MD MUSHFEKUR RAHMAN

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Research Interests

Software Engineering, Parallel & Distributed Systems, High Performance Computing, Networking & Information Security, Machine Learning

Education

BSc (Honours) in Computer Science and Engineering 2008 - 2013
University of Dhaka *Dhaka, Bangladesh*
CGPA: 3.58 (3.65 in last 2 years)

Extra-curricular Activities: Algorithmic problem solving and competitive programming

Industry Experience

Senior Software Engineer July 2018 - Present
Therap BD Ltd. *Dhaka, Bangladesh*

- Designed and developed a file transfer infrastructure based on **Enterprise Integration Patterns** to streamline file transfers between Therap and external SFTP servers.
- Developed API to lookup standard diagnosis codes (e.g. ICD-9/10) with a **typeahead search** functionality.
- Developed an Issue Tracker application to import user reported issues from a third-party system (Salesforce Cloud) along with a **live chat platform**.
- Designed and developed **telephony integration (IVR)** system for Therap **Electronic Visit Verification (EVV)** system.

Software Engineer II July 2016 - June 2018
Therap BD Ltd. *Dhaka, Bangladesh*

- Developed a Notification Delivery and User Activity Tracking System. The system currently handles around **2 Million** notifications per day.
- Designed and developed an Email like application to securely transfer sensitive **PHI data and medical health records** which complied with standards such as **HIPAA**, **HL7** and **SOC 2.0.**
- Developed an Excel based Reporting Framework and added support for streaming Excel building/reading to handle very large amount of data in a memory efficient way. This change **reduced generated file size up to 30%** and resulted in a faster response time.

Software Engineer I July 2014 - June 2016
Therap BD Ltd. *Dhaka, Bangladesh*

- Designed and developed a fully configurable data collection form with custom dynamic questionnaire which is being used to record services provided to users.
- Improved Therap **search framework** for health record archives. Simplified the framework APIs for developers.

Associate Software Engineer July 2013 - June 2014
Therap BD Ltd. *Dhaka, Bangladesh*

- Migrated the codebase of Therap Android application to use newer Gradle based Android build tool from legacy Maven tools and was able to **cut down build time to one third.**
- Developed **REST APIs** and added **Android app** feature for multiple user profiles where users will be able to customize separate set of privilege and applications for each profile.

Competitions and Achievements

- **National Hackathon 2015**. Developed an application named **Prottoyee** to help preventing Sexual Harassment (one of the prominent problems of the country) in a 36 hour long planning, designing and coding sprint. [Link]
- **BASIS Code Warrior's Challenge 2014**. Developed a smart universal contact manager for iOS to accumulate all the contact informations from phone as well as social media. Rank: Honorable Mention. [Link]
- **CUET RMA RoboRace 2011**. Rank: **6th** (Team: DU Hello World).

- **Bangladesh University Inter-University Collegiate Programming Contest 2011**. Rank: **9th** (Team: DU Hello World).
- **Daffodil Inter-University Collegiate Programming Contest 2010**. Rank: **12th** (Team: DU Hello World).
- **BUBT CSE Fiesta 2010**. Rank: Honorable Mention (Team: DU Hello World).
- **CSEDU Intra-Batch Programming Contest 2009**. Rank: **7th**.

Research Works

An Intelligent Unified Log Analytics Infrastructure (Ongoing)
- Working on a system to get insights from application, system logs and user generated events inside a **DMZ** to facilitate **sensitive data leakage prevention (PHI, HIPAA)**, **usage trends understanding**, **resource provisioning**, **problem diagnosis** etc. using **ML and NLP (CRF based identification) algorithms**.

An Automatic Method for Red-eye Detection and Correction in Digital Images (Undergrad Thesis)
- Developed a state of the art automatic red-eye detection and correction system based on **image processing** and **pattern recognition** algorithms. The system achieved up to **92% accuracy**.

Web Application Security and Code Quality Analysis with Static Code Analyzers
- Used multiple open source and proprietary static code analysis tools (Sonarqube, Checkstyle, PMD, FindBugs/SpotBugs) to detect potential vulnerabilities (e.g. **OWASP Top 10 Security Vulnerabilities**). Later fixed those findings using **Pareto Principle (80/20 rule)** which fixed more than 95% of the reported issues.

Sandman: An Intelligent Sleep Tracker
- Developed a sleep quality prediction system based on the features extracted from **Heart-rate, Movement, and Circadian Rhythm data from the MEMS and PPG sensors of Apple Watch**. Sleep stage detection was done using **Random Forests** and **Neural Networks** which achieved **90% accuracy and 60% specificity**.

REST API Request Profiling and Performance Analysis in Highly Concurrent Environments
- Developed **load/stress testing application** with Gatling to work on **REST API** endpoints to simulate concurrent high-traffic and assess API performances from various metrics such as throughput, response time, backend query latency etc. Later optimized the APIs to achieve accepted level of performance.

Performance Comparison of AODV and DSDV Routing Protocols in Mobile Ad Hoc Networks (MANET)
- Simulated two routing protocols using **NS2** for Mobile Ad Hoc Networks: The **Destination Sequenced Distance Vector (DSDV)** and the **Ad Hoc On-Demand Distance Vector routing (AODV)** and evaluated both protocols based on packet delivery fraction and throughput while varying number of sources and pause time.

Academic Projects

- **Distributed Systems**: A distributed file sharing system based on Google File System (GFS)
- **Compiler Design**: An intermediate code generator for a subset of C language by Back-Patching using Flex and Bison
- **System Programming**: Simple character device driver for Linux platform
- **Data Mining**: Apriori and FP-Growth algorithms performance analysis
- **Design and Analysis of Algorithms**: File (ASCII) compression application based on Huffman Coding
- **Computer Peripherals & Interfacing**: Line follower robot using ATmega32 microcontroller
- **Microprocessor & Assembly Language**: Snake game with a x86 bootloader
- **Computer Architecture**: 4-bit Arithmatic Logic Unit (ALU)
- **Object Oriented Programming**: Distributed Mutual Exclusion algorithm simulator in Java
- **Operating System**: A simple Bash like Unix shell with file information lister (ls command)

Technical Skills

Languages: Java, SQL (Oracle, MySQL), JavaScript, Python, Swift, C/C++
Frameworks and Platforms: Spring Framework, Java Enterprise Edition, ReactJS, Hazelcast, Elasticsearch, Pandas, TensorFlow, RxJava, GraphQL, ActiveMQ, Hadoop Ecosystem, OpenCV, jQuery, Android & iOS app development
Developer Tools: Git, Docker, Jenkins, Gradle, Unit Testing (JUnit, TestNG, Mockito), Static Code Analysers (PMD, SpotBugs, Checkstyle, Sonarqube), JVM Profiling and Tuning (JMC, JFR), Vim, VS Code, IntelliJ IDEA