

# Md Nadim

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Saskatoon, Saskatchewan, S7N 1L7

## OBJECTIVE

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I seek a challenging role to leverage expertise in Python, C/C++, Java, PHP, HTML/CSS, and diverse development environments. Proven proficiency in database management, version control, containerization, web security, and networking. Known for solid problem-solving, effective collaboration using Git and collaboration platforms, and excellent time management in remote work. I am committed to continuous learning and quick adaptation to new tools and technologies.

## EDUCATION

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### Ph.D. in Computer Science

Sept 2020 - Dec 2024 (Expected)

University of Saskatchewan • Saskatoon, Saskatchewan, Canada

- Currently in my 4th Year of Study.
- Average cumulative grades on theoretical courses: 90.33%
- **Python** (NumPy, Pandas, Matplotlib, Seaborn, Scikit-learn, TensorFlow, Flask, Requests, Beautiful Soup, Virtual ENV, SQL Alchemy), **Java**, GitHub Code Repository, Open-Source Software, Bug Repository, etc.
- Researching **Quantum Vs. Classical Machine Learning Algorithms**: Investigating Their Execution, Comparison, and Challenges.
- Utilizing **IBM Quantum Services** and Systems for Experimenting with QML algorithms in Real Quantum Machines and Simulators.

### M.Sc. in Computer Science

Sep 2018 - Aug 2020

University of Saskatchewan • Saskatoon, Saskatchewan, Canada

- Awarded the University of Saskatchewan **Dean's Scholarship** for doing an M.Sc. in Computer Science.
- Achieved 91.50% grades on theoretical courses.
- Completed Thesis: **Investigating the Techniques to Detect and Reduce Bug Inducing Commits During Change Operations in Software Systems.**
- **Technology Learned and Practiced**: Java, Python (Programming Languages), MySQL, Clone Detection Tools, etc.
- **Thesis URL**: <https://harvest.usask.ca/handle/10388/13125>

**B.Sc. in Computer Science & Engineering**

Jan 2006 - Jun 2010

Hajee Mohammad Danesh Science &amp; Technology University • Dinajpur, Bangladesh

- Awarded **Prime Minister Gold Medal (Bangladesh), 2010**, for my academic performance during this period.
- Achieved the **University Grant Commission (UGC) Scholarship, Bangladesh** during this study.
- In each academic year, I got a **Dean's List Award** for my academic excellence in that year.
- Obtained a CGPA of **3.92** out of **4.00**, which is the highest CGPA in the batch.

**THESIS WORKS**

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- **Investigating the Techniques to Detect and Reduce Bug Inducing Commits During Change Operations in Software Systems**, M.Sc. Thesis, **Supervisor:** Chanchal K. Roy, Professor, Department of Computer Science, University of Saskatchewan (USASK), Saskatoon, Canada. **URL:** <https://harvest.usask.ca/handle/10388/13125>
- **Web-Based Library Management System with Efficient Search Technique Indexed by Double Metaphone Algorithm**, B.Sc. Thesis, **Supervisor:** Ashis Kumar Mandal, Associate Professor, Department of Computer Science & Engineering (CSE), HSTU, Dinajpur, Bangladesh.

**SKILLS**

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- **Programming Languages:** Demonstrates proficiency in Python, JavaScript, Java, and C/C++.
- **Quantum Computing:** IBM Qiskit, D-wave Leap Cloud Interface.
- **Web Development:** Possesses skills in front-end technologies (HTML, CSS, JavaScript) and is proficient in back-end development with PHP.
- **Version Control/Git:** Holds experience in Git, showcasing expertise in branching, merging, and pull-requests.
- **Database Management:** Exhibits proficiency in managing SQL Servers, MySQL, and MongoDB.
- **Linux/Unix:** Familiar with command-line operations in Linux/Unix environments, including SSH, SCP, TMUX, Screen, PSFTP, etc.
- Problem-Solving Skills, Time Management, Communication Skills, Self-motivation, Continuous Learning.

**PROJECT COMPLETION**

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|---|------------------------|
| Evaluating the Performance of a <b>D-Wave Quantum Annealing</b> System for Feature Subset Selection in Software Defect Prediction<br>Ph.D. Study • University of Saskatchewan • SK • Canada | May 2024 - August 2024 |
|---|------------------------|

**Short Description:** This study explores the use of quantum annealing (QA) for feature subset selection in software defect prediction. By leveraging the **D-Wave Quantum Processing Unit (QPU)** and a **mutual information-based** filter approach, the researchers aim to enhance the accuracy and efficiency of defect prediction models. It is conducted on datasets from AEEM, JIRA, and NASA projects, showing that

QA-based feature selection significantly reduces the time needed to identify optimal feature subsets compared to classical methods.

**Skills Utilized: Python:** dwave-system, dwave-ocean-sdk, dimod on **D: Wave Leap** Cloud Interface.

**Replication Package:** <https://github.com/mnadims/dwexpCodes.git>

### Comparative Analysis of **Quantum and Classical** Machine Learning Algorithms for Software Bug Prediction: An Exploratory Study

January 2024 - August 2024

Ph.D. Study • University of Saskatchewan • SK • Canada

**Short Description:** The goal of this research project was to investigate the comparative scenario among **Quantum vs. Classical** machine learning (QML vs. ML) algorithms on software bug prediction datasets. This study identifies some challenges in applying QML algorithms with real-world classification problems. Conducted in two phases, in the first phase, we identify general challenges among QML compared to the ML algorithms and then proposes a technique to address the challenge of handling large number of data instances in applying the **Quantum Support Vector Classifier (QSVC)** algorithm.

**Skills Utilized: Python:** IBM Qiskit python libraries and related algorithms.

### Bug Inducing Commit Detection Utilizing Features from Source Code and Machine Learning Models

Jan 2022 - Dec 2022

Ph.D. Study • University of Saskatchewan • SK • Canada

**Short Description:** This study explores Bug Inducing Commit (BIC) and Just in Time (JIT) defect prediction in software development using Machine Learning (ML) models. Existing approaches rely on GitHub Statistics (GS), n-gram-based code text processing, and developer information as feature values. However, these features may not capture developers' syntax preferences. The study introduces a method to extract features from source code syntax patterns for detecting bug proneness. Six manually and two automatically labeled datasets from diverse open-source projects in Java, C++, and Python were used. Results indicate that the proposed features enhance the performance of ML bug detection models, outperforming traditional features and providing better explanatory insights. The study suggests further research for improving software effectiveness through bug identification and resolution during maintenance.

**Source Code** is available at: <https://github.com/mnadims/bicDetectionSF>

**Skills Utilized:** Git • Shell Scripting • Linux • Python (Programming Language) • XML • Git BASH • GitHub • Machine Learning • Deep Learning • Explainable AI • Jupyter Notebook.

**Paper Published:** Springer Journal <https://link.springer.com/article/10.1007/s11219-022-09611-3>

### Leveraging Structural Properties of Source Code Graphs for Just-In-Time Bug Prediction

Jan 2021 - Aug 2022

Ph.D. Study • University of Saskatchewan • SK • Canada

**Short Description:** Data visualization is commonly used to simplify complex information. This study proposes a methodology using Source Code Graphs (SCG) to identify Just-in-Time (JIT) bug predictions in software systems during revisions. SCG, representing source code patches as graphs, incorporates structural properties like density and cycles. Analyzing over 246K software commits from 12 projects in

C++ and Java, the study combines SCG features with conventional ones, showing improved Machine Learning-based buggy commit detection. The increase in F1 Scores is statistically significant, emphasizing the importance of maintaining source code style and structure for bug-free software systems.

**Source Code** is available at: <https://github.com/mnadims/bicDetectionSF>

**Skills Utilized:** Graph Visualization · Feature Extraction · Bash · Python (Programming Language) · GitHub · Machine Learning.

**Paper Published:** Springer Journal <https://link.springer.com/article/10.1007/s10515-022-00326-0>

### Evaluating the performance of clone detection tools in detecting cloned co-change candidates

Jan 2019 - May 2022

M.Sc. Study · University of Saskatchewan · SK · Canada

**Short Description:** This study investigates the significance of detecting cloned co-change candidates and code fragments requiring modification when related fragments are altered during software evolution. Cloned co-change candidates, created by reusing code fragments, are crucial for clone-tracking. Despite studies evaluating clone detection tools, none precisely assess their accuracy in detecting cloned co-change candidates. The study explores this gap, comparing 12 configurations of nine clone detection tools across eight open-source C and Java systems. The results offer insights into selecting and configuring tools for identifying co-change candidates, paving the way for a new dimension in code clone research focused on change impact analysis.

**Skills Utilized:** Cone Detection Tools · Bash Scripts · Java Programming

**Paper Published:** Journal of System and Software

<https://www.sciencedirect.com/science/article/abs/pii/S0164121222000085>

## Certification Courses

- **Graduate Professional Skills Certificate @University of Saskatchewan, SK, Canada**

The Graduate Professional Skills Certificate is a comprehensive, non-credit program for graduate students and postdoctoral researchers at the University of Saskatchewan, SK, Canada. Within this Certificate program, **GPS 974** focuses on strengths-based professional skills development, building reflective practice, and developing a professional portfolio for improving skills and growth.

- **Thinking Critically @University of Saskatchewan, SK, Canada**

The goal of this class is to provide a supportive and challenging setting to develop the creative and critical thinking skills required for professional practice. **GPS 984** focuses on foundational frameworks of thinking (often invisible to us) that are used for almost everything we do in our personal and professional lives.

## Canadian WORK EXPERIENCE (Casual Job & VOLUNTEER WORK)

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### Graduate Teaching Assistant (Casual Job)

Sep 2019 – PRESENT

As a Graduate Student @University of Saskatchewan • Saskatoon, SK, Canada

- **Key responsibilities** include Marking student assignments/ exams as per the grading scheme given by the course instructor and invigilating examinations if required during the mid-term or lab exam.

### Crowd Support (Watch Party) -- Volunteer

Sunday, January 21, 2024

TEDx University of Saskatchewan 2024 • Saskatoon, SK, Canada

- One-day program @ Leslie & Irene Dube Theatre (Rm 1150), E-Wing Health Sciences Building, 107 Wiggins Road, Saskatoon.

### GSA Representative -- Volunteer

Sep 2019 - Aug 2020

Computer Science Graduate Council, University of Saskatchewan • Saskatoon, SK, Canada

- Represent the interests of computer science graduate students in the Graduate Students' Association (GSA) (meetings held monthly).

### Vice President (Internal) -- Volunteer

Sep 2020 - Feb 2021

Computer Science Graduate Council, University of Saskatchewan • Saskatoon, SK, Canada

- Responsible for recording the minutes of meetings of the Council and presenting these for approval at the following meetings of the Council.
- Keep up to date on the CSGCC website.
- Perform the duties of the Treasurer in their absence.

### Volunteer Lead (Data Science Workshop) -- Volunteer

May 2019 - May 2019

DIGITIZED, University of Saskatchewan • Saskatoon, Saskatchewan, Canada

- One-day program.
- Provide support and assistance & escort students and volunteers to and from the workshop locations.

## Bangladesh WORK EXPERIENCE (Full-time job)

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### Computer Science Course Teacher

Feb 2012 - Aug 2018

Hajee Mohammad Danesh Science & Technology University • Dinajpur, Bangladesh

- Teach one or more university subjects related to computer programming and software development for undergraduate students.
- Prepare and deliver lectures to students and conduct laboratory sessions or discussion groups.
- Prepare, administer, and grade examinations, laboratory assignments, and reports.
- Advise students on course and academic matters and career decisions.

- Conduct research in the field of specialization and publish findings in scholarly journals or books.

**Assistant Officer (IT Division)**

Jun 2011 - Jan 2012

Dutch Bangla Bank Limited • Dhaka, Bangladesh

- Design, develop, test, implement, and oversee IT systems.
- Collect, analyze, and summarize data related to mobile banking products.
- Develop, implement, and apply changes to different web services on the company website.

**Lecturer**

Oct 2010 - May 2011

University of Development Alternatives (UODA) • Dhaka, Bangladesh

- Teach one or more university subjects related to computer programming and software development for undergraduate students.
- Prepare and deliver lectures to students and conduct laboratory sessions or discussion groups.
- Advise students on course and academic matters and career decisions.
- Conduct research in the field of specialization and publish findings in scholarly journals or books.

**AWARDS AND HONOURS**

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**Departmental Scholarship (Ph.D.)**

2020

- To complete a Ph.D. in Computer Science between September 2020 to August 2024

**University of Saskatchewan Dean's Scholarship**

2018

- To complete an M.Sc. in Computer Science starting in the Fall of 2018.

**Prime Minister Gold Medal (Bangladesh)**

2010

- As a recognition of my academic performance at the level of B.Sc. in CSE during my undergraduate studies at Hajee Mohammad Danesh Science & Technology University, Dinajpur, Bangladesh.

**RESEARCH PUBLICATIONS**

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- **Md Nadim**, Banani Roy. Utilizing source code syntax patterns to detect bug inducing commits using machine learning models, Published: December 31, 2022, in Software Quality Journal (2022), a Journal of Springer. <https://doi.org/10.1007/s11219-022-09611-3>
- **Md Nadim**, Debajyoti Mondal, and Chanchal K. Roy. Leveraging structural properties of source code graphs for just-in-time bug prediction. Journal Publication on Automated Software Engineering, an International Journal of Springer. vol-29, issue-01 pp. 27-57.

<https://doi.org/10.1007/s10515-022-00326-0>

- **Md Nadim**, Manishankar Mondal, Chanchal K. Roy, Kevin A. Schneider. Evaluating the Performance of Clone Detection Tools in Detecting Cloned Co-change Candidates, the Journal of Systems & Software (**JSS**). <https://doi.org/10.1016/j.jss.2022.111229>
- **Md Nadim**, Manishankar Mondal, Chanchal K. Roy, "Evaluating Performance of Clone Detection Tools in Detecting Cloned Co-change Candidates", the 14th International Workshop on Software Clones (IWSC), 2020, 7pp. (Presented: February 18, 2020).
- Shahnaj Parvin Shathi, Md. Delowar Hossain, **Md Nadim**, Sayed Golam Rasul Riaydh, and Tangina Sultana, "Enhancing Performance of Naïve Bayes in Text Classification by Introducing an Extra Weight using less Number of Training Examples", In Proc. of the IWCI, held on 12-13 December 2016. URL: <https://ieeexplore.ieee.org/document/7860355>
- Ashis Kumar Mandal, Md. Delowar Hossain, **Md. Nadim**, "Developing an Efficient Search Suggestion Generator, Ignoring Spelling Error for High-Speed Data Retrieval Using Double Metaphone Algorithm", In Proc. of the 13th ICCIT, held on 23-25 December 2010, AUST, Dhaka, Bangladesh, Publisher: IEEE, Paper ID: p811. Presenter: I presented this paper at the conference. <https://ieeexplore.ieee.org/document/5723876>

## REFERENCE

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