies to support the extraction and exploitation of information from real-world data that comes from web, hospital surveillance system, library circulation, cloud workload,

census, agriculture and other social media like Facebook, Twitter, Youtube. We develop various tools and applications for movie recommendation system, sentiment analysis, hand gesture recognition, academic routine timetable generation, forecasting stock prices, and management of high dimensional data from cloud and grid.

COURSES

- CSE 311 Database Systems
- CSE 311L Database Systems Lab
- CSE 411 Advanced Database Systems
- CSE 424 Object-Oriented Software Developments
- EEE 436 Theory of Fuzzy Systems

HUMAN COMPUTER INTERACTION (HCI)

Overview

It is the research area that captures user experiences of using computational systems. It includes research in user interface, user satisfaction, communication theory, social computation and the area is expanding through various new concepts and applications. The current interest in North South University researcher focuses on the following areas:

- *Social aspect of computing in adverse situation* such as harassment
- E*ducation using computational tools* Â and the *educational environment*
- *User interfaces for physically challenged population*

All considering a developing country perspective.

EMBEDDED SYSTEMS AND INTERNET OF THINGS (IOT)

Overview

- Embedded systems for infrastructure security
- Smart devices for health care and assisted living
- Home and Office security and automation
- Object and pattern recognition

COURSES

- CSE 231 Digital Logic design
- CSE 231L Digital Logic design Lab
- CSE 323 Operating Systems Design
- CSE 433 Advanced Computer Architecture
- EEE 331 Data Communications & Networks
- EEE 453 Microprocessor Interface and Embedded System

MODELING AND SIMULATION

Overview

- Energy distribution in Wireless Sensor Network

COURSES

- CSE 417 Numerical Methods
- CSE 418 Computer Graphics
- CSE 422 Modelling and Simulation

SOFTWARE ENGINEERING

Overview

Software Engineering has many areas to work like the following:

- Architecture, design and frameworks of software
- Model-driven software engineering
- Requirements engineering
- Component-based software engineering
- Knowledge-based software engineering
- Software maintenance, reverse engineering and re-engineering
- Aspect-oriented software development
- software processes, rigorous and agile
- Software safety, security, privacy and risks
- Software quality assurance
- Software reuse

COURSES

- CSE 424 Object-Oriented Software Developments
- CSE 427 Software Quality Assurances & Testing
- CSE 428 Software Process Management
- CSE 429 Software System Architecture

VLSI TECHNOLOGY

Overview

Research and Development in the VLSI (Very Large Scale Integration) Technology area is focused on the Design, Verification and Implementation of high performance Integrated Circuits (ICs) commercially known as Chip using sophisticated Electronic

Design Automation (EDA) tools and methods. Current research work and projects cover all strategically important areas including High-tech Industry Standard Advanced HDL based Chip Design Methodology that includes RTL modeling using HDL (Hardware Description Language) such as Verilog and VHDL, functional simulation, logic synthesis and schematic generation, structural Simulation, floorplan, placement, routing, mapping and implement the deign in sophisticated FPGA (Field Programmable Gate Array) and CPLD (Complex Programmable Logic Device) using industry leader Xilinx and Altera Development Board.

VLSI area also includes STA (Static Timing Analysis), low power techniques, DFT (Design for Testability such as JTAG, Boundary Scan), Coverage Analysis, DFM (Design for Manufacturability), hardware/software co-design, layout design with an emphasis on CMOS technology targeted to Application Specific Integrated Circuits (ASICs) and System-on-a-Chip (SOC) design. Physical design of the IC chip covering techniques such as cell and hard macro placement, power grid design, clock tree synthesis (CTS), global and detail routing of signals, power routing are also included in this area. Advance topics in this area include IR drop analysis, electromigration, signal integrity, critical path analysis and power island design in low power high speed integrated circuits.

COURSES

- CSE 413 Verilog HDL: Modelling, Simulation and synthesis
- CSE 414 Advanced Chip Design Methodology and Optimiza.using HDL
- CSE 435 Introduction to VLSI Design
- EEE 410 Semiconductor Devices and Technology
- EEE 411 Introduction to VLSI Design
- EEE 413 Verilog HDL: Modeling, Simulation and Synthesis
- EEE 414 Advanced VLSI Chip Design Methodology and Optimization using HDL
- EEE 415 CMOS Analog Circuit Design

SIGNALS AND IMAGE PROCESSING

COURSES

- CSE 418 Computer Graphics
- CSE 485 Digital Signal Processing
- EEE 468 Computer Vision
- EEE 471 Digital Signal Processing