Junayed Mahmud

L3Harris Engineering Center, HEC 249, Orlando, FL, 32816
✉ junayed.mahmud@ucf.edu 📞+1 (571) 595-2727 🌐 jmahmud47.github.io
Google scholar in www.linkedin.com/in/junayed-mahmud/

EDUCATION

University of Central Florida, Florida, USA

Ph.D. in Computer Science   Jun 2025 (Expected)
- Advisor: Dr. Kevin Moran
- Studied Ph.D. in Computer Science at George Mason University from Aug 2019 to Aug 2023
- Dissertation: Multimodal Learning for Automated Bug Report Management
- CGPA: 4.00 (out of 4.00)

George Mason University, Virginia, USA

M.S. in Computer Science   May 2023
- Advisor: Dr. Kevin Moran
- CGPA: 3.98 (out of 4.00)

Islamic University of Technology, Dhaka, Bangladesh

B.S. in Computer Science and Engineering   Nov 2016
- Advisor: Dr. Abu Raihan Mostofa Kamal
- CGPA: 3.49 (out of 4.00)

WORK EXPERIENCE

University of Central Florida, Florida, USA
- *Graduate Research Assistant*   Aug 2023 – Present
  - Utilized Large language models (LLMs) for graphical user interface *(GUI)-based program repair*
  - *Assessed bug reproduction steps* by mapping to the GUI elements utilizing LLMs and program analysis to provide feedback to bug reporters so that they can rewrite the steps if necessary
  - Utilized LLMs for *automatically generating assertions* to validate the existence of diverse types of reported failures (i.e., crash and non-crash) in Android applications to aid in regression testing
  - Addressed the limitations of code-to-comment-translation models and *generated improved software documentation* using transformer-based models and contrastive learning

George Mason University, Virginia, USA
- *Graduate Research Assistant*   May 2021 – Aug 2023
  - Improved *text-retrieval-based bug localization* by leveraging GUI interaction data to mitigate the semantic gap between information in bug reports and code
  - Developed a *program analysis* tool that converts user-performed app actions into replayable scenarios and extracts detailed GUI information for automated testing and debugging
  - Built a *chatbot for bug reporting* to improve report quality and studied the usability of the tool
  - Analyzed the *characteristics of diverse types of reproducible bug reports* to build effective automated techniques for different bug report management activities
  - Generated *automated software documentation* using visual software data encoded in GUIs by fine-tuning neural image captioning models
  - Characterized the *shortcomings of code-to-comment-translation models* without relying on existing reference-based metrics in order to address the shortcomings in developing new models
- *Graduate Teaching Assistant*   Aug 2019 – May 2021
  - Assisted in the following courses: CS367 (Computer Systems and Programming) and CS222 (Computer Programming for Engineers)

Samsung R&D Institute Bangladesh Ltd., Dhaka, Bangladesh
- *Software Engineer*   Jan 2017 – Mar 2019
  - Worked in an iOS application named SmartThings, designed to enable users to monitor and control smart electronic devices or appliances through their phones
  - Worked on developing the IoTivity architecture, which enables seamless communication between cloud services and consumer electronics devices
  - Developed multiple GUIs for the SmartThings project

RESEARCH INTERESTS	**Software Engineering**, Bug Reporting, Bug Localization, Program Repair, Automated Mobile Testing, Natural Language Processing for Software Engineering, Source Code Analysis

REFERRED CONFERENCE PUBLICATIONS

C7. [ICPC'25] **J. Mahmud**, A. Saha, O. Chaparro, K. Moran, and A. Marcus, "Combining Language and App UI Analysis for the Automated Assessment of Bug Reproduction Steps," in *Proceedings of the 33rd IEEE/ACM International Conference on Program Comprehension*, Ottawa, Canada, Apr 2025, pp. to appear in 12 pages. (*41% acceptance rate*)

C6. [ISSTA'24] A. Saha, Y. Song, **J. Mahmud**, Y. Zhou, K. Moran, and O. Chaparro, "Toward the Automated Localization of Buggy Mobile App UIs from Bug Descriptions," in *Proceedings of the 33rd ACM SIGSOFT International Symposium on Software Testing and Analysis*, Vienna, Austria, Sep 2024, pp. 1249-1261. (*21% acceptance rate*)

C5[*]. [ICSE'24] **J. Mahmud**, N. D. Silva, S. A. Khan, S. H. Mostafavi, S. M. H. Mansur, O. Chaparro, A. Marcus, and K. Moran, "On Using GUI Interaction Data to Improve Text Retrieval-based Bug Localization[*]," in *Proceedings of the 46th IEEE/ACM International Conference on Software Engineering*, Lisbon, Portugal, Apr 2024, pp. 1-13. (*7% acceptance rate*)

C4. [MSR'24] K. Baral, J. Johnson, **J. Mahmud**, S. Salma, M. Fazzini, J. Rubin, J. Offutt, and K. Moran, "Automating GUI-based Test Oracles for Mobile Apps," in *Proceedings of the 21st International Conference on Mining Software Repositories*, Lisbon, Portugal, Apr 2024, pp. 309-321. (*29% acceptance rate*)

C3[*]. [ESEC/FSE'22] Y. Song, **J. Mahmud**, Y. Zhou, O. Chaparro, K. Moran, A. Marcus, and D. Poshyvanyk, "Toward Interactive Bug Reporting for (Android App) End Users[*]," in *Proceedings of the 2022 ACM Joint European Software Engineering Conference and Symposium on the Foundations of Software Engineering*, Singapore, Nov 2022, pp. 344-356. (*22% acceptance rate*)

C2. [SANER'22] J. Johnson, **J. Mahmud**, T. Wendland, K. Moran, J. Rubin and M. Fazzini, "An Empirical Investigation into the Reproduction of Bug Reports for Android Apps," in *Proceedings of the 29th IEEE International Conference on Software Analysis, Evolution and Reengineering*, Honolulu, Hawaii, Mar 2022, pp. 321-332. (*24% acceptance rate*)

C1. [SANER'22] K. Moran, A. Yachnes, G. Purnell, **J. Mahmud**, M. Tufano, C. B. Cardenas, D. Poshyvanyk, and Z. H'Doubler, "An Empirical Investigation into the Use of Image Captioning for Automated Software Documentation," in *Proceedings of the 29th IEEE International Conference on Software Analysis, Evolution and Reengineering*, Honolulu, Hawaii, Mar 2022, pp. 514-525. (*24% acceptance rate*)

REFERRED SHORT CONFERENCE & WORKSHOP PUBLICATIONS

S5. [ICSE'24] **J. Mahmud**, "Toward Rapid Bug Resolution for Android Apps," in *Proceedings of the 46th IEEE/ACM International Conference on Software Engineering*, Doctoral Symposium Track, Lisbon, Portugal, Apr 2024, pp. 237-241. (*57% acceptance rate*)

S4. [ICSE'23] Y. Song, **J. Mahmud**, N. D. Silva, Y. Zhou, O. Chaparro, K. Moran, A. Marcus, and D. Poshyvanyk, "BURT: A Chatbot for Interactive Bug Reporting," in *Proceedings of the 45th IEEE/ACM International Conference on Software Engineering*, Formal Tool Demonstrations Track, Melbourne, Australia, May 2023, pp. 170-174. (*48% acceptance rate*)

S3. [NLP4Prog'21] **J. Mahmud**, F. Faisal, R. I. Arnob, A. Anastasopoulos, and K. Moran, "Code to Comment Translation: A Comparative Study on Model Effectiveness & Errors," in *Proceedings of the First Workshop on Natural Language Processing for Programming*, Co-located with ACL-IJCNLP'21, Bangkok, Thailand, Aug 2021, pp. 1-16.

S2. [MSR'21] T. Wendland, J. Sun, **J. Mahmud**, S. M. H. Mansur, S. Huang, K. Moran, J. Rubin and M. Fazzini, "AndroR2: A Dataset of Manually-Reproduced Bug Reports for Android Apps," in *Proceedings of the 18th Conference on Mining Software Repositories*, Data showcase track, Madrid, Spain, May 2021, pp. 600-604.

S1. [SAS'18] A. R. Chowdhury, **J. Mahmud**, A. R. M. Kamal, and M. A. Hamid, "MAES: Modified Advanced Encryption Standard for Resource Constraint Environments," in *Proceedings of the 2018 IEEE Sensors Applications Symposium*, Seoul, Korea (South), Mar 2018, pp. 1–6.

---

[*]Top tier publications

TALKS & FORMAL PRESENTATIONS	■ **Research Paper Presentation** - Software Engineering Seminar, University of Central Florida, Florida, USA Feb 10, 2025

TALKS & FORMAL PRESENTATIONS

- **Research Paper Presentation** - Software Engineering Seminar, University of Central Florida, Florida, USA   Feb 10, 2025
  - "Combining Language and App UI Analysis for the Automated Assessment of Bug Reproduction Steps"
- **Dissertation Proposal Presentation** - University of Central Florida, Florida, USA   Dec 04, 2024
  - "Multimodal Learning for Automated Bug Report Management"
- **Research Paper Presentation** - Software Engineering Seminar, University of Central Florida, Florida, USA   Mar 27, 2024
  - "On Using GUI Interaction Data to Improve Text Retrieval-based Bug Localization"
- **Research Paper Presentation** - Software Engineering Class (CEN 5016), University of Central Florida, Florida, USA   Mar 7, 2024
  - "Code to Comment Translation: A Comparative Study on Model Effectiveness & Errors"
- **Comprehensive Exam Presentation** - George Mason University, Virginia, USA   Apr 29, 2022
  - "Automating Bug Report Management: A Survey"
- **Invited Seminar Talk** - Microsoft Research, Virtual   Apr 20, 2022
  - "Automated Software Documentation: A Brief Retrospective & Future Directions"
- **Research Paper Presentation** - Proceedings of the 29th IEEE International Conference on Software Analysis, Evolution and Reengineering (SANER'22), Virtual (originally Honolulu, Hawaii)   Mar 16, 2022
  - "An Empirical Investigation into the Use of Image Captioning for Automated Software Documentation"
- **Research Paper Presentation** - Software Engineering Seminar, George Mason University, Virginia, USA   Nov 11, 2021
  - "Code to Comment Translation: A Comparative Study on Model Effectiveness & Errors"
- **Research Paper Presentation** - Proceedings of the First Workshop on Natural Language Processing for Programming (NLP4Prog'21), Co-located with ACL-IJCNLP'21, Virtual (originally Bangkok, Thailand)   Aug 06, 2021
  - "Code to Comment Translation: A Comparative Study on Model Effectiveness & Errors"

PROFESSIONAL SERVICES

External Reviewer

- 47th IEEE/ACM International Conference on Software Engineering (ICSE'25)
- 37th IEEE/ACM International Conference on Automated Software Engineering (ASE'22)
- 29th IEEE International Conference on Software Analysis, Evolution and Reengineering (SANER'22)
- 29th IEEE/ACM International Conference on Program Comprehension (ICPC'21)
- 2021 Mining Software Repositories (MSR'21)

TECHNICAL SKILLS

- Programming Languages: Python, Java, C, C++, Swift, Objective C, Perl, Shell Scripting, Kotlin, JavaScript, R, MATLAB, PHP, HTML
- Machine/Deep Learning Frameworks and Tools: LangChain, Pytorch, Tensorflow
- Python Scientific Stack: Numpy, Pandas, Scipy, Jupyter
- Version Control and Containerization: Git, GitHub, Docker
- Software Development Frameworks and Tools: Visual Studio Code, Android Studio, Xcode, Spring, AngularJS, Hibernate, Bootstrap, NodeJS, Unity
- Mobile Development Platforms: Android, iOS
- Databases/SQL: Oracle, MySQL, PostgreSQL

SELECTED PROJECTS

Utilizing GUIs for Identifying Android Bugs in Code | Paper | Code | Dataset |

This project aims to identify bugs in code in Android platform utilizing information from graphical user interfaces (GUIs). We adapted two text-retrieval (TR)-based and two neural text embedding approaches. Our study outperformed existing approaches by a marked increase in Hits@10 of 13-18%.

Assessing the Quality of Bug Reproduction Steps Code

This project assesses the quality of the bug reproduction steps on Github by mapping information to GUIs. For analyzing bug reports and mapping steps to GUIs, we integrated GPT-4 using langchain framework. Our approach annotates bug reproduction steps 25.2% better (in terms of F1 score) than the state-of-the-art.

Evaluating Language Models for Code Paper Code

This project automatically generated comments from Java methods using language models. We quantitatively and qualitatively evaluated the limitations of existing machine translation metrics and proposed a taxonomy of errors.

HONORS & AWARDS	

- Outstanding Graduate Creative Work Award — Jan 2024
- Summer Research Initiation Award — May 2020
- Professional level programmer at Samsung Electronics — Jan 2018
- Icon of the month at Samsung R&D Institute Bangladesh Ltd. — Apr 2018
- Received 4 years of OIC scholarship — 2012
- Received 4 years of government scholarship for Higher Secondary Certificate result — 2012

STUDENT MENTORSHIP

Undergraduate Mentees (via University of Central Florida's Software Engineering Project)

- Terry Achille, University of Central Florida — Fall 2024 – Spring 2025
- Darren Basil, University of Central Florida — Fall 2024 – Spring 2025
- Camilo Alvarez-Velez, University of Central Florida — Fall 2024 – Spring 2025
- James Chen, University of Central Florida — Fall 2024 – Spring 2025
- Patrick Ijieh, University of Central Florida — Fall 2024 – Spring 2025
- Samar Karanch, University of Central Florida — Fall 2024 – Spring 2025

High School Mentees (via George Mason University's Aspiring Scientists Summer Internship Program)

- Alyssa McGowan, Thomas Jefferson High School of Science & Technology — Summer 2023

REFERENCES

Assistant Professor Kevin Moran
Department of Computer Science
University of Central Florida
Room 217A, L3Harris Engineering Center
Orlando, FL 32816, USA
Email: kpmoran@ucf.edu
Phone: (703)-993-6826

Assistant Professor Oscar Chaparro
Department of Computer Science
College of William and Mary
McGlothlin-Street Hall 311, 251 Jamestown Rd.
Williamsburg, VA 23185, USA
Email: oscarch@wm.edu
Phone: (757)-221-2144

Professor Andrian Marcus
Department of Computer Science
George Mason University
Room 4452, Nguyen Engineering Building
Fairfax, VA 22030, USA
Email: amarcus7@gmu.edu
Phone: (703)-993-9237