Md Maruf Hossain

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Objective

Actively looking for a full-time position to apply knowledge of high-performance computing on shared memory and distributed system architecture.

Research Interests: High performance computation on graph algorithms, parallel computing, distributed systems, and vector architecture.

Expertise and Skills

- **Java:** Spring, JMS, Struts, Swing, XML, J2EE Web Services, Jenkins, SOAP [4 years of experience]
  - Implement business logic to develop web and desktop-based applications like student registration portal, inventory for medical front desk, SMS alert system.
- **Database Storage Systems:** PostgreSQL, Oracle 11g, PL/SQL. [4 years of experience]
  - Has experience in writing SQL scripts for relational database management systems.
- **Cloud Computing:** AWS S3 Storage System, EC2 Server, Elastic Beanstalk [2 years of experience]
  - Handle cloud-based applications to run on the server and their storage system.
- **C/C++:** Standard Template Library (STL), OpenMP, Oneapi Threading Building Blocks(TBB), OpenMPI, MPICH, MVAPICH2, AVX-512 Instructions, and Intrinsic Language. [5 years of experience]
  - Has research experience on high-performance graph analysis for shared-memory and distributed systems.
- **Heterogeneous System Architectures**: General Purpose GPU(GPGPU) architecture, FPGA, CUDA, OpenCL. [1 year of experience]
- **Python:** Data Analysis and Visualization, Supervised and Unsupervised Machine-Learning Algorithms. [2 years of experience]
- **Web Development Languages and Others:** JSP (JavaScript Pages), Java Virtual Machine (JVM), CSS, HTML, JQuery, AngularJS, Tomcat, WebLogic, Magento. [3 years of experience]
  - Has experience in developing web-based user interfaces using JavaScript frameworks like AngularJS and BackboneJS.

Professional Experience

Software Engineer: Dynamic Solution Innovators Ltd. *02.2014 - 07.2017*

- Use Java/J2EE technologies to develop web applications for education management and add functionalities to handle student registration.
- Build a student portal to upload and store documents using the Amazon S3 storage system.
- Develop a PostgreSQL database-oriented system to communicate between two different file systems.
- Setup and maintain AWS Elastic Beanstalk to deploy web applications on cloud systems for better load balancing.
- Perform important role as a part of the agile scrum team that accountable, developing, and designing new applications using Spring framework(backend) and BackboneJS(frontend).

Junior Software Engineer: Nazdaqtechnologies Inc. *02.2013 - 02.2014*

- Use Swing framework to design user interface to generate tokens for outdoor patients.
- Develop a portal for the radiology department that automatically exports radiology reports (X-RAY, MRI, CT) to the hospital system database using Spring and Hibernate.
- Migrate desktop-based system to web-based system using Spring and AngularJS framework.
- Mobile SMS Alert for Banking-Transaction: Develop an alert system for the banking system that can send messages alert to a user for any deposit or withdrawal action on his bank account.
- Generate PL/SQL procedures to maintain inventory of a Megento framework-based e-commerce site(1800wheelchair).

Research Experience

Graduate Research Assistant, University of North Carolina at Charlotte. *08.2017 - Present*

- Vectorized parallel *Louvain Method* with the help of the Intel Intrinsic programming.
- Performance model for the sparse matrix-vector multiplication ($SpMV$) on the distributed system.
  - We buildup a performance model that can provide approximate execution time and predict better solutions for the $SpMV$ kernel on the distributed system.
  - We proposed three different models for the SpMV model:
    - Linear Model.
    - Support-Vector Regression(SVR) Model.
    - $SpMV$ Model from Benchmark.
- *Postmortem* graph analysis on temporal graph.
  - Postmortem Graph Analysis: If a temporal graph shows offline behavior and we need to perform a series of graph analyses on different time intervals, we call it *Postmortem* graph analysis.
  - We choose *Pagerank* as a candidate application for this analysis and show that *Postmortem* graph analysis outperformed the state-of-art *Streaming* model.

Education

Ph.D. in **Computer Science** *08.2017 – Present*
University of North Carolina at Charlotte
Thesis: Performance models and Impact of Vector architecture on Graph Algorithms.
Advisor: Dr. Erik Saule
Selected Courses: Heterogeneous System Architecture, Algorithm, Machine Learning, Cloud Computing.

B.Sc. in **Computer Science and Engineering** *01.2008 – 02.2013*
Bangladesh University of Engineering and Technology (BUET)

Selected Publications [Google Scholar]

1. Md Maruf Hossain and Erik Saule. Impact of avx-512 instructions on graph partitioning problems. In 50th International Conference on Parallel Processing Workshop, pages 1–9, 2021
2. Md Maruf Hossain and Erik Saule. Postmortem graph analysis on the temporal graph. 2021
3. Md Maruf Hossain and Erik Saule. Performance Model of Iterated Solvers for the Distributed System. [Under Review]