

# Md Mushfekur Rahman

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## RESEARCH INTERESTS

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

## EDUCATION

**University of Dhaka**

Dhaka, Bangladesh

**BSc (Honours) in Computer Science and Engineering**

2009-2013

**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*

- Developed a file transfer framework based on **Enterprise Integration Patterns** to streamline file transfer between Therap server and SFTP servers (external systems).
- 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 systems along with a **live chat infrastructure**.
- Designed and developed **Telephony integration (IVR)** with 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 handles around **2 Million** notifications per day.
- 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. [Github]
- BASIS Code Warrior's Challenge 2014.** Developed a universal contact manager for iOS. Rank: Honorable Mention. [Github]
- CUET RMA RoboRace 2011.** Rank: **6<sup>th</sup>** (Team: DU Hello World).

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

## RESEARCH WORKS

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### Usage Pattern Classifier From User Activities and Application Logging Events (Ongoing)

- Working on a system to get insights from user logs and system generated events to understand **frequently site visit pattern**. This information is then used to optimize the user interface and to make the **User Experience** more seamless.

### 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 and lifestyle change recommendation engine for optimal sleep quality based on the **heart-rate, movement, and daily activity data from Apple Watch**. Sleep stage detection was done using **Decision Tree based Support Vector Machine (DTB-SVM)**.

### REST API Request Profiling and Performance Analysis on Peak-Load

- Conducted load testing with Gatling on **REST API** endpoints to profile API performances from various metrics such as throughput, response time, 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

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- **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
- **Peripherals & Interfacing:** Line follower robot using ATmega32 microcontroller
- **Microprocessor & Assembly Language:** Snake game in a x86 bootloader
- **Computer Architecture:** 4-bit Arithmetic 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

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**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, Visual Studio, IntelliJ