MASUD RAHMAN, Ph.D.

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CAREER OBJECTIVES

My career objectives are (a) conducting cutting edge research in the area of Software Engineering and challenging myself every day with tough, emerging, interesting research problems, (b) innovating **cost-effective, robust, practical** solutions to support the developers in managing their **software bugs**, **features**, and **source code**, (c) honing my research, development and supervision skills through constant learning, active collaborations and self-reflection, and (d) using my talents and skills in the making of the research/technology leaders of tomorrow.

EDUCATION

Doctor of Philosophy, Computer Science/Software Engineering
University of Saskatchewan, Canada
September 2014 – September 2019
Thesis: Supporting Source Code Search with Context-Aware and Semantics-Driven Query Reformulation
Advisor: Prof. Dr. Chanchal K. Roy
Awards: **Governor General's Gold Medal 2019** + **U of S Doctoral Thesis Award 2019** + **2019 Best PhD Thesis Award (CS)** + **2017 Dr. Keith Geddes Award** + 2020 WAGS/ProQuest Innovation in Technology Award (Nomination)

Master of Science, Computer Science/Software Engineering
University of Saskatchewan, Canada
September 2012 – August 2014
Thesis: Exploiting Context in Dealing with Programming Errors and Exceptions in the IDE
Supervisor: Prof. Dr. Chanchal K. Roy
Award: **2014 Best MSc Thesis Award Nomination**

Bachelor of Science, Computer Science and Engineering
Khulna University, Bangladesh
January 2005 – March 2009
CGPA: **3.91/4.00**, 1^{st} class 1^{st}
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: **2010 Chancellor Gold Medal**

PUBLICATIONS (35)

[2021]

[1] M. Vahedi, **M. Masudur Rahman**, F. Khomh, G. Uddin and G. Antoniol. *"Summarizing Relevant Parts from Technical Videos"*. In Proceeding of The 28th IEEE International Conference on Software Analysis, Evolution and Reengineering (SANER 2021), pp. 12, Honolulu, HI, USA, March 2021 (Acceptance rate: **42/165=25.00%**)

[2] S. Mondal, C M K. Saifullah, A. Bhattacharjee, **M. Masudur Rahman** and C. K. Roy. *"Early Detection and Guidelines to Improve Unanswered Questions on Stack Overflow"*. In Proceeding of The 13th Innovation in Software Engineering Conference (ISEC 2021), pp. 11, Bhubaneswar, India, February 2021 (Acceptance rate: 22/66=33.33%).

- **M. Masudur Rahman**, F. Khomh, S. Yeasmin, and C. K. Roy, *"The Forgotten Role of Search Queries in IR-based Bug Localization: An Empirical Study"*, Empirical Software Engineering Journal (**EMSE**). (Submission Number: EMSE-D-19-00100) (Under Revision)
- **M. Masudur Rahman**, C. K. Roy and F. Khomh, *"Search Keyword Identification for Concept Location using Graph-Based Term Weighting"*, Transactions on Software Engineering (**TSE**). (Submission Number: TSE-2021-03-0136) (Under Review)
- S. Mondal, **M. Masudur Rahman**, C. K. Roy, and K. Schneider, *"The Reproducibility of Programming-Related Issues in Stack Overflow Questions"*, Empirical Software Engineering Journal (**EMSE**). (Submission Number: EMSE-D-21-00007) (Under Review)
- **M. Masudur Rahman**, F. Khomh, and M. Castelluccio, *"Works for Me! Cannot Reproduce – A Large Scale Empirical Study of Non-reproducible Bugs"*, Empirical Software Engineering Journal (**EMSE**). (Submission Number: EMSE-D-21-00171) (Under Review)
- R. F. Silva, **M. Masudur Rahman**, C. E. Dantas, C. Roy, F. Khomh, and M. A. Maia. *"Improved Retrieval of Explained Programming Solutions Using a Multi-featured Score"*. Journal of Systems & Software (**JSS**). (Submission Number: JSSOFTWARE-D-20-00787) (Under Revision)

[2020]

[3] **M. Masudur Rahman**, F. Khomh, and M. Castelluccio, *"Why are Some Bugs Non-Reproducible? An Empirical Investigation using Data Fusion"*, In Proceeding of The 36th International Conference on Software Maintenance and Evolution (**ICSME** 2020), pp. 12, Adelaide, Australia, September, 2020. (In Press) (Acceptance rate: **50/201=24.90%**) (Invited for **EMSE** special issue) (**TCSE Distinguished Paper Award 2020***)

[4] H. Jebnoun, H. Ben Braiek, **M. Masudur Rahman** and F. Khomh, *"The Scent of Deep Learning Code: An Empirical Study"*, In Proceeding of The 17th International Conference on Mining Software Repositories (**MSR** 2020), pp. 11, Seoul, South Korea, May, 2020 (Acceptance rate: **41/138=29.70%**)

[5] B. Asmare Muse, **M. Masudur Rahman**, C. Nagy, A. Cleve, F. Khomh and G. Antoniol, *"On the Prevalence, Impact, and Evolution of SQLcode smells in Data-Intensive Systems"*, In Proceeding of The 17th International Conference on Mining Software Repositories (**MSR** 2020), pp. 12, Seoul, South Korea, May, 2020 (Acceptance rate: **41/138=29.70%**)

[6] Rodrigo F. G. Da Silva, C. K. Roy, **M. Masudur Rahman**, K. Schneider, K. Paixão, M. Maia and C. E. Dantas, *"CROKAGE: Effective Solution Recommendations for Programming Tasks by Leveraging Crowd Knowledge"*, Empirical Software Engineering Journal (**EMSE**), 25:4707–4758, 2020. (Impact Factor=**3.48**).

[2019]

[7] **M. Masudur Rahman**, C. K. Roy and David Lo, *"Automatic Query Reformulation for Code Search using Crowdsourced Knowledge"*, Empirical Software Engineering Journal (**EMSE**), 24(4):1869–1924, 2019. (Impact Factor=**3.48**) (Invited at Journal First track by VL/HCC 2020, Dunedin, New Zealand)

[8] **M. Masudur Rahman**, *"Supporting Code Search with Context-Aware, Analytics-Driven, Effective Query Reformulation"*, In Proceeding of The 41st ACM/IEEE International Conference on Software Engineering (Companion volume, Doctoral Symposium Track) (**ICSE** 2019), pp. 226–229, Montreal, Canada, May, 2019. (Acceptance rate: **9/31=29.03**%)

[9] S. Mondal, **M. Masudur Rahman** and C. K. Roy, *"Can Issues Reported at Stack Overflow Questions be Reproduced? An Exploratory Study"*, In Proceeding of The 16th International Conference on Mining Software Repositories (**MSR** 2019), pp. 479–489, Montreal, Canada, May, 2019. (Acceptance rate: **32/126=25.40%**)

[10] Rodrigo F. G. Da Silva, C. K. Roy, **M. Masudur Rahman**, K. Schneider, K. Paixão and M. Maia, *"Recommending Comprehensive Solutions for Programming Tasks by Mining Crowd Knowledge"*, In Proceeding of The 27th IEEE/ACM International Conference on Program Comprehension (ICPC 2019), pp. 358–368, Montreal, Canada, May, 2019. (Acceptance rate: **28/93=30.11%**) (**Featured at Stack Overflow Blog***)

[2018]

[11] **M. Masudur Rahman** and C. K. Roy, *"Improving IR-Based Bug Localization with Context-Aware Query Reformulation"*, In Proceeding of The 26th ACM Joint European Software Engineering Conference and Symposium on the Foundations of Software Engineering (**ESEC/FSE** 2018), pp. 621–632, Florida, USA, November, 2018. (Acceptance rate: **55/295=19.00**%) (ACM Artifact Badges by peer reviews: **Functional* + Available* + Reusable***)

[12] **M. Masudur Rahman** and C. K. Roy, *"Effective Reformulation of Query for Code Search using Crowdsourced Knowledge and Extra-Large Data Analytics"*, In Proceeding of The 34th International Conference on Software Maintenance and Evolution (**ICSME** 2018), pp. 516–527, Madrid, Spain, September, 2018. (Acceptance rate: **37/174=21.00**%) (**TCSE Distinguished Paper Award 2018 Nomination***)

[13] **M. Masudur Rahman** and C. K. Roy, *"Poster: Improving Bug Localization with Report Quality Dynamics and Query Reformulation"*, In Proceeding of The 40^{th} International Conference on Software Engineering (**ICSE** 2018), pp. 348–349, Gothenburg, Sweden, May, 2018.

[14] **M. Masudur Rahman** and C. K. Roy, *"NLP2API: Query Reformulation for Code Search using Crowdsourced Knowledge and Extra-Large Data Analytics"*, In Proceeding of The 34th International Conference on Software Maintenance and Evolution (Artifact Track) (**ICSME** 2018), pp. 714, Madrid, Spain, September, 2018. (Artifact **Verified & Accepted***)

[2017]

[15] **M. Masudur Rahman** and C. K. Roy, *"Improved Query Reformulation for Concept Location using CodeRank and Document Structures"*, In Proceeding of The 32^{nd} IEEE/ACM International Conference on Automated Software Engineering (**ASE** 2017), pp. 428-439, Urbana-Champaign, Illinois, USA, October, 2017. (Acceptance rate: **65/314=21.00**%)

[16] **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 14^{th} International Conference on Mining Software Repositories (**MSR** 2017), pp. 215–226, Buenos Aires, Argentina, May, 2017. (Acceptance rate: **37/121=30.60**%)

[17] **M. Masudur Rahman** and C. K. Roy and David Lo, *"RACK: Code Search in the IDE using Crowdsourced Knowledge"*, In Proceeding of The 39^{th} International Conference on Software Engineering (Companion Volume) (**ICSE** 2017), pp. 51–54, Buenos Aires, Argentina, May, 2017. (Acceptance rate: **18/57=31.58**%)

[18] **M. Masudur Rahman** and C. K. Roy, *"STRICT: Information Retrieval Based Search Term Identification for Concept Location"*, In Proceeding of The 24^{th} IEEE International Conference on Software Analysis, Evolution, and Reengineering (SANER 2017), pp. 79–90, Klagenfurt, Austria, February 2017. (Acceptance rate: **34/140=24.00**%)

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

[2016]

[20] **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 38^{th} International Conference on Software Engineering (Companion Volume) (**ICSE** 2016), pp. 222–231, Austin Texas, USA, May 2016. (Acceptance rate: **28/108=26.00**%)

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

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

[23] **M. Masudur Rahman**, C. K. Roy and David Lo, *"RACK: Automatic API Recommendation using Crowdsourced Knowledge"*, In Proceeding of The 23^{rd} IEEE International Conference on Software Analysis, Evolution, and Reengineering (SANER 2016), pp. 349–359, Osaka, Japan, March 2016. (Acceptance rate: **52/140=37.00**%)

[24] 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 28^{th} International Conference on Software Engineering & Knowledge Engineering (SEKE 2016), pp. 521–526, San Francisco Bay, California, USA, July 2016.

[2015]

[25] **M. Masudur Rahman**, C. K. Roy and Iman Keivanloo, *"Recommending Insightful Comments for Source Code using Crowdsourced Knowledge"*, In Proceeding of The 15^{th} IEEE International Working Conference on Source Code Analysis and Manipulation (SCAM 2015), pp. 81–90, Bremen, Germany, September 2015. (Acceptance: **24/68=35.00**%)

[26] **M. Masudur Rahman** and C. K. Roy, *"Recommending Relevant Sections from a Webpage about Programming Errors and Exceptions"*, In Proceeding of The 25^{th} International Conference on Computer Science and Software Engineering (CASCON 2015), pp. 181–190, Markham, Canada, November 2015. (Acceptance rate: **21/71=29.57**%)

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

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

[2014]

[29] **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: **27/87=31.00**%)

[30] **M. Masudur Rahman** and C. K. Roy, *"On the Use of Context in Recommending Exception Handling Code Examples"*, In Proceeding of the 14^{th} IEEE International Working Conference on Source Code Analysis and Manipulation (SCAM 2014), pp. 285–294, Victoria, Canada, September 2014. (Acceptance rate: **26/82=31.70**%)

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

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

[2013]

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

[2009–2012]

[34] 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: **170/570=29.82**%)

[35] 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.

AWARDS (27)

[1] **[2020]** **TCSE Distinguished Paper Award:** Awarded by the Technical Council of Software Engineering for the ICSME 2020 paper – *"Why are Some Bugs Non-Reproducible? An Empirical Investigation using Data Fusion."*

[2] **[2020] 2019 Governor General's Gold Medal:** Awarded by the Governor General of Canada. The highest academic award that a Canadian PhD student can be awarded for academic and research excellence in the PhD program in the Canadian universities.

[3] **[2021] President's Research Excellence Award Nomination:** Nominated by the Faculty of Computer Science for this prestigious, university-wide award competition within Dalhousie University.

[4] **[2020] 2019 U of S Doctoral Thesis Award:** Awarded by the University of Saskatchewan for the best PhD thesis in the area of Physical and Engineering Science.

[5] **[2020] 2019 Best PhD Thesis Award:** Awarded by the Department of Computer Science, University of Saskatchewan.

[6] **[2020] WAGS/ProQuest Innovation in Technology Award Nomination:** My PhD thesis was nominated by the University of Saskatchewan for this national-level PhD dissertation contest.

[7] **[2018] TCSE Distinguished Paper Award Nomination:** Nominated for TCSE Distinguished Paper Award for the **ICSME** 2018 paper – *"Effective Reformulation of Query for Code Search using Crowdsourced Knowledge and Extra-Large Data Analytics."*

[8] **[2017] Dr. Keith Geddes Award, Student of the Year**: 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. Award value: $2,500.

[9] **[2010] Chancellor Gold Medal**: 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 200 students from five departments of the School of Science, Engineering and Technology (SET), Khulna University. Award value: ≈ $1,000.

[10] **[2020] 2019 Best PhD Thesis Award Nomination:** Nominated by the PhD advisory board for thesis awards.

[11] **[2019] ACM SIGSoft CAPS Award**: Awarded by ACM SIGSoft for attending ICSE 2019, held at Montreal, Canada, based on research and academic excellence. Award value: $400 USD.

[12] **[2017] ACM SIGSoft CAPS Award**: 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.

[13] **[2020] Wiley Reviewer Recognition:** Awarded by Journal of Software Evolution and Process for high-quality journal reviews.

[14] **[2019] Springer Reviewer Recognition:** Awarded by Empirical Software Engineering journal for high-quality journal reviews.

[15] **[2018] Elsevier Reviewer Recognition:** Awarded by Journal of Systems and Software for high-quality journal reviews.

[16] **[2011] Prime Minister Gold Medal Nomination**: 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

[17] **[2014] Best MSc Thesis Award Nomination**: My MSc thesis was nominated for the Best MSc Thesis Award 2014 by the Department of Computer Science, U of S

[18] **[2014] Best Graduate Award Nomination**: I was nominated for the Best Graduate Award 2014 from the Department of Computer Science, U of S

[19] **[2014] Graduate Research Video Contest Winner:** One of three winners of the video contests arranged by the Department of Computer Science, U of S. Award value: $100.

[20] **[2016] Vanier Graduate Scholarship Nomination:** I was nominated for Vanier Graduate Scholarship by the Department of Computer Science, U of S.

[21] **[2016] Microsoft PhD Fellowship Nomination:** I was nominated for Microsoft PhD Fellowship by the Department of Computer Science, U of S.

[22] **[2010] Service Excellence Award**: Awarded by NOCHALLENGE TECHNOLOGY LLC for service excellence as a professional software developer during 2009–2010.

[23] **[2007–2008] Programming Contest Award Winner** of Khulna University.

[24] **[2018] Graduate Travel Award**: Awarded by University of Saskatchewan for ICSME 2018 travel to Madrid, Spain. Award value: $550.

[25] **[2015] Graduate Travel Award**: Awarded by University of Saskatchewan for CASCON 2015 travel to Markham, Canada. Award value: $250.

[26] **[2014] Graduate Travel Award**: Awarded by GrammaTech for SCAM 2014 travel to Victoria, Canada. Award value: $150.

[27] **[2013] Graduate Travel Award**: Awarded by University of Saskatchewan for WCRE 2013 travel to Koblenz, Germany. Award value: $550.

GRANTS & SCHOLARSHIPS (13)

[1] **[2021] NSERC Discovery Grant**: Awarded by NSERC for my discovery research program – *Mining, Intelligence and Automation in Tackling Machine-Learning Bugs*. Grant amount: **$157,500** ($29,000×5 years + Discovery launch supplement: $12,500)

[2] **[2021] NSERC Postdoctoral Fellowship (Declined)**: Awarded by NSERC for the postdoctoral research proposal - *Towards Automated Reproduction of Software Bugs and Failures from Incomplete Bug Reports*. Grant amount: $**90,000**.

[3] **[2020] Dalhousie BELONG Research Fellowship**: Awarded by Dalhousie University for research excellence as a new faculty from the visible minority group. Grant proposal: *Making Software Development Efficient Using Artificial Intelligence in Code Reviews*. Grant amount: $5000.

[4] **[2020] Tenure-Track Startup Grant**: Awarded by the Faculty of Computer Science, Dalhousie University. Grant amount: **$25,000** + Two-years funding for two graduate students.

[5] **[2016] NSERC Industry Engage Grant**: Awarded by NSERC for industry collaboration with Vendasta Technologies, Saskatoon, Canada. Grant value: $6,300, $700/month for 9 months. Duration: March 2016–November 2016.

[6] **[2014–2017] International Dean's Scholarship**: Awarded by University of Saskatchewan for PhD in Computer Science/Software Engineering. Scholarship amount: **$66,000** ($22,000/year for 3 years). Duration: September 2014–August 2017.

[7] **[2017–2018] SK Innovation & Opportunity Scholarship**: Awarded by University of Saskatchewan, for research and academic excellence in the ongoing PhD program. Scholarship amount: $20,000/year for 1 year. Duration: September 2017– August 2018.

[8] **[2016–2018] Faculty Scholarship:** Awarded by the Department of Computer Science, University of Saskatchewan for the research excellence in the ongoing PhD program as top ups. Scholarship amount: ≈ $8,000.

[9] **[2018–2019] Faculty Scholarship:** Awarded by the Department of Computer Science, University of Saskatchewan for the research excellence in the ongoing PhD program. Scholarship amount: $23,000/year.

[10] **[2012–2014] Faculty Scholarship & Graduate Teaching Fellowship**: Awarded by the Department of Computer Science, University of Saskatchewan for the Masters program. Scholarship amount: $17,500/year for 2 years.

[11] **[2006–2009] Dean's Merit List Scholarship**: Awarded by Khulna University during 2006 to 2009. I scored the 1^{st} position in all four academic years of B.Sc in CSE.

[12] **[2005–2007] Merit List Scholarship**: Awarded by Government Education Board (Jessore) during 2005 to 2007 for excellence in 2003 HSC exam.

[13] **[2001–2002] Merit List Scholarship**: Awarded by Government Education Board (Jessore) during 2001 to 2002 for excellence in 2001 SSC exam.

EMPLOYMENT HISTORY (5)

[July 2020–Current] Assistant Professor, Dalhousie University: Appointed as a tenure-track Assistant Professor in the Faculty of Computer Science. My job responsibilities include (a) establishing an independent research program by securing research grants, supervising graduate and undergraduate students, (b) teaching undergraduate and graduate level courses, and (c) delivering administrative service.

[2019–June 2020] Postdoctoral Fellow, Polytechnique Montreal: Appointed as a Postdoctoral Fellow in the SWAT laboratory led by Prof. Dr. Foutse Khomh. I was accounted for research and development, co-supervising graduate students, and writing research grant proposals.

[2009–2012] Lecturer, Khulna University: Appointed as a **full-time faculty member** in the Department of Computer Science and Engineering, Khulna University. I was accounted for (1) teaching undergraduate classes, curricular innovation, course planning, course evaluation, conducting exams and publishing grades, (2) conducting research, supervising student theses, (3) conducting academic projects, organizing student contests, leading students in the regional/national level contests, and (4) conducting administrative affairs such as admission test management, departmental purchase inspection, and various other official decision making.

[2012–2019] Graduate Research & Teaching Assistant, University of Saskatchewan: Appointed as a graduate research & teaching assistant in the Department of Computer Science from 2012 to 2019. I was accounted for graduate research & development, leading tutorials of *CMPT 370: Intermediate Software Engineering*, and for marking three other undergraduate courses.

[2009–2012] Software Developer, NOCHALLENGE TECHNOLOGY LLC: Appointed as a junior software developer, and later promoted as the *lead software developer* due to outstanding development,

problem-solving and leadership skills. I was accounted for (1) developing professional e-commerce applications for buying and selling real estate and businesses, (2) handling client communications from overseas, (3) leading multiple mid-level software projects, and (4) hiring and training junior software developers.

MEDIA & PUBLICITY (4)

My research work got featured in the local and international media multiple times as follows.

- DAL News: Recognizing the Rich Diversity of DAL Research
- Department of Computer Science, University of Saskatchewan
- University of Saskatchewan
- Stack Overflow Blog, TechRepublic, SDTimes, ACM Tech News, and I-Programmer.

RESEARCH

Software bugs and failures are responsible for trillion-dollar financial losses every year. Traditional ad hoc practices to deal with software bugs and feature requests also claim up to **60%** of the total development budget. I have been developing **novel, cost-effective, and robust solutions** to support the developers in dealing with their software bugs and features. In particular, my solutions aim to carefully automate different steps of a typical software change process such as (1) bug localization, (2) concept location, and (3) code reviews. In my research, I make use of Information Retrieval (IR), static code analysis, Machine/Deep Learning (ML/DL), natural language processing, and software repository mining (e.g., Stack Overflow, GitHub) to come up with these solutions. Please check my **research statement** for details.

Journal Reviewer

Serving as a regular reviewer of several top-tier journals in Software Engineering for the last few years.

- IEEE Transactions on Software Engineering (**TSE**)
- ACM Transactions on Software Engineering and Methodology (**TOSEM**)
- Empirical Software Engineering Journal (**EMSE**)
- IEEE Transactions on Dependable and Secure Computing (**TDSC**)
- IEEE Transactions on Reliability (**TR**)
- Journal of Systems and Software (**JSS**)
- Software Quality Journal (SQJ)
- Information and Software Technology (IST)
- Journal of Software Evolution & Process (JSME)
- Journal of Software: Practice and Experience (SPE)
- Journal of Automated Software Engineering (AUSE)
- SCIENCE CHINA Information Sciences (SCIS)
- Foundation of Computing and Decision Sciences (FCDS)

Program/Organization Committee Member

- (2021) PC Member: The ACM Joint European Software Engineering Conference and Symposium on the Foundations of Software Engineering (**ESEC/FSE**)

- (2021) PC Member: International Working Conference on Mining Software Repositories (**MSR**)
- (2021) OC Member: International Working Conference on Mining Software Repositories (**MSR**)
- (2021) PC Member: International Conference on Software Analysis, Evolution and Reengineering (SANER)
- (2021) PC Member: International Conference on Program Comprehension (ICPC)
- (2020) PC Member: International Conference on Automated Software Engineering (**ASE**)
- (2020) OC Member: International Conference on Source Code Analysis and Manipulation (SCAM)
- (2019) PC Member: International Conference on Program Comprehension (ICPC)
- (2019) OC Member: International Conference on Source Code Analysis and Manipulation (SCAM)
- (2018) OC Member: International Conference on Program Comprehension (ICPC)

Sub-Reviewer (2013–2019)

- International Conference on Software Engineering (**ICSE**) [Sub-reviewer]
- International Conference on Automated Software Engineering (**ASE**) [Sub-reviewer]
- International Conference on Software Maintenance and Evolution (**ICSME**) [Sub-reviewer]
- International Conference on Software Maintenance (**ICSM**) [Sub-reviewer]
- International Conference on Software Analysis, Evolution, and Reengineering (SANER) [Sub-reviewer]
- International Working Conference on Reverse Engineering (WCRE) [Sub-reviewer]
- International Working Conference on Mining Software Repositories (**MSR**) [Sub-reviewer]
- International Working Conference on Source Code Analysis and Manipulation (SCAM) [Sub-reviewer]
- International Conference on Program Comprehension (ICPC) [Full reviewer]
- International Conference on Computer Science and Software Engineering (CASCON) [Sub-reviewer]

Services at Dalhousie University

- (2021) Chair: MSc thesis defence of Fatemeh Rahimi, Computer Science, Dalhousie University.
- (2021) Chair: MSc thesis defence of Rakshit Varu, Computer Science, Dalhousie University.
- (2021) External Reviewer: Scholarships and Killam Fellowships, Dalhousie University.
- (2020) Member: Course curriculum committee, Faculty of Computer Science, Dalhousie University.
- (2020) Member: Faculty search committee, Faculty of Computer Science, Dalhousie University.

Research Projects (29)

Completed PhD Projects: I had worked on the following research projects during the last five years as a part of my PhD courses and research works. Papers produced from these projects have been accepted/published at the highly selective peer-reviewed conferences of Software Engineering such as **ICSE(A*)**, **ESEC/FSE (A*)**, **ASE(A)**, **ICSME(A)** and **MSR(A)**, and at the top ranked journals such as **EMSE (A)**. More details are here .

[1] **[2018] BLIZZARD** is an automated technique for improving IR-based bug localization using query reformulation and bug report quality dynamics. *Technology & Concepts:* Report quality dynamics, empirical study, graph-based term weighting, query reformulation, noise filtration, and information retrieval. (one full paper at **ESEC/FSE** 2018 and one poster paper at **ICSE** 2018)

[2] **[2018] NLP2API** reformulates a natural language query intended for code search using crowdsourced knowledge and extra-large data analytics derived from Stack Overflow Q & A site (one full paper and one accepted artifact at **ICSME** 2018).

[3] **[2017] ACER** provides effective reformulations to queries for concept location using CodeRank and source document structures. ACER uses graph-based term weighting, query difficulty analysis, machine learning and Information Retrieval for query reformulation (one full paper at **ASE** 2017).

[4] **[2017] RevHelper** 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**).

[5] **[2016–2017] CORRECT** is 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).

[6] **[2017] STRICT** 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 and one short paper at SANER 2015).

[7] **[2016] RACK** 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).

[8] **[2018] RACK+** is an extended version of our earlier work on code search and query reformulation – RACK. This extended version got published at **EMSE** journal.

[9] **[2015] CodeInsight** is an automated technique for generating insightful comments for source code using crowdsourced knowledge from Stack Overflow. CodeInsight uses data mining, topic modelling and heuristics for extracting such insights (one full paper at SCAM 2015).

[10] **[2016] QUICKAR** is 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.

[11] **[2019] BLADER** suggests appropriate search queries from the poor bug reports that do not contain any structured entities (e.g., program entity names) for IR-based bug localization. It employs word embeddings derived from Stack Overflow with FastText for query reformulation. This work is being prepared for a journal submission.

Postdoctoral Research Projects: Several journal articles are under review and under revision.

[12] **[2019] Bug Reproducer:** I have been studying the challenges in traditional practices of bug reproduction, and developing intelligent tools to help the developers reproduce their bugs even from the incomplete bug reports. One technical track paper got accepted at **ICSME** 2020, which was invited to **EMSE** special issues. The extended journal article is currently under review.

[13] **[2019] GenQR** is an empirical study on the query construction practices of IR-based bug localization approaches from the literature. We found that bug reports containing only natural language texts might not be poor after all. One **EMSE** journal article is under revision.

[14] **[2019] STRICT+** is an extended version of our earlier work on search keyword selection – STRICT. The extended version is under review at **TSE**.

[15] **[2019] RevHelper+** is an extended version of our earlier work, RevHelper, that predicts the usefulness of code review comments. We are planning for an **EMSE** journal submission.

Co-supervised PhD/MSc Projects: The following graduate-level research projects were co-supervised by me. My co-supervision included brain-storming the core ideas and methodologies, regular progress monitoring, advising, and finally co-authoring the submitted papers.

[16] **[2019] Issue-Reproducer** (1) investigates whether the issues reported at Stack Overflow questions could be reproduced or not, and (2) provides tool supports for making them reproducible. One full paper at **MSR** 2019 and the extended version is currently under review at EMSE. [MSc student co-supervised: **Saikat Mondal**].

[17] **[2019] CROKAGE** delivers comprehensive solutions from Stack Overflow for a programming task where each solution contains both relevant, working code examples and complementary explanations. One full paper at ICPC 2019 and one journal article at **EMSE**. This work was featured at **Stack Overflow Blog** ↗. [PhD student co-supervised: **Rodrigo Fernandes**].

[18] **[2019] BLUAMIR** localizes software bugs not only using lexical similarity between bug report texts and source code documents but also by leveraging their implicit associations derived from the bug-fixing history. We are planning for a **JSS** journal submission. [PhD student co-supervised: **Shamima Yeasmin**]

[19] **[2019] Scent of Deep Learning Code:** We detect code smells in the deep learning code and contrast between DL-based systems and traditional systems in terms of their code smell prevalence and bug-proneness. One full paper got accepted at **MSR** 2020. [MSc student co-supervised: **Hadhemi Jebnoun**]

[20] **[2019] Scent of Data-Intensive Code:** We detect SQL code smells in the data-intensive systems and contrast between data-intensive and traditional systems in terms of their smell prevalence and bug-proneness. One full paper at **MSR** 2020. [PhD student co-supervised: **Biruk Asmare Muse**]

[21] **[2020] TechTube** accepts a programming task description, analyses the contents from relevant videos of YouTube and then delivers a comprehensive video summary for the task. One full paper got accepted at SANER 2021. [MSc student co-supervised: **Mahmood Vahedi**]

Completed MSc Projects: I completed the following research projects during my Master in Computer Science at the University of Saskatchewan:

[22] **[2014] SurfClipse:** An IDE-based, context-aware, meta search engine for programming errors and exceptions (three papers at ICSME 2014, WCRE-CSMR 2014, WCRE 2013)

[23] **[2014] SurfExample:** An IDE-based context-aware code example recommender for exception handling (one paper at SCAM 2014)

[24] **[2015] ContentSuggest:** A context-aware web page content recommender in the IDE (one paper at CASCON 2015)

[25] **[2014] QueryClipse:** A context-aware search query recommender for programming errors and exceptions (one tool paper at ICSME 2014)

[26] **[2014] ExcClipse:** An integration of all four plugins– SurfClipse, QueryClipse, ContentSuggest and SurfExample, and developed as an Eclipse plug-in.

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

[27] **[2017] MSR Challenge with Travis CI:** Impact of continuous integration (e.g., Travis CI) on code review participation and review quality (one paper at MSR 2017).

[28] **[2015] MSR Challenge with Stack Overflow:** An insight into the unresolved (i.e., answer not accepted as solution) questions from Stack Overflow (one paper at MSR 2015).

[29] **[2014] MSR Challenge with GitHub:** An insight into the merge success and merge failure of pull requests from GitHub (one paper at MSR 2014).

Developed Tools & Prototypes

Many of my research projects resulted into either fully functional tools (e.g., IDE plug-ins) or working prototypes. Three of my developed tools and two of my prototypes/replication packages were accepted for publication and demonstration at the top venues as follows:

- **[2014] SurfClipse** tool was accepted and demonstrated at **ICSME** 2014, Victoria, Canada. It also won the graduate research video contest organized by the Department of Computer Science, University of Saskatchewan, back in 2013.
- **[2016] CORRECT** tool was accepted and demonstrated at **ASE** 2016, Singapore. It was also demonstrated in front of the professional developers at Vendasta Technologies.
- **[2017] RACK** tool was accepted and demonstrated at **ICSE** 2017, Argentina.
- **[2018] BLIZZARD** replication package was accepted by **ESEC/FSE** 2018, FL, USA. It received **"Functional", "Reusable"**, **"Available"** badges of ACM, and also has been *permanently* archived by ACM for smooth reuse and wider dissemination.
- **[2018] NLP2API:** Replication package was accepted and demonstrated at the artifact track of **ICSME** 2018, Madrid, Spain.
- **[2019] BugDoctor:** An Eclipse IDE plug-in and the outcome of my PhD dissertation. It encapsulates six tools for concept location, bug localization and Internet-scale code search that were developed as a part of my PhD thesis.

More details on my developed tools and prototypes can be found at the **tool page**. I am also greatly enthusiastic about **Open Science**, and many of my completed research projects are **publicly available** at **GitHub** for replication, reuse, and collaboration.

Global Outreach & Research Collaborations

I collaborated with leading researchers from three internationally reputed universities and two software practitioners from the industry for several of my research projects. I led each collaborative project by **brainstorming** the core ideas, conducting the experiments, and writing the papers. The collaborators (1) helped refine my ideas with professional insights, (2) helped improve the papers with high-quality feedback, and (3) complemented our experiments with the industry-standard dataset (e.g., professional code reviews). I also regularly visited our industry partner, Vendasta Technologies, to demonstrate my research works in front of the **professional software developers**, and collected high-quality feedback from them. Such visits shaped my research towards more applicable, realistic, and practice-oriented solutions. My collaborators are as follows:

- **[2016–2019] David Lo, Singapore Management University, Singapore**: We collaborated on RACK project that produced multiple papers – one full paper at SANER 2016, one tool paper at **ICSE** 2017 and one journal paper at **EMSE**.

- **[2017] Raula G. Kula, Osaka University, Japan**: We collaborated on RevHelper project that produced one full paper at **MSR** 2017.

- **[2015] Iman Kievanloo, Concordia University, Canada**: We collaborated on CodeInsight project that produced one full paper at SCAM 2015.

- **[2016–2018] Vendasta Technologies, Canada**: We collaborated on CORRECT and RevHelper projects that produced multiple high quality papers– one full paper at **ICSE** 2016 (SEIP), one tool paper at **ASE** 2016, and one full paper at **MSR** 2017.

- **[2020–] Mozilla Corporation:** Our ongoing collaboration has produced one paper at **ICSME** 2020, which has been recently awarded the TCSE Distinguished Paper Award 2020. The extended version is under review at EMSE.

Research Grant Writing

- **[2021] NSERC Discovery Grant:** Recently submitted the Discovery Grant proposal as an early career researcher – *"Mining, Intelligence and Automation in Tackling Machine-Learning Bugs."* (**Awarded**)

- **[2020] Dalhousie BELONG Research Fellowship Grant:** Recently submitted a grant proposal as an early career researcher – *"Making Software Development Efficient Using Artificial Intelligence in Code Reviews."* (**Awarded**)

- **[2019] NSERC Postdoctoral Fellow Grant:** Recently submitted a PDF research grant proposal namely "*Towards Automated Reproduction of Software Bugs and Failures from Incomplete Bug Reports.*" (**Awarded**)

- **[2016] NSERC Industry Engage Grant:** Co-authored a research grant proposal with my PhD advisor namely *"Code Reviewer Recommendation Based on Cross-Project and Technology Experience"*. (PhD Work) (**Awarded**).

- **[2020] IVADO Postdoctoral Fellow Grant:** Recently submitted a postdoctoral research grant proposal to IVADO namely "*Reproducing Deep Learning Bugs with Data Fusion and Machine Intelligence.*" (Postdoc Work)

Graduate Student Co-supervision

I co-supervised/mentored multiple graduate-level research projects undertaken by seven graduate students (four MSc + three PhD) from University of Saskatchewan and Polytechnique Montreal. Several of them got accepted in the top Software Engineering venues as follows:

- **[2018–] Rodrigo Fernandes:** We are developing a software bot that delivers comprehensive solutions from Stack Overflow Q&A site for a given programming task. We got one full paper accepted at **ICPC** 2019. The extended article is also accepted at **EMSE**. Rodrigo was a visiting student from Federal University of Uberlândia, Brazil.

- **[2016] Amit Kumar Mondal**: We worked on a research project that analyses the sentiments expressed in the Stack Overflow questions, and it produced one paper at SEKE 2016. Institution: University of Saskatchewan, Canada.

- **[2018–] Saikat Mondal:** We have been working on several interesting projects – (1) quality analysis of Stack Overflow questions, (2) reproducibility of the issues reported at Stack Overflow questions, and (3) code reliability prediction using crowd knowledge. We got one full paper accepted at **MSR** 2019. Another journal paper is under review at **EMSE**. Saikat has recently been awarded prestigious **Dr. Keith Geddes Award 2019** and **Best MSc Thesis Award 2020** for his excellence in the MSc program. Institution: University of Saskatchewan.

- **[2017–] Shamima Yeasmin:** We are developing a bug localization technique that employs natural language processing, software repository mining and Information Retrieval. One full paper was submitted at **ESEC/FSE** 2019. Institution: University of Saskatchewan.

- **[2019–] Biruk Asmare Muse:** We have been studying the prevalence, impact and evolution of SQL code smells in the data-intensive software systems. One full paper got accepted at **MSR** 2020. Institution: Polytechnique Montreal.

- **[2020–] Hadhemi Jebnoun:** We have been studying the prevalence, trends and impact of code smells in the deep learning code. One full paper got accepted at **MSR** 2020. Institution: Polytechnique Montreal, Canada.

- **[2019–] Mahmood Vahedi:** We have been developing appropriate tools for summarizing relevant parts from programming related videos. Our work got published at **SANER** 2021. Institution: Polytechnique Montreal, Canada.

I also co-supervised two undergraduate theses as a faculty member of Khulna University as follows:

- Web Services Performance Improvement by Modifying SOAP Security Principles

- Automatic Seed Set Expansion for Anti-trust based Anti-spamming Algorithms

Research Talks/Posters/Demonstrations (42)

I attended **15+** Software Engineering conferences and workshops held in **six** different countries over the last six years, and delivered dozens of research talks on my research topics. Such attendance and talks allowed me (1) to **collaborate** with the leading researchers from my area, (2) to **better communicate** my ideas with a large audience, and (3) to **stay up-to-date** with the hot research trends. The following research talks ↗ were produced from my works:

[1] M. Masudur Rahman. 2020, *"Finding Bugs and Features in the Software Code with Better Search Queries"*, **New Faculty Talk**, Consortium for Software Engineering Research, Canada (Virtual)

[2] M. Masudur Rahman. 2020, *"Why are Some Bugs Non-Reproducible? An Empirical Investigation using Data Fusion"*, ICSME, Adelaide, Australia (Virtual).

[3] M. Masudur Rahman. 2020, *"BugDoctor: Finding Bugs and Features in the Software Code with Better Search Queries"*, **Tenure-Track Faculty Seminar**, University of Calgary, Calgary, AB, Canada. (Online Seminar)

[4] M. Masudur Rahman. 2020, *"BugDoctor: Detecting Bugs and Features in Software Code with Context-Aware and Semantics-Driven Query Reformulation"*, **Tenure-Track Faculty Seminar**, Dalhousie University, Halifax, NS, Canada. (Online Seminar)

[5] M. Masudur Rahman. 2020, *"BugDoctor: Detecting Bugs and Features in Software Code with Context-Aware and Semantics-Driven Query Reformulation"*, **Tenure-Track Faculty Seminar**, Queen's University, Kingston, ON, Canada.

[6] M. Masudur Rahman. 2020, *"BugDoctor: Detecting Bugs and Features in Software Code with Context-Aware and Semantics-Driven Query Reformulation"*, **Tenure-Track Faculty Seminar**, Rochester Institute of Technology (RIT), Rochester, NY, USA.

[7] M. Masudur Rahman. 2020, *"BugDoctor: Detecting Bugs and Features in Software Code with Context-Aware and Semantics-Driven Query Reformulation"*, **Tenure-Track Faculty Seminar**, Miami University, Oxford, OH, USA.

[8] M. Masudur Rahman. 2019, *"Supporting Source Code Search with Context-Aware and Semantics-Driven Query Reformulation"*, Thesis Defence, University of Saskatchewan, Canada.

[9] M. Masudur Rahman. 2019, *"Supporting Code Search with Context-Aware, Analytics-Driven, Effective Query Reformulation"*, Doctoral Symposium, ICSE 2019, Montreal, Canada.

[10] M. Masudur Rahman. 2019, *"Using version control systems in everyday activities and how to make a better presentation"*, **Guest Lecture**, Software Research Lab, University of Saskatchewan, Canada.

[11] M. Masudur Rahman. 2019, *"Improving Bug Localization with Context-Aware, Analytics-Driven Query Reformulation"*, **Tenure-Track Faculty Seminar**, York University, Toronto, Ontario, Canada.

[12] M. Masudur Rahman. 2019, *"Improving Bug Localization with Context-Aware, Analytics-Driven, Effective Query Reformulation"*, **Tenure-Track Faculty Seminar**, University of Manitoba, Winnipeg, Canada.

[13] M. Masudur Rahman. 2018, *"Improving IR-Based Bug Localization with Context-Aware Query Reformulation"*, ESEC/FSE, FL, USA.

[14] M. Masudur Rahman. 2018, *"Partial Reproduction of Bug Localization Results from BugLocator, BLUiR and AmaLgam+"*, ROSE Festival, ESEC/FSE, FL, USA.

[15] M. Masudur Rahman. 2018, *"Effective Reformulation of Query for Code Search using Crowdsourced Knowledge and Extra-Large Data Analytics"*, ICSME, Madrid, Spain.

[16] M. Masudur Rahman. 2018, *"NLP2API: Query Reformulation for Code Search using Crowdsourced Knowledge and Extra-Large Data Analytics"* [Artifact], ICSME, Madrid, Spain.

[17] M. Masudur Rahman and Chanchal K. Roy. 2018, *"Poster: Improving Bug Localization with Report Quality Dynamics and Query Reformulation"*, ICSE, Gothenburg, Sweden.

[18] M. Masudur Rahman. 2017, *"Improved Query Reformulation for Concept Location using CodeRank and Document Structures"*, ASE, Urbana, IL, USA

[19] M. Masudur Rahman. 2017, *"Improved Query Reformulation for Concept Location using CodeRank and Document Structures"* [Poster], ResearchFest, University of Saskatchewan.

[20] M. Masudur Rahman and Chanchal K. Roy. 2017, *"Towards automated supports for code reviews using reviewer recommendation and review quality modelling"*, 56^{th} CREST Open Workshop (COW), **University College London**, UK. [Invited Talk]

[21] M. Masudur Rahman, Chanchal K. Roy and David Lo. 2017, *"RACK: Code Search in the IDE using Crowdsourced Knowledge"* [Demo], ICSE, Buenos Aires, Argentina .

[22] M. Masudur Rahman, Chanchal K. Roy and R. G. Kula. 2017, *"Predicting Usefulness of Code Review Comments using Textual Features and Developer Experience"*, MSR, Buenos Aires, Argentina.

[23] M. Masudur Rahman and Chanchal K. Roy. 2017, *"Impact of Continuous Integration on Code Reviews"*, MSR, Buenos Aires, Argentina.

[24] M. Masudur Rahman and Chanchal K. Roy. 2017, *"STRICT: Information Retrieval Based Search Term Identification for Concept Location"*, SANER, Klagenfurt, Austria.

[25] M. Masudur Rahman. 2016, *"CORRECT: Code Reviewer Recommendation in GitHub Based on Cross-Project and Technology Experience"*, ICSE, Austin, TX, USA

[26] M. Masudur Rahman. 2016, *"CORRECT: Code Reviewer Recommendation at GitHub for Vendasta Technologies"* [Demo+Poster], ASE, Singapore

[27] M. Masudur Rahman. 2016, *"CORRECT: Code Reviewer Recommendation at GitHub for Vendasta Technologies"* [Demo], Technology Meeting, Vendasta Technologies, Saskatoon, Canada.

[28] M. Masudur Rahman. 2016, *"QUICKAR: Automatic Query Reformulation for Concept Location Using Crowdsourced Knowledge"*, ASE, Singapore

[29] M. Masudur Rahman. 2016, *"RACK: Automatic API Recommendation using Crowdsourced Knowledge"*, SANER, Osaka, Japan

[30] M. Masudur Rahman. 2015, *"Recommending Insightful Comments for Source Code using Crowdsourced Knowledge"*, CSER, Markham, Canada

[31] M. Masudur Rahman. 2015, *"Recommending Relevant Sections from a Webpage about Programming Errors and Exceptions"*, CASCON, Markham, Canada.

[32] M. Masudur Rahman and Chanchal K. Roy. 2015, *"Recommending Insightful Comments for Source Code using Crowdsourced Knowledge*, SCAM, Bremen, Germany.

[33] M. Masudur Rahman and Chanchal K. Roy. 2015, *"An Insight into the Unresolved Questions at Stack Overflow"*, MSR, Florence, Italy.

[34] M. Masudur Rahman. 2015, *"CORRECT: Code Reviewer Recommendation in GitHub Based on Cross-Project and Technology Experience"*, Technology Meeting, Vendasta Technologies.

[35] M. Masudur Rahman. 2015, *"TextRank Based Search Term Identification for Software Change Tasks"*, SANER, Montreal, Canada

[36] M. Masudur Rahman. 2014, *"SurfClipse: Context-Aware Meta Search in the IDE"* [Demo + Poster], ICSME, Victoria, Canada

[37] M. Masudur Rahman. 2014, *"On the Use of Context in Recommending Exception Handling Code Examples"*, SCAM, Victoria, Canada

[38] M. Masudur Rahman and Chanchal K. Roy. 2014, *"Towards a Context-Aware Meta Search Engine for IDE-Based Recommendation about Programming Errors and Exceptions"*, CSMR-WCRE, Antwerp, Belgium.

[39] M. Masudur Rahman and Chanchal K. Roy. 2014, *"An Insight into the Pull Requests of GitHub"*, MSR, Hyderabad, India.

[40] M. Masudur Rahman. 2013, *"An IDE-Based Context-Aware Meta Search Engine"*, WCRE, University of Koblenz-Landau, Koblenz, Germany.

[41] M. Masudur Rahman. 2018, *"Supporting Software Change Tasks using Automated Query Reformulations"*, **Guest Lecture**, CMPT 470/816: Advanced Software Engineering, University of Saskatchewan, Canada.

[42] M. Masudur Rahman. 2013, *"Semantic Network Based API Usage Pattern Extraction and Learning"*, Graduate Symposium, University of Saskatchewan, Canada.

Research Tools & Technology Experience

[1] **Software Development & Maintenance:** Eclipse, PyCharm, IntelliJ, Visual Studio, ArgoUML, Doxygen, JUnit, JavaParser, Jsoup, PMD, FindBugs, CheckStyle, Ant, and Maven.

[2] **Software Version Control**: Git, GitHub, GitLab, and BitBucket.

[3] **Code Reviews & Continuous Integration:** Gerrit, Travis CI, and GitHub Pull Request.

[4] **Big Data Technologies:** Apache Spark 2.2, Hadoop 2.7, and Yarn cluster.

[5] **Machine Learning & Data Mining:** Gensim, FastText, Word2Vec, WEKA, R, MATLAB, Decision Trees, RandomForest, CART, Logistic Regression, Naive Bayes, Bayes Net, Linear Regression, Resampling, Bagging, Boosting, Stacking, Ensemble Learning, and SHAP framework.

[6] **Deep Learning:** Keras, DeepLearning4J, LSTM, GNN, chatbots, and Jupyter notebook.

[7] **Code Search & Information Retrieval:** Lucene, Indri, Lemur, PageRank, and K-Core.

[8] **Natural Language Processing:** Stanford CoreNLP, Mallet, POS tagging, Sentiment analysis, Term weighting, Text summarization, and Semantic similarity analysis.

[9] **Statistics & Data Modelling:** Probability distributions, Random sampling, Confidence interval, Central tendency, Data centrality, and Statistical significance tests.

[10] **Reporting & Prototyping:** LaTeX, and Pencil.

[11] **Programming Languages:** Java (standard + android), C#, Python, and C/C++.

[12] **Research Collaboration:** Overleaf, Slack, and GitHub Issues.

🕮 TEACHING EXPERIENCE

Over the last 10 years, I taught several courses in three different universities in various capacities.

Dalhousie University

Since September 2020, I have been teaching a third-year undergraduate course in the Faculty of Computer Science. I am responsible for designing course materials, delivering lectures, managing students' projects, conducting exams and assessing their performance.

- Winter 2021: CSCI 3130: Software Engineering (Enrollment: 130 students)
- Fall 2020: CSCI 3130: Software Engineering (Enrollment: 107 students, Teaching effectiveness)

Khulna University

I taught several undergraduate-level courses at Khulna University from 2009 to 2012. I was accounted for course syllabus design, teaching classes, designing questionnaires, conducting exams, evaluating exams, and then publishing the grades. Besides regular classes, I also supervised the software development projects undertaken by the students. While Software Engineering and related courses were of my main interest, I also taught courses on Microprocessors, Computer Programming, and Computer Architectures as follows:

- **Software Engineering** (CSE 3101)

- **Information System Analysis and Design** (CSE 3203)
- **Software Development Projects** I & II (CSE 2200 & CSE 3100)
- Microprocessor and Interfacing (CSE 3111)
- Seminar (CSE 4102)
- Object-Oriented Programming (CSE 1201)
- Computer Programming (CSE 12XX)
- Computer Fundamentals (CSE 1100)

The detailed syllabus of these courses can be found at **the website** of Khulna University.

University of Saskatchewan

Tutorial Leader: I conducted a lecture-style tutorial series on Software Development Life Cycle (**SDLC**) for the course–**CMPT 370: Intermediate Software Engineering**. Each of my tutorial classes consisted of a **formal lecture** and a **hands-on session** where I **took part** with the students in the technical troubleshooting. In this tutorial series, I taught **100+** undergraduate students from the Department of Computer Science, University of Saskatchewan. All the tools and associated lecture-materials were made publicly available at **GitHub** for the students.

Marker: I evaluated the assignments of several undergraduate-level courses at the University of Saskatchewan from 2012 to 2017 as follows:

- CMPT 370: Intermediate Software Engineering (2012, 2013, 2014)
- 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)

The detailed syllabus of these courses can be found at **University of Saskatchewan website**. Please check my **teaching statement** for further details on my teaching philosophy and visions.

ACADEMIC EXCELLENCE

I was always committed to academic excellence throughout my academic career as shown below.

Graduate-Level Courses

I took seven graduate-level courses during my Master and PhD in Computer Science at the University of Saskatchewan and scored an average of **88.71**%. Each of these courses involved multiple assignments, paper reviews, presentations, a term project, and a term paper. Several of my term projects produced publications later, and thus were **included into the MSc and PhD theses** due to their high quality. I scored **90**% in five out of seven courses as follows:

- 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%)

The detailed syllabus of these courses can be found at **the website** of University of Saskatchewan.

Undergraduate-Level Courses

A total of **160** credits were completed during the four years of my Bachelor of **Computer Science and Engineering** at Khulna University. I scored the highest CGPA of **3.91/4.00** among 200+ students from five different departments of the School of Science, Engineering and Technology – Computer Science & Engineering, Electrical & Communication Engineering, Mathematics, Architecture, and Urban & Rural Planning. I was awarded **Chancellor Gold Medal**, the highest academic achievement at the undergraduate-level from any public universities of Bangladesh.

INDUSTRY EXPERIENCE

I have **three** years of professional development experience in the software industry. I worked in various stages of the development process, and gained **first hand experience** in project planning, requirement analysis, client communications, software prototyping, system design, coding, testing, software documentation, and application deployment. Although my initial appointment was junior software developer, I was soon promoted as the **Lead software developer** of the company due to excellence in technical problem solving and analytical ability. I was also awarded the **Service Excellence Award 2010**. I have the following programming and technical skills:

Programming & Problem Solving

- **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 Software & Technologies

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

Professional Software Projects Completed

I completed several professional software projects during my service at NOCHALLENGE TECHNOLOGY LLC from 2009 to 2012. I played the **lead role** in terms of project planning, designing, coding, and technical troubleshooting in a group of 3-5 members. A few of them are as follows:

[1] **[2012] PicIssu**: A web-based software issue tracking system that automatically collects screenshots of issue locations from the UI. It provides a flexible dashboard with various features for issue management and empowers both the clients and the maintenance developers. *Technology*: ASP.net C#, Javascript, JQuery, CSS, DirectXCapture, and MSSQL Server.

[2] **[2010] BizWhack**: An e-commerce application for buying and selling of businesses, real estates and franchises online. It allows a seller to create advertisements for his/her items using site-provided tools. BizWhack also allows the buyers to look for their desired businesses or franchises through an efficient search mechanism. As a full-featured e-commerce application, it supports online payment using Paypal. *Technology*: ASP.net C#, Javascript, JQuery, CSS, Paypal API integration, Google Data APIs, and MSSQL Server.

[3] **[2011] 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.

[4] **[2010] 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 in advanced game planning. *Technology*: ASP .net C#, CSS, Javascript, JQuery and XML.

[5] **[2011] MarketLinkBD:** An accounting software system that manages and automates several tasks of multi-level marketing in Bangladesh. *Technology:* C#, MSSQL, Javascript, Multi-level marketing algorithm.

More details about these completed projects can be found in the company's **portfolio page**.

LEADERSHIP & SERVICES

I served academic, community and professional organizations, and gained experience in **leadership, interpersonal communications, and in executing organizational goals**. To date, I served at the following leadership positions:

[1] **[2018–2019] Webmaster, IEEE Canada North Saskatchewan Chapter**: I served as the webmaster of IEEE Canada North Saskatchewan Chapter. I was accounted for maintaining the organization's website and posting the announcements, newsletters, IEEE events, and their community involvements. I also attended the monthly executive meeting, took part in the discussions and executive decision making. This position not only helped me to learn the internal structures, operational procedures, and noble missions of a world-class professional organization but also improved my **professional networking skills**.

[2] **[2014–2016] Vice President Internal, Computer Science Graduate Course Council**: I served as the VP-Internal for Computer Science Graduate Course Council (CSGCC), University of Saskatchewan, from September 2014 to August 2016. I was accounted for developing and maintaining the council's website, recording meeting minutes, introducing discussion points, conducting the occasional meeting, and for organizing various departmental events for the students (e.g., **ResearchFest**).

[3] **[2010–2012] Student Contest Organizer & Mentor, Khulna University:** I mentored dozens of academic projects undertaken by the students, and organized multiple student contests such as programming contests and gaming contests. In 2010, I led a group of three student projects that won the **third** position among **60+** groups in the prestigious **Innovative Software Contest**.

[4] **[2010–2012] Lead Application System Engineer, NOCHALLENGE TECHNOLOGY LLC**: I led several dot NET based projects of the company for almost two years. I was accounted for project planning and system design, recruiting and training the novice developers, handling client communications, and for making important decisions regarding these professional projects as well as the company.

[5] **[2005–2006] Publication Secretary, CLUSTER, Khulna University**: I served as the publication secretary of CLUSTER, a student organization at Khulna University. I was accounted for **publishing technical periodicals** and maintaining a **notice board** at the Department of Computer Science and Engineering.

[6] **[2002–2003] House Cultural Prefect, JCC**: I served as 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**. I was accounted for the training and rehearsal of the cadets. I also worked as the **liaison** between the cadets and the authority in cultural aspects. More about **JCC**.

[7] **[2004] Leadership Contest Winner, Bangladesh Army:** I passed the Inter-Service Selection Board (ISSB) exam. ISSB exam is the **premier leadership contests** organized by Bangladesh Army for cadet officer recruitment. It comprises of dozens of leadership challenges and crucial/instant decision making. The contest runs for **four** consecutive days. More about **ISSB**.

[8] **[2000] Television Debate Winner:** I along with two other classmates represented Jhenidah Cadet College in a national-level Television Debating Contest and won the debate. Our debate session was telecast in the **national television** of Bangladesh (BTV).

[9] **Professional Membership:** IEEE Student Member (2013–2019), ACM SIGSOFT Member (2017–2019), and **Professional Engineers Institute** of Bangladesh (2012–Current).

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