Akond Ashfaque Ur Rahman

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Research Interests

Software Engineering focused in the area of Continuous Deployment, DevOps, and Mining Software Repositories

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Education

- **Doctor of Philosophy in Computer Science**   Aug 2014 - Present

    - Adviser: Dr. Laurie Williams
    - North Carolina State University, Raleigh, NC, USA
    - GPA: 3.94/4.00

- **Master of Science in Computer Science and Engineering**   Jan 2012 - May 2014

    - University of Connecticut, Storrs, CT, USA
    - GPA: 3.80/4.00

- **Bachelor of Science in Computer Science and Engineering**   Dec 2004 - Sep 2009

    - Adviser: Dr. Mahmuda Naznin
    - Bangladesh University of Engineering and Technology, Dhaka, Bangladesh
    - GPA: 3.55/4.00

Peer Reviewed Journal Publications

- **Akond Ashfaque Ur Rahman**, Md. Atiqul Islam Mollah, and Mahmuda Naznin "Multiple Targets Tracking Using Kinematics in Wireless Sensor Networks" in Wireless Sensor Network, pages 263-274, August, 2011.

Peer Reviewed Conference Publications

- **Akond Ashfaque Ur Rahman**, Eric Helms, Laurie Williams, and Chris Parnin "Synthesizing Continuous Deployment Practices in Software Development", in Proceedings of 13th Agile Conference, pages 1-10, Washington D.C., USA, August, 2015.

- **Akond Ashfaque Ur Rahman**, Mahmuda Naznin, and Md. Atiqul Islam Mollah "Energy Efficient Multiple Targets Tracking Using Target Kinematics in Wireless Sensor Networks" in Proceedings of 4th International Conference on Sensor Technologies and Applications (SensorComm), pages 275-280, Venice, Italy, July, 2010.

- **Akond Ashfaque Ur Rahman**, Mahmuda Naznin, and Md. Atiqul Islam Mollah "Service Priority Based Target Tracking Framework in a Wireless Sensor Network" in Proceedings of 3rd IEEE International Conference on Computer Science and Information Technology (ICCSIT), pages 389-392, Chengdu, China, July, 2010.

- M.M.Shahiduzzaman, Mahmuda Naznin, and **Akond Ashfaque Ur Rahman** "Portable and Secure Multimedia Data Transfer in Mobile Phones Using Record Management Store (RMS)" in Proceedings of 3rd IEEE International Conference on Computer Science and Information Technology (ICCSIT), pages 364-367, Chengdu, China, July, 2010.

Presentations

- "Synthesizing Continuous Deployment Practices in Software Development", in 13th Agile Conference, Washington D.C., USA, August, 2015 URL

Awards & Honors

- **Dean's List Award**
  I received this award for achieving academic excellence for two semesters in the year of 2008 during my Bachelors program in Bangladesh University of Engineering and Technology.

- **University Scholarship for Merit**
  I received this award for maintaining decent academic progress for four semesters from 2007 to 2009 during my Bachelors program in Bangladesh University of Engineering and Technology.

- **First prize in IUT National ICT Festival**
  In August, 2009, I received this award in IUT National ICT Festival, in Software Projects category.

Professional Experience

- **Software Research Intern** — May 2015 - Aug 2015
  - ABB Corporate Research, Raleigh, NC, USA
  - Activities:
    * Designed, and developed a software framework to detect similar software applications in ABB.
    * Collaborated with full time members and interns of the Software Architecture Team and Industrial Software Engineering team at ABB Corporate Research.

- **Teaching Assistant** — Aug 2014 - Dec 2015
  - Department of Computer Science, North Carolina State University, Raleigh, NC, USA
  - Activities:
    * Provided lectures for a graduate course.
    * Manged Apache Virtual Computing (VCL) images to administer course projects and homeworks.
    * Designed requirements for class projects.
    * Designed questions for class quizzes, and exams for graduate and undergraduate courses.
    * Graded homeworks, and exams for graduate and undergraduate courses.

- **Graduate Assistant** — Jun 2013 - May 2014.
  - Engineering Computing Services (ECS), University of Connecticut (UConn), Storrs, CT, USA
  - Activities:
    * Troubleshooted ECS computer systems and services.
    * Solved day to day software and hardware problems of the administrative staff in School of Engineering at UConn.

- **Teaching Assistant** — Aug 2012 - Dec 2012
  - Department of Computer Science and Engineering, University of Connecticut, Storrs, CT, USA
  - Activities:
    * Provided lectures for an undergraduate course.
    * Administered lab sessions focused on Matlab programming.
    * Graded homeworks, and exams for an undergraduate course.

- **Software Engineer** — Jan 2010 - Jun 2011
  - Dohatec New Media, Dhaka, Bangladesh
  - Activities:
    * Designed and developed a Java-based multi-modal biometric system using the MegaMatcher SDK.
    * Developed and tested an online procurement system for the Ministry of Planning of the People's Republic of Bangladesh using ASP.NET with C# and Microsoft SQL Server.

Voluntary Experience

- **External Reviewer**:
  I reviewed multiple articles that were submitted in the Research track and the Software Engineering Industry Practitioner's (SEIP) track in the International Conference of Software Engineering (ICSE), 2015 .

Technical Skills

Programming Languages: Bash, C, C#, CSS, HTML, Java, PHP, Python, SQL

Data Analysis Tools: Apache Spark, Excel, Matlab, R Studio, SciKit

Database Tools: Microsoft SQL Server (v. 2005, 2008), MySQL (v. 5.0, 5.5)

DevOps Tools: Amazon Web Services(AWS), Git, Jenkins, JUnit,Vagrant

Development Kits: Android SDK, Eclipse Plugin Development Kit (PDK), Wordpress

IDEs: Anaconda (v. 2.3), Cloud9, Eclipse (v. 3.5, 4.4, 4.5), Microsoft Visual Studio (v. 2005, 2008, 2013)

Security Tools: Findbugs, Fortify, IBM BlueMix Static Analyzer, Microsoft Threat Modeling Tool (MSTMT)

Education Tools: Apache Virtual Computing Lab (Apache VCL), Moodle

Major Research Projects

- **Perception and Adoption of Software Security in DevOps Organizations**:

  The goal of this ongoing research project is to identify the software engineering practices used for software security in IT organizations who have adopted DevOps. We have studied 92 Internet artifacts to gain background knowledge about security aspects of DevOps. Using this background knowledge we would like to identify the notion of software security among different IT organizations who have adopted DevOps, and what software practices they are using.

- **Characterizing Programming Sessions and Quantifying Programmer Interleaving**:

  In this ongoing project I am exploring a dataset generated by Codealike, a plugin that tracks programmer activities from popular IDEs such as Visual Studio, and Eclipse, and reports developer activity accordingly. In this research project I am investigating to categorize ~85000 developer programming sessions that are spread across ~15178 days. I am also looking for interesting trends that will help software practitioners understand how programmers interleave with what intensity.

- **Supporting Enterprise-Wide Software Reuse Using Semantic Similarity of Software Projects**:

  In this ongoing project, I along with my colleagues at ABB Corporate research are investigating how semantic similarity amongst software projects can be quantified, and used to perform software reusability. To detect software similarity, our tool called *SrcNL*, conerts software applications into natural language tokens. As next steps, first we are planning to detect software similarity amongst open source project repositories, and then amongst enterprise software repsoitories.

- **Investigating Continuous Deployment Practices Used in Software Development**:

  The goal of this research project was to aid software practitioners in implementing continuous deployment through a systematic analysis of software practices that are used by software companies. I studied the continuous deployment practices of 19 software companies by performing a qualitative analysis of Internet artifacts and by conducting follow-up inquiries. In total, I found 11 software practices that are used by 19 software companies. I also found that in terms of use, eight of the 11 software practices are common across 14 software companies URL: `http://www.realsearchgroup.org/realsearch/agile-software-development/`

- **Diagnosing Configuration Induced Software Performance Interference**: In this project I investigated how tuning of one software configuration setting affects the performance of another application running in a Linux system. I developed a novel framework that will monitor different system and application performance metrics to identify interference of application performance. The framework first identifies interference of application performance between two applications due to a certain configuration

parameter of one application. Next it reports possible causes of performance interference in terms of system calls, hard- ware events, CPU, memory, and disk consumption etc. that can be helpful for a system administrator.

- **SettingRanker: Identifying Android Application Configuration Settings Responsible for Increased Power Consumption**:

  In this project I investigated the effects of configuration settings of different Android applications on Android device power consumption. The research effort also resulted in a tool called SettingRanker, that provides a relative ranking of settings for an application; this ranking gives a prediction stating which setting is more likely to increase power consumption, when that particular configuration setting is turned on or assigned a certain value. The tool uses system resource consumption information such as CPU, memory, network, screen brightness etc. as input.

- **Leaveraging Physiological Measures to Predict Task Quality**: In this project I investigated the possibilities and challenges of predicting task quality for different computational tasks using different physiological measures such as heart rate, galvanic skin response, and body temperature. From this research study I concluded that variation in physiological measures significantly affect task quality which can be leveraged to predict task quality using a linear regression model.

- **Energy-Efficient Multiple Targets Tracking Using Target Kinematics in Wireless Sensor Networks**: In this project, I along with my colleagues, proposed, and implmented a distributed tracking method for tracking multiple targets considering targets' kinematics. We incorporated sensor network properties which results into a novel and service priority based dynamic tracking framework. We simulated our method by a sensor network simulator OMNeT++ and empirical results state that our proposed methodology outperforms traditional tracking algorithms.

Major Professional Projects

- **SIMILA: Detecting Similar Software Applicatons in ABB**: I developed a software framework that detects similarity amongst software applications by converting software artifacts intonatural language tokens. I implemented the project using SrcML.NET, Swum.NET, and Python Natural Language Toolkit (NLTK). To facilitate performance gain and scalability I used Apache Spark with Python.

- **Multi Modal Biometric SDK**: I developed a software framework that provides multi-functional biometric utilities such as capturing, quality checking, auto rotation, cropping, etc. of biometric images like face, finger, and iris. I implemented this project using the Megamatcher 3.1 SDK tool.

- **Central Procurement Management Information System (PROMIS)**: I was actively in development, and testing of this software package which is a information management system developed for the Planning Ministry of the Government of People's Republic of Bangladesh. For implementation I used C#, and Microsoft SQLServer 2005.

Major Course Projects

- **University Housing Managment System**:

  In this project I along with my colleagues developed a university housing management system in MySQL and PHP. The developed management system provided several features such as renting and leasing on-campus and off-campus housing, submitting and acquiring parking permits, and submitting and reviewing housing complaints. This management system was designed for different entities of the university such as students, teachers, guests, university staff, and parents. URL: `https://github.com/akondrahman/DBMS`

- ***Decaf* Compiler**: The goal of this project was to implement a compiler for *Decaf*, a subset of the Java programming language. Me and my partner used Java, JavaCC, and Jasmin to compile and run 120 Decaf programs, to implement this project.

- **Investigating the Relationship Between Monetary Incentives and Quality Programming: A Pilot Study**:

  Motivating factors for programmers is a well studied topic but the factors that influence writing quality programming solutions still remains an open question. In this study I investigated if monetary incentives can be a motivational factor for writing quality programming solutions. The study did not find strong evidence of monetary incentives acting as a motivating factor for writing quality programming solutions.

- **Finding the Optimal Comfort Temperature of Human using Bio Sensors**:

This goal of this project was to introduce a novel technique to control different thermal systems. In this project I proposed and implemented a "user-oriented" methodology that leaveraged physiological measures and activities of human. The final output of this project was a functional Android application integrated with a wearable sensor called "Bio Harness Kit" which provides different physiological measures of human.

- **Knot Applications in Mobile Applications**: I along with my colleagues developed an Android application that can render different complex knots and structures. The developed Andriod application supported nine knot-like structures. The developed Android applications also had multi-touch interactions to support zooming and presets. We developed this application in Android 4.2 - 4.2.2 (API Level 17).

OTHER PROJECTS

- **EKATTOR**: The goal of this project was to implement a complete web-based information management system to preserve liberation war history of Bangladesh. Along with essential database operations such insert, update, and delete, this project also provide four kinds of searching privileges namely entity wise search, map-based search, category wise search, and non-category wise search. I, along with my colleague implemented this project using open source technologies such as PHP Data Object (PDO), HTML/CSS, and MySQL Server.