

MASUD RAHMAN, PhD Candidate

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OBJECTIVES

My career objectives are—(1) continuing higher studies and research in the field of information technology, especially in Software Engineering, and sharpening my research and development skills, and (2) using such talents and skills in the development of a knowledge-based society with a sustainable economy and many enlightened minds.

EDUCATION

Doctor of Philosophy, Computer Science/Software Engineering

University of Saskatchewan, Canada

September 2014–August 2018 (expected)

Course average: 89.00%

Thesis: Supporting query reformulation and code review towards software change automation. (*tentative*)

Adviser: Prof. Dr. Chanchal K. Roy

Award: **Keith Geddes Award**

Master of Science, Computer Science/Software Engineering

University of Saskatchewan, Canada

September 2012–August 2014

Course average: 88.60%

Thesis: Exploiting context in dealing with programming errors and exceptions in the IDE

Supervisor: Prof. Dr. Chanchal K. Roy

Award: Best Graduate Thesis 2014 (*nominated*)

Bachelor of Science, Computer Science and Engineering

Khulna University, Bangladesh

January 2005–March 2009

CGPA: 3.91/4.00, 1st class 1st

Thesis: Information Retrieval by Modified Term Weighting Method using Random Walk Model with Query Term Position Ranking

Supervisor: Prof. Dr. Abu Shamim Mohammad Arif

Award: **Chancellor Gold Medal**

PUBLICATIONS (21)

2017

M. Masudur Rahman and C. K. Roy, “Improved Query Reformulation for Concept Location using CodeRank and Document Structures”, In Proceeding of The 32nd IEEE/ACM

International Conference on Automated Software Engineering (ASE 2017), pp. 428-439, Urbana-Champaign, Illinois, USA, October, 2017 (Acceptance rate: **21.00%**)

M. Masudur Rahman and C. K. Roy and R. G. Kula, “*Predicting Usefulness of Code Review Comments using Textual Features and Developer Experience*”, In Proceeding of The 14th International Conference on Mining Software Repositories (**MSR** 2017), pp. 215–226, Buenos Aires, Argentina, May, 2017 (Acceptance rate: **30.60%**)

M. Masudur Rahman and C. K. Roy and David Lo, “*RACK: Code Search in the IDE using Crowdsourced Knowledge*”, In Proceeding of The 39th International Conference on Software Engineering (Companion Volume) (**ICSE** 2017), pp. 51–54, Buenos Aires, Argentina, May, 2017 (Acceptance rate: **31.58%**)

M. Masudur Rahman and C. K. Roy, “*Impact of Continuous Integration on Code Reviews*”, In Proceeding of The 14th International Conference on Mining Software Repositories (**MSR** 2017), pp. 499–502, Buenos Aires, Argentina, May, 2017

M. Masudur Rahman and C. K. Roy, “*STRICT: Information Retrieval Based Search Term Identification for Concept Location*”, In Proceeding of The 24th IEEE International Conference on Software Analysis, Evolution, and Reengineering (SANER 2017), pp. 79–90, Klagenfurt, Austria, February 2017 (Acceptance rate: **24.00%**)

2016

M. Masudur Rahman, C. K. Roy, and Jason Collins, “*CORRECT: Code Reviewer Recommendation in GitHub Based on Cross-Project and Technology Experience*”, In Proceeding of The 38th International Conference on Software Engineering (Companion Volume) (**ICSE** 2016), pp. 222–231, Austin Texas, USA, May 2016 (Acceptance rate: **26.00%**)

M. Masudur Rahman and C. K. Roy, “*QUICKAR: Automatic Query Reformulation for Concept Location Using Crowdsourced Knowledge*”, In Proceeding of The 31st IEEE/ACM International Conference on Automated Software Engineering (**ASE** 2016) (New Ideas Track), pp. 220–225, Singapore, September 2016

M. Masudur Rahman, C. K. Roy, Jesse Redl, and Jason Collins, “*CORRECT: Code Reviewer Recommendation at GitHub for Vendasta Technologies*”, In Proceeding of The 31st IEEE/ACM International Conference on Automated Software Engineering (**ASE** 2016) (Tool Demo Track), pp. 792–797, Singapore, September 2016

M. Masudur Rahman, C. K. Roy and David Lo, “*RACK: Automatic API Recommendation using Crowdsourced Knowledge*”, In Proceeding of The 23rd IEEE International Conference on Software Analysis, Evolution, and Reengineering (SANER 2016), pp. 349–359, Osaka, Japan, March 2016 (Acceptance rate: **37.00%**)

Amit K. Mondal, **M. Masudur Rahman** and C. K. Roy, “*Embedded Emotion-based Classification of Stack Overflow Questions Towards the Question Quality Prediction*”, In Proceeding of The 28th International Conference on Software Engineering & Knowledge Engineering (SEKE 2016), pp. 521–526, San Francisco Bay, California, USA, July 2016

2015

M. Masudur Rahman, C. K. Roy and Iman Keivanloo, “*Recommending Insightful Comments for Source Code using Crowdsourced Knowledge*”, In Proceeding of The 15th IEEE International Working Conference on Source Code Analysis and Manipulation (SCAM 2015), pp. 81–90, Bremen, Germany, September 2015 (Acceptance: **35.29%**)

M. Masudur Rahman and C. K. Roy, “*Recommending Relevant Sections from a Web-page about Programming Errors and Exceptions*”, In Proceeding of The 25th International Conference on Computer Science and Software Engineering (CASCON 2015), pp. 181–190, Markham, Canada, November 2015 (Acceptance rate: **29.57%**)

M. Masudur Rahman and C. K. Roy, “*An Insight into the Unresolved Questions at Stack Overflow*”, In Proceeding of the 12th Working Conference on Mining Software Repositories (Challenge Track) (**MSR** 2015), pp. 426–429, Florence, Italy, May 2015

M. Masudur Rahman and C. K. Roy, “*TextRank Based Search Term Identification for Software Change Tasks*”, In Proceeding of the 22nd IEEE International Conference on Software Analysis, Evolution, and Reengineering (ERA Track) (**SANER** 2015), pp. 540–544, Montreal, Canada, March 2015

2014

M. Masudur Rahman and C. K. Roy, “*On the Use of Context in Recommending Exception Handling Code Examples*”, In Proceeding of the 14th IEEE International Working Conference on Source Code Analysis and Manipulation (SCAM 2014), pp. 285–294, Victoria, Canada, September 2014 (Acceptance rate: **31.70%**)

M. Masudur Rahman and C. K. Roy, “*SurfClipse: Context-Aware Meta Search in the IDE*”, In Proceeding of the 30th International Conference on Software Maintenance and Evolution (Tool Demo Track) (**ICSME** 2014), pp. 617–620, Victoria, Canada, September 2014

M. Masudur Rahman and C. K. Roy, “*An Insight into the Pull Requests of GitHub*”, In Proceeding of the 11th Working Conference on Mining Software Repositories (Challenge Track) (**MSR** 2014), pp. 364–367, Hyderabad, India, May 2014

M. Masudur Rahman, S. Yeasmin and C. K. Roy, “*Towards a Context-Aware Meta Search Engine for IDE-Based Recommendation about Programming Errors and Exceptions*”, In Proceeding of the IEEE CSMR-18/WCRE-21 (CSMR/WCRE 2014), pp. 194–203, Antwerp, Belgium, February 2014 (Acceptance rate: **31.03%**)

2013

M. Masudur Rahman, S. Yeasmin and C. K. Roy, “*An IDE-Based Context-Aware Meta Search Engine*”, In Proceedings of the 20th Working Conference on Reverse Engineering (ERA Track) (**WCRE** 2013), pp. 467–471, Koblenz, Germany, October 2013

Previous years

H. Rahman, M. M. Rashid and **Masudur Rahman**, “*Heritage Interpretation: Collective Reconstruction of Sompur Mahavihara, Bangladesh*”, In Proceedings of International Conference on Virtual Systems and Multimedia (VSMM 2010), pp. 163–170, Seoul, South Korea, October 2010

A. S. Mohammad Arif, **M. Masudur Rahman** and S. Y. Mukta, “*Information Retrieval by Modified Term Weighting Method using Random Walk Model with Query Term Position Ranking*”, In Proceedings of International Conference on Signal Processing Systems (ICSPS 2009), pp. 526–530, Singapore, May 2009 (Acceptance: **29.82%**)

ICSE (A*) = 02, ASE (A) = 03, ICSME (A) = 01, MSR (A) = 04, and SANER (B) = 05, SEKE (B) = 01, SCAM (C) = 02, Others = 03, Total = 21 ===== Full = 09, ERA = 03, Tool Demo = 03, MSR Challenge = 03, Others = 03
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AWARDS (17)

2013–2017

Dr. Keith Geddes Award, Student of the Year (2017): Awarded to only one PhD student by the Department of Computer Science, University of Saskatchewan, for outstanding research and academic performance in the ongoing PhD program. (Amount: \$2,500, one time, April 2017)

NSERC Industry Engage Grant (2016): Awarded by NSERC for industry collaboration with Vendasta Technologies, Saskatoon, Canada. (Amount: \$6,300, \$700/month for 9 months. Duration: March 2016–November 2016)

International Dean’s Scholarship (2014–2017): Awarded by University of Saskatchewan for PhD in Computer Science/Software Engineering. (Amount: \$22,000/year for 3 years. Duration: September 2014–August 2017)

SK Innovation & Opportunity Scholarship (2017): Awarded by University of Saskatchewan, for outstanding research and academic performance in the ongoing PhD program. (Amount: \$20,000/year for 1 year. Duration: September 2017– August 2018)

ACM SIGSoft CAPS Award (2017): Awarded by ACM SIGSoft for attending ASE 2017, held at University of Illinois Urbana-Champaign, IL, USA, based on research and academic excellence. Award value: \$600 USD.

Faculty Scholarship & Graduate Teaching Fellowship (2012–2014): Awarded by the Department of Computer Science, University of Saskatchewan for Master in Computer Science. (Amount: \$17,500/year for 2 years)

Best Thesis Award 2014 (Nominated): My MSc thesis was nominated for the Best Thesis Award 2014 by the Department of Computer Science, U of S

Best Graduate Award 2014 (Nominated): I was nominated for the Best Graduate Award 2014 from the Department of Computer Science, U of S

Graduate Travel Award (2015): Awarded by University of Saskatchewan for CASCON 2015, Markham, Canada

Graduate Travel Award (2014): Awarded by GrammaTech for SCAM 2014, Victoria, Canada

Graduate Travel Award (2013): Awarded by University of Saskatchewan for WCRE 2013, Koblenz, Germany

2010–2011

Chancellor Gold Medal (2010): Awarded by the President, Peoples' Republic of Bangladesh and Chancellor, Khulna University. I scored the highest CGPA 3.91/4.00 in the year 2008 among all five departments from the School of Science, Engineering and Technology.

Prime Minister Gold Medal (2011): Nominated by School of Science, Engineering and Technology, Khulna University. I scored the highest CGPA 3.91/4.00 in B.Sc in Computer Science and Engineering, Khulna University

Service Excellence Award (2010): Awarded by NOCHALLENGE TECHNOLOGY LLC for service excellence during 2009–2010.

Previous years

Dean's Merit List Scholarship (2006-2009): Awarded by Khulna University during 2006 to 2009. I scored the 1st position in all four academic years of B.Sc in CSE

Merit List Scholarship (2005-2007): Awarded by Government Education Board (Jessore) during 2005 to 2007 for HSC results in 2003

Merit List Scholarship (2001-2002): Awarded by Government Education Board (Jessore) during 2001 to 2002 for SSC results in 2001

EMPLOYMENT HISTORY (3)

Lecturer, Computer Science and Engineering
Khulna University, Khulna-9208, Bangladesh
November 2009– current (on study leave)

Lead Application System Engineer
NOCHALLENGE TECHNOLOGY LLC, Minneapolis, MN, USA
May 2009– July 2012 (full time & part time)

Graduate Teaching Assistant
University of Saskatchewan, Canada, September 2012– current

RESEARCH

Interests: My research topic is *software change automation*. I develop tools and techniques to automate query reformulation for concept/feature/bug localization and code review activities where I apply Information Retrieval (IR), static code analysis, Machine Learning (ML) and software repository mining. Recently, I have been exploring the scope of applying BigData frameworks in the context of software change automation.

Reviewer: I have been serving as a reviewer or co-reviewer of the following reputed journals and conferences for the last 5+ years:

- JSS, SPE and SCIS
- ICSME, SANER, MSR, SCAM, ICPC, and CASCON

PhD Research Projects (2014–current): I have been working on the following research projects for the last 3+ years as a part of my PhD course and research work. Many of them are published at the highly competitive peer-reviewed conferences (e.g., ICSE(A*), IC-SME(A), ASE(A), MSR(A)) of Software Engineering while some of them are under review.

- **ACER:** It provides effective reformulations to queries for concept location using CodeRank and source document structures. ACER uses graph-based term weighting (PageRank), query difficulty analysis, machine learning and information retrieval for query reformulation (one full paper at ASE 2017).
- **RevHelper:** It predicts usefulness of code review comments based on their texts and developers' experience. RevHelper collects features from comment texts and reviewers' experience, and applies Random Forest algorithm to them for the automatic prediction (one full paper at MSR 2017).
- **CORRECT:** A code reviewer recommendation system for pull requests at GitHub. It mines cross-project experience and specialized technology experience of the developers, and suggests appropriate code reviewers for a pull request. The solution is packaged as a Google Chrome plug-in and a web service (one full paper at ICSE 2016 and one tool paper at ASE 2016).
- **STRICT:** It is a technique for appropriate search term identification from software change requests. STRICT uses graph-based term weighting (PageRank), natural language processing and information retrieval for identifying the important search keywords (one full paper at SANER 2017).
- **RACK:** It reformulates a natural language query for code search into relevant API names. RACK mines posts from programming Q & A site– Stack Overflow, and employs three co-occurrence based heuristics and natural language processing for the query reformulation (one full paper at SANER 2016 and one tool paper at ICSE 2017).
- **CodeInsight:** An automated technique for generating insightful comments for source code using crowdsourced knowledge from Stack Overflow. CodeInsight uses data mining, topic modeling and heuristics for extracting such insights (one full paper at SCAM 2015).
- **QUICKAR:** An automated query reformulation technique for concept location using crowdsourced knowledge from Stack Overflow (one paper at ASE 2016). *Technology:*

Query reformulation, query expansion, word co-occurrence analysis, crowdsourced repository mining, concept location, and Stack Overflow.

- **BLIZZARD:** An automated technique for improved bug localization using query reformulation and bug report quality dynamics (under review). *Technology & Concepts:* Report quality dynamics, empirical study, graph-based term weighting, query reformulation, noise filtration, and information retrieval. (Submitted to ICSE 2018)
- **Ongoing:** My current works (1) attempt to understand why a useful review comment trigger the code change(s), and (2) suggest appropriate queries from a bug report that does not contain any structured items (e.g., program entity names).

MSR Mining Challenge Projects (2014–2017): I have been taking part in the MSR mining challenge competition since 2014. In this competition, researchers are challenged with a new dataset every year, and only novel and interesting findings are accepted for publication through a peer-review process. I succeeded three out of four times, and completed the following mining challenge projects successfully:

- **MSRCH 2017:** Impact of continuous integration (e.g., Travis CI) on code review participation and review quality (one paper at MSR 2017).
- **MSRCH 2015:** An insight into the unresolved (i.e., answer not accepted as solution) questions from Stack Overflow (one paper at MSR 2015).
- **MSRCH 2014:** An insight into the merge success and merge failure of pull requests from GitHub (one paper at MSR 2014).

Tools Developed: Three of my developed tools—*Surfclipse*, *CORRECT* and *RACK*—are published in the top tier conferences such as ICSE, ICSME and ASE. My tool page: <http://www.usask.ca/~masud.rahman/tools>

Master Research Projects (2012–2014): I completed the following research projects during my Master in Computer Science at the University of Saskatchewan:

- **Surfclipse:** An IDE-based context-aware meta search engine for programming errors and exceptions (three papers at ICSME 2014, CSMR 2014, WCRE 2013)
- **SurfExample:** An IDE-based context-aware code example recommender for exception handling (one paper at SCAM 2014)
- **ContentSuggest:** A context-aware web page content recommender in the IDE (one paper at CASCON 2015)
- **Queryclipse:** A context-aware search query recommender for programming errors and exceptions (one paper at ICSME 2014)
- **Excclipse:** An integration of all four plugins—Surfclipse, Queryclipse, ContentSuggest and SurfExample

Source Code Repository: <https://github.com/masud-technope>

Tool Experience: I have working experience with the following tools:

- WEKA, R, MATLAB, LaTeX, Pencil
- ArgoUML, Doxygen, JUnit, Jsoup, Git, PMD, FindBugs, CheckStyle

Thesis Supervision (2010-2012): I supervised the following undergraduate theses during my stay at Khulna University, Bangladesh:

- Web Services Performance Improvement by Modifying SOAP Security Principles
- Automatic Seed Set Expansion for Anti-trust based Anti-spamming Algorithms

OUTREACH (4)

I have been actively collaborating with prominent researchers from three reputed universities and one industrial partner for several of my research projects. While I propose research ideas and conduct the main research work, the collaborators review the ideas, papers and experimental findings. Our industry partner has collaborated by sharing their organization data (e.g., source code, code review history) and developer feedback on the developed tools.

- *Singapore Management University*, Singapore (RACK, outcome: two papers at SANER 2016 and ICSE 2017)
- *Osaka University*, Japan (RevHelper, outcome: one paper at MSR 2017)
- *Concordia University*, Canada (CodeInsight, outcome: one paper at SCAM 2015)
- *Vendasta Technologies*, Canada (CORRECT, outcome: three papers at ICSE 2016, ASE 2016, and MSR 2017)

COURSES (7)

Courses Taken: I took the following graduate courses during my Master and PhD in Computer Science at University of Saskatchewan, and ended up with **88.71%** average:

- CMPT 846: Software Maintenance & Evolution (92%)
- CMPT 816: Advanced Software Engineering (93%)
- CMPT 880: Research Method & Topics (90%)
- CMPT 898: Machine Learning (89%)
- CMPT 811: Human Computer Interaction (79%)
- CMPT 898: Big Data Analytics in Software Engineering (92%)
- CMPT 842: Mobile and Cloud Computing (86%)

TEACHING

Courses Taught: I taught the following courses at Khulna University, Bangladesh:

- Software Engineering (CSE 3101)
- Information System Analysis and Design (CSE 3203)
- Microprocessor and Interfacing (CSE 3111)
- Object Oriented Programming (CSE 1201)
- Computer Fundamentals (CSE 1100)
- Software Development Projects I & II (CSE 2200 & CSE 3100)
- Seminar (CSE 4102)

Courses TAed/Marked: I led tutorials and marked assignments at University of Saskatchewan for the following undergraduate courses:

- CMPT 370: Intermediate Software Engineering (2012, 2013, 2014, 2017)
- CMPT 352: An Introduction to Information Security (2015)

- CMPT 215: Introduction to Computer Organization and Architecture (2017)
- CMPT 214: Programming Principles and Practice (2016)
- CMPT 115: Principles of Computer Science (2013, 2014)

PROBLEM SOLVING

I love problem solving using programming, take part in ACM online contests and I have the following skills:

Desktop Application Programming: C/C++, Java, C#.NET, 8086 (MASM), ns-2.32, SWI-Prolog, MATLAB

Programming Achievements: I took part in different in-campus, national and international programming contests, and scored top positions:

- 2007: **First** in KU Programming Contest
- 2008: **Second** in KU Programming Contest

INDUSTRY EXPERIENCE

I have three years of professional software development experience in the industry, and I have the following programming and technical skills:

Web Application Programming: ASP.net, AJAX, MVC, PHP, Coolite, Ext.NET, Javascript, CSS, JQuery, JQueryUI, XHTML, XML

Database Programming: PL/SQL, Microsoft SQL Server, Oracle 9, MySQL, MS Access, JDBC, ODBC

Professional Working experience: JCarousel, Lightbox, JQuery Map, Google Map, Fusion Map, Google Data API, Payment Integration (Paypal), Finance API Integration (Yahoo!), DirectXCapture, Social Web Integration, Email Marketing, SpryAsset, Zoom Map, E-Commerce development and Management, and HTML Scraping

Technical Software Skills: MS Visual Studio.NET, Net Beans, Pencil, JCreator, FileZilla, BugZilla, TortoiseHg, Crystal Report, ULead Studio, PhotoShop, Dreamweaver, WordPress, DotNetNuke, Joomla, and Plesk.

Professional Software Projects: I completed several professional software projects during my service at NOCHALLENGE TECHNOLOGY LLC (2009–2012). I mostly played the lead role in terms of project planning, designing, coding, and troubleshooting in a team of 3-5 members. Some of them are as follows:

- **PicIssu:** An automated web-based software issue tracking system that collects instant screen shots of issue locations in the UI. It provides a flexible dashboard with various capabilities for issue management, and empowers both the clients and the developers. (*Technology:* ASP.net C#, Javascript, JQuery, CSS, and DirectXCapture)
- **BizWhack:** An e-commerce application for buying and selling of business, real estates and franchises online. It allows a seller to create ads for his/her items using site-provided tools, and allows the buyers to look for desired businesses or franchises

through an efficient search mechanism. As a full-feature e-commerce application, it supports online payment using Paypal. (*Technology*: ASP.net C#, Javascript, JQuery, CSS, Paypal API, and Google Data APIs)

- **CrabTree Screener**: A desktop application that scraps Yahoo! finance pages, and mines stock quote information (e.g., Keyword Statistics, Cash Flow and Analyst Estimates) for hundreds of stocks. (*Technology*: C#, Socket, JSoup, XML, Finance API, and Excel API)
- **Interactive Golf Course**: An interactive map application for exploring golf courses at Arizona, USA. It visualizes each par and hole of the field, and helps the golfers with advanced game planning. (*Technology*: ASP .net C#, CSS, Javascript, JQuery and XML).

LEADERSHIP

I served for several academic, voluntary and professional organizations, and I was elected/selected for the following leadership positions:

- **Web Chair, ICPC 2018**: I have been serving as the web chair of ICPC 2018, Gothenburg, Sweden.
- **VP Internal, CSGCC (2014–2016)**: I served as the VP-Internal for Computer Science Graduate Course Council (CSGCC), University of Saskatchewan during September 2014 to August 2016. My responsibilities include developing or maintaining the council's website, recording meeting minutes, introducing discussion points, and conducting council meeting occasionally.
- **Lead Application System Engineer, NOCHALLENGE TECHNOLOGY LLC (2010–2012)**: I led several .NET based projects of the company for almost two years. My responsibilities included project planning and system modeling, recruiting and training novice developers, handling client communications, and making important decisions for the projects.
- **Publication Secretary, CLUSTER (2005–2006)**: I was the publication secretary of CLUSTER, a student organization of CSE Discipline at Khulna University. My responsibilities included publishing technical periodicals and maintaining a notice board.
- **House Cultural Prefect, JCC (2002–2003)**: I was the cultural prefect of Hunain House, Jhenidah Cadet College. I led the cadets in various inter-house and inter-college cultural contests such as debating, recitation, music, drama, and extempore speech competition for one year.
- **Miscellaneous**: I passed the Inter Service Selection Board (ISSB) exam, the premier leadership test by Bangladesh Army for cadet officer recruitment. I also won a television debating contest back in 2000 hosted by Bangladesh Television.

OTHERS

Language Skills: Bangla (mother tongue), English (IELTS 7.0)

Professional Membership: IEEE Student and ACM SIGSOFT

Other Interests: Movies, Cricket, Table Tennis, Badminton, Music, Debate, Reading, Blogging, Drawing, Fishing and many more.

REFERENCES

(1) Dr. Chanchal K. Roy

Associate Professor, University of Saskatchewan, Canada

Email: chanchal.roy@usask.ca

(2) Dr. David LO

Associate Professor, Singapore Management University, Singapore

Email: davidlo@smu.edu.sg

(3) Dr. Raula G. Kula

Assistant Professor, Nara Institute of Science and Technology, Japan

Email: raula-k@ist.osaka-u.ac.jp

Last updated: November 30, 2017

Please contact me (masud.rahman@usask.ca) for further information.