Soumen Basu

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EDUCATION

Indian Institute of Technology, Delhi 2013 – 2015
Master of Technology in Computer Science & Engineering
CGPA: **8.383** on a scale of 10
Thesis: *Randomized Rounding using Random Walks*
Advisor: Professor Sandeep Sen

Bengal Engineering & Science University, Shibpur 2008 – 2012
Bachelor of Engineering in Information Technology
First Class with Honors, **79.62%** (CGPA: 8.712/10)
Project: *Test Simulator for Digital Microfluidic Biochips*
Advisor: Professor Hafizur Rahaman & Professor Pranab Roy

ACHIEVEMENTS

– Recipient of MHRD, Govt of India Scholarship.
– Runner-up in *Xerox Innovation Challenge*, (2014) held in IIT-Delhi.
– All India Rank **99** among **224160** candidates (**99.96** percentile) in GATE-2013 (Computer Science).

RESEARCH EXPERIENCE

Randomized Rounding using Random Walks [IIT-D, 2014–2015]
Rounding algorithms are often used to find near-optimal approximate solutions of *integer programs* in polynomial time. Even though the conventional method of rounding each variable to *one* with the probability equal to the initial feasible solution was shown to be tight, we investigated techniques that produce better bound for the 'average-case' inputs. Our method used an iterative transformation of initial feasible solution using multidimensional random walk to sparsify the constraint matrix. Then the reduced dependencies among the constraints were leveraged by using the constructive form of *Lovasz Local Lemma* and a much better error bound for the average case was obtained.

Test Simulator for Digital Microfluidic Biochips [BESU, 2011–2012]
Microfluidic biochips offer promising platform for parallel DNA analysis, automated drug discovery etc. It is important to ensure high reliability of biochip funcitonality for safety-critical applications. We proposed a new technique for functional testing of bio chips for customized droplet route-paths. The average completion time for the customized testing method was nearly 10-times faster than that of Parallel Scan and Peripheral Scan testing methods for In-Vitro test benches. The average number of cells traversed in customized testing was nearly 6-10% of the Parallel and Peripheral scanning methods.

WORK EXPERIENCE

ADOBE SYSTEMS INDIA [Bangalore, 2015–Present]

Designation: Member of Technical Staff

Working in *Adobe Media Optimizer* team and managed following projects -

1. Designed and built REST API using Flask and SQLAlchemy for supporting CRUD operations for various digital marketing entities like Campaign, Keyword, Auto-target, Placement. Also wrote service classes to sync the data to database.
2. Built an unified error handling framework by compiling error messages across different search engines. The error messages with similar meaning but of different phrasing were grouped together using sentence equivalence analysis.

SAMSUNG ELECTRONICS INDIA [Noida, 2012]

Designation: Engineer

Worked in *Call & Network* team and handled following responsibilities -

1. Analyzed call interface of smartphones and provided solutions for malfuntioning units.
2. Evaluated performance and behavioral sanity of call interface for different Android products.

TECHNICAL SKILLS

– Python, C/C++, Java, MATLAB, SQL
– Flask, SQLAlchemy, Git, No-SQL
– Twitter and Facebook Python API
– UNIX, Bash, SML, Prolog, LaTeX
– Agile Methodologies - Certified ScrumMaster

COURSE PROJECTS

Automated Newspaper Article Classifier

The classifier used independent Bayesian Classfication. The sample size was nearly 15000, and the classifier achieved up to 96% 5-fold cross validation accuracy. Used Python for building the preprocessor and MATLAB for the classifier.

Feature Selection for Speaker Recognition

Carried out Genetic Algorithms and PSO based feature selection using MATLAB. By using approximately 1-2% of 2000 features, we achieved 5-fold cross validation accuracy up to 92%.

Natural Language Query Processor

The query processor was developed in Prolog. The database used was a simple student database. The processor could recognize general English language queries like 'In which department does Mr. ABC study' and respond correctly.

Pentium-II Pipeline Simulator

Added the Pentium-II Out-of-Order pipeline engine (developed in Java) to Tejas (a high performance simulator made by IIT Delhi students).

Lexical Analyzer tool
Defined a Grammar for a hypothetical language and built a lexical analyzer tool using C that will produce lexemes for a given input program in that language.

SIC/XE Assembler
Simplified Instructional Computer(SIC) is a hypothetical architecture used by Leland Beck in his book 'System Software'. SIC/XE is an extension in terms of memory, number of registers and instruction set. Developed an assembler using C++ to convert the mnemonics and symbolic operands to their machine codes and finally write the object program in HEX code.

POSITIONS OF RESPONSIBILITIES

Teaching Assistant [IIT-Delhi]
Conducted tutorials and lab sessions and graded scripts for *Introduction to Computing*[Fall, 2013 and Winter, 2015], *Operating Systems*[Winter, 2014] and *Advanced Data Structures & Algorithms*[Fall, 2014].

Training and Placement Coordinator [IIT-Delhi]
Served as a volunteer to facilitate the campus hiring process to the graduate students of Computer Science and to invite companies to visit the campus.