Rrezarta Krasniqi

EDUCATION University of North Texas Denton, TX Exploring the Software Quality Maze: Detecting Scattered and Tangled Crosscutting DISSERTATION: Quality Concerns in Source Code in Support of Maintenance and Evolution Tasks ADVISOR: Hyunsook Do THESIS: Detecting Emerging Quality-Related Concerns across Evolving Software Artifacts Advisor: Gregory Madey M.S., in Computer Science MAY 2010 RESEARCH INTERESTS Software Engineering, Requirements Engineering, Software Quality, Software Maintenance and Evolution, Natural Language Processing, Information Retrieval, Applied Machine Learning, Empirical Methodologies NOTABLE AWARDS Research and Education Grants [1]. Doctoral Research Support Grant, The Toulouse Graduate School, University of North Texas (\$500) 2023 **Travel Grants**

[3].	TGS Travel Grant, The Toulouse Graduate School, University of North Texas (\$400)
[4].	$GHC\ Travel\ Grant,\ UNT\ Department\ of\ Computer\ Science\ and\ Engineering\ (\$1,500)\ \dots 2022$
[5].	$COMPSAC\ Travel\ Grant,\ UND\ Department\ of\ Computer\ Science\ and\ Engineering\ (\$790)\ \dots 2021$
[6].	$\mathit{CRA-WP}$ Travel Grant, Grad Cohort Workshop on Widening Participation (\$1,500)
[7].	${\it IDEALS~Travel~Grant}, {\it Grad~Cohort~Workshop} (\$1,500) \dots \dots 2020$
[8].	$\mathit{CRA-W}$ Travel Grant, Grad Cohort Workshop for Women (\$1,500)
Hor	nors and Awards
[1].	Best Poster Award, CMD-IT/ACM Richard Tapia Conference (\$500)
[2].	NCWIT Collegiate Award (finalist) (\$150)
[3].	Tuition Benefit Program Award, University of North Texas (\$20,318)
[4].	College of Engineering Department Award, University of North Texas (\$3,160)
[5].	Graduate Student Success Award, University of North Texas (\$500)
[6].	Invitation to EMSE Journal, SANER'21 Special Issue for Top Papers $C_{[3]}$
[7].	GHC-Virtual, UNT Department of Computer Science and Engineering (\$200)
[8].	3MT Doctoral Competition-People's Choice Award, University of North Texas (\$250)
[9].	Excellence Award, Ministry of Science, Education ans Technology, Kosovo (\$2,000)
[10]	. Certificate of Appreciation, Midwestern State University
[11]	Outstanding Graduate Woman, Midwestern State University
Sch	plarships and Fellowships
[1].	Graduate Teaching Assistantship, University of North Texas (\$25,356)
[2].	Teaching Fellow Scholarship, University of North Texas (\$1,000)
[3].	$\label{eq:Richard Tapia Scholarship} Richard \ Tapia \ Conference, \ Dallas, \ TX \ (\$1,500) \ \dots \ 2023$
[4].	Google Lime Scholarship, Lime Connect and Google (semi-finalist)
[5].	Graduate Research Assistantship, University of Notre Dame (\$55, 308)
[6].	$\textit{Jenkins & Roy Smith Scholarship}, \ \text{Midwestern State University (\$1,500)} \ \dots \ \dots \ 2009$
[7].	$McCoy\ School\ of\ Engineering\ Scholarship,$ Midwestern State University (\$1,000)
[8].	Tom C. White Scholarship, Midwestern State University (\$1,500)
[9].	Graduate Teaching Assistantship, Midwestern State University (\$17,240)

PUBLICATIONS

(ORCiD ID: 0000-0001-6884-6131)

Referred Journal Articles

[1]. Krasniqi, R., Do, H., "A Multi-Model Framework for Semantically Enhancing Detection of Quality-Related Bug Report Descriptions," Empirical Software Engineering (EMSE'23), 28, 1-62 pages, 2023. (2 Invitation for a Special Issue for Top Best Papers of SANER 2021).

- [2]. Krasniqi, R., Do, H., "Towards Semantically Enhanced Detection of Emerging Quality-Related Concerns in the Source Code," Software Quality Journal (SQJ'23), 1-51 pages, 2023.
- [3]. Aljedaani, W., <u>Krasniqi R.</u>, Aljedaani S., Mkouer M., Ludi, S., Al-Radadah K., "If Online Learning Works for You, What about Deaf Students?," Universal Access in the Information Society (UAIS'22), 1-20, 2022.

Peer-Reviewed Conference Publications (Full Papers)

- [1]. Krasniqi, R., Do, H., "A Hierarchical Topical Modeling Approach for Recommending Repair of Quality Bugs,"

 Proceedings of the 30th IEEE International Conference on Software Analysis, Evolution and Reengineering

 (SANER'23), Macao SAR, China, March 21-24, 2023.
- [2]. Krasniqi, R., Do, H., "Automatically Capturing Quality-Related Concerns in Bug Report Descriptions for Efficient Bug Triaging," Proceedings of the 23rd International Conference on Evaluation and Assessment in Software Engineering (EASE'22), Research Track, Gothenburg, Sweden, June 13-15, 2022.
- [3]. Krasniqi, R., Agrawal A., "Analyzing and Detecting Emerging Quality-Related Concerns across OSS Defect Report Summaries," Proceedings of the 28th IEEE International Conference on Software Analysis, Evolution and Reengineering (SANER'21), Honolulu, HI, March 9-12, 2021.
- [4]. Krasniqi, R., "Recommending Bug-fixing Comments from Issue Tracking Discussions in Support of Bug Repair," Proceedings of the 45th IEEE Annual Computers, Software, and Applications Conference (COMP-SAC'21), Madrid, Spain, July 12-16, 2021.
- [5]. Stringfellow, C., Simpson, R., Enloe, K., <u>Krasniqi, R., Ngo, T., Keown, R., Hood, J., "Solving T-Joint Problem in Reconstructing 2-D Objects," Proceedings of International Conference on Image Theory and Applications (IPTA'10), Angers, France, May 17-21, 2010.</u>

Peer-Reviewed Conference Publications (Short Papers)

- [1]. Krasniqi, R., Do, H., "Capturing Contextual Relationships of Buggy Classes for Detecting Quality-Related Bugs," Proceedings of the 39th IEEE International Conference on Software Maintenance and Evolution (ICSME'23), NIER Track, Bogota, Colombia, October 1-6 2023.
- [2]. Krasniqi, R., "Detecting Scattered and Tangled Quality Concerns in Code to Aid Maintenance and Evolution Tasks," Proceedings of the 45th IEEE/ACM International Conference on Software Engineering (ICSE'23), Doctoral Symposium Track, Melbourne, Australia, May 14-20, 2023.
- [3]. Krasniqi, R., Cleland-Huang, J., "Enhancing Source Code Refactoring Detection with Explanations from Commit Messages," Proceedings of the 27th IEEE International Conference on Software Analysis, Evolution and Reengineering (SANER'20), ERA Track, London, ON, February 18-21, 2020.
- [4]. Krasniqi, R., McMillan, C., "TraceLab Components for Generating Speech Act Types in Developer Question/Answer Conversations," *Proceedings of the 34th IEEE International Conference on Software Maintenance and Evolution (ICSME'18)*, Artifacts Track, Madrid, Spain, September 23-29, 2018.
- [5]. Krasniqi, R., Jiang, S., McMillan, C., "TraceLab Components for Generating Extractive Summaries of User Stories," Proceedings of the 33rd IEEE International Conference on Software Maintenance and Evolution (ICSME'17), Artifacts Track, Shanghai, China, September 17-24, 2017.

Peer-Reviewed Workshop Publications

- [1]. Krasniqi, R., Do, H., "Generalizability of NLP-based Models for Modern Software Development Cross-Domain Environments," Proceedings of the 2nd IEEE International Workshop on Natural Language-based Software Engineering (NLPBSE'23), co-located with ICSE, Melbourne, Australia, May 14-20, 2023.
- [2]. Krasniqi, R., "Extractive Summarization of Related Bug-fixing Comments in Support of Bug Repair," Proceedings of the 2nd IEEE International Workshop on Automated Program Repair (APR'21), co-located with ICSE, Madrid, Spain, June 1, 2021.

Poster Presentations

- [1]. Krasniqi, R., "Extracting Crosscutting Comment Discussions from Issue Tracking Systems in Support of Bug Repair," Presented at the CMD-IT/ACM Richard Tapia Conference, Gaylord Texan Resort & Convention, Grapevine, TX, Sept 13, 2023. (Best Poster Award)
- [2]. Krasniqi, R., "Leveraging Feature Selection Models for Effective Triaging of Quality Bugs," Presented at the UNT Engineering Research Showcase Competition, Denton, TX, Mar 30, 2023.
- [3]. Krasniqi, R., "A Context-Aware Detection of Quality Concerns for Enhancing Explainability of Systems," Presented at the Federation Graduate Student Research Symposium, Denton, TX, Apr 22, 2022.
- [4]. Krasniqi, R., "Towards Semantic-Based Detection of Crosscutting Software Quality Concerns across Codebase," Presented at the UNT Engineering Research Showcase Competition, Denton, TX, Apr 14, 2022.
- [5]. Krasniqi R., "Extractive Summarization of Related Bug-fixing Comments in Support of Bug Repair," Poster presented at the Grad Cohort Track (CRA-WP), New Orleans, LA, Apr 24, 2021.
- [6]. Krasniqi R., "Enhancing Code Refactoring Detection with Explanations from Commit Messages," Poster presented at the Grad Cohort Track (CRA-IDEALS), Austin, TX, Mar 6, 2020.

THESIS AND DISSERTATION

Krasniqi, R., "Detecting Emerging Quality-Related Concerns Across Evolving Software Artifacts," MS Thesis, University of Notre Dame, November 2020. [Public Source]

RESEARCH EXPERIENCE

RESEARCH ASSISTANT, University of North Texas JAN'21-PRESENT

Department of Computer Science and Engineering Denton, TX

AUTOMATED UNTANGLING OF QUALITY CONCERNS FROM THE SOURCE CODE CHANGESETS: Developed an automated approach using ML-based unsupervised techniques and program analysis techniques to untangle quality-related changesets from complex dependencies they form when interacting with functional aspect of the code.

SEMANTICALLY ENHANCING DETECTION OF CROSSCUTTING QUALITY CONCERNS IN THE SOURCE CODE: Developed an approach for extracting quality concerns from source code using a comprehensive three-pronged technique. This involved integrating various NLP-based techniques, including a graph-based model (TextRank), a statistical-based model (TF-IDF), and a feature-based model (Yake), to generate summaries of code segments pertaining to quality concerns.

A MULTI-MODEL FRAMEWORK FOR ENHANCING DETECTION OF QUALITY BUG REPORT DESCRIPTIONS: Developed a multi-model approach that efficiently captures lexical, shallow, and semantic features from concise bug report descriptions. By leveraging the augmented BERT model and triplet augmentation, this technique automates the detection of quality concerns. These concerns align with the FURPS and ISO standard categories.

HIERARCHICAL CLUSTERING OF QUALITY CONCERNS AND CONTEXT-AWARE FIXING OF QUALITY BUGS: Developed a probabilistic approach to detect hidden semantic structures of quality-related concerns in source code for bug repair. Applied Hierarchical Dirichlet Process (HDP) to capture scattered quality concerns and aggregated them into a meaningful hierarchy, revealing candidate classes for quality bug repair.

AUTOMATICALLY CAPTURING QUALITY CONCERNS IN BUG REPORTS FOR EFFICIENT BUG TRIAGING: Developed a quality-based classifier using feature selection techniques, including TF-IDF, Chi-Square (χ^2), Mutual Information, and Extra Randomized Trees. This classifier incorporates various machine learning algorithms to efficiently triage quality bugs, ensuring effective identification and prioritization.

TOWARDS SYSTEMATIC INTEGRATION OF TEAM VOCABULARY FOR DEMARCATING REQUIREMENTS: I conducted an empirical case study involving senior undergraduate students, focusing on exploring the vocabularies developed by teams during maintenance tasks associated with quality concerns.

CHALLENGES AND PERCEPTIONS IN EXPLORING QUALITY CONCERNS DURING SOFTWARE DEVELOPMENT: Conducted a comprehensive survey study comprising 58 questions to reveal both common and unique challenges faced during the tasks of searching, understanding, and maintaining quality concerns.

ANALYSIS AND DETECTION OF EMERGING QUALITY-RELATED CONCERNS IN DEFECT REPORTS: Developed a classifier that extracts lexical, shallow, and semantic features from bug reports to detect quality concerns. Additionally, annotated 5,400 bug reports according to the FURPS quality model and the ISO 25010 standard. I also, incorporated a visualization mechanism to tag and map quality-related concerns in the codebase.

EXTRACTIVE CODE SUMMARIZATION FOR RECOMMENDING BUG REPAIR: Developed a tool referred to as RetroRank, a GUI-based extractive summarization tool that recommends bug-fixing comments from discussion threads of previously fixed bugs to address unresolved bugs. RetroRank recommends bug-fixing comments based on user query relevance, positive language (sentiment analysis), and semantic relevance among comments.

ENHANCING SOURCE CODE REFACTORING DETECTION WITH EXPLANATIONS FROM COMMIT MESSAGES: Developed a technique that enhances code refactoring by augmenting contextual information from code commits and source code. This augmentation enhance the completeness of refactoring detection and provides refactoring rationales generated from commit messages.

TRACELAB ARTIFACTS FOR REPRODUCING EMPIRICAL SOFTWARE ENGINEERING RESEARCH: Built TraceLab artifacts to improve software traceability across software engineering tasks. Developed reproducibility packages for generating extractive summaries for user stories and speech act types in developer question/answer conversations. Both artifacts are not only reusable but also easy to modify, so that future researchers can further improve them.

T-Joint Problem in Reconstructing 2D Objects: Participated in an automatic 2D jigsaw puzzle reconstruction project for reassembling archaeological fragments with T-Joint pieces. Developed a corner point detection algorithm for matching and reassembling archaeological fragments. Translated existing MatLab code to C# code and improved the thinning algorithm for increased efficiency.

TEACHING EXPERIENCE

CSCE5933-Topics in Computer Science and Engineering, Spring 2023 | Class Size: 9 | Student Responses: 7 Teaching Effectiveness: 4.8/5.0 | Overall Quality: 4.7/5.0 | Difficulty: 5.8/7.0 |

CSCE4357–Database Systems Security, Spring 2023 | Class Size: 5 | Student Responses: 5

Teaching Effectiveness: $4.8/5.0 \mid Overall \ Quality: \ 4.7/5.0 \mid Difficulty: \ 5.8/7.0 \mid$

CSCE3444–Software Engineering, Fall 2022 | Class Size: 10 | Student Responses: 3 Teaching Effectiveness: 5.0/5.0 | Overall Quality: 4.6/5.0 | Difficulty: 4.3/7.0 |

CSCE5320-Scientific Data Visualization, Spring 2024 | Class Size: 90

CSCE5430–Software Engineering, Fall 2023 | Class Size: 130

CSCE5460–Software Testing and Empirical Methodologies, Spring 2022 | Class Size: 28

CSCE5200-Information Retrieval and Web Search, Summer 2022 | Class Size: 66

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CSCE5430-Software Engineering, Fall 2021 | Class Size: 182
CSCE3444–Software Engineering, Summer 2021 | Class Size: 74
CSCE4901-Software Development Capstone I, Spring 2021 | Class Size: 86
CSE40793–Software Development Practices, Fall 2020 | Class Size: 44
CSE40793-Principles and Practices of Software Development, Fall 2019 | Class Size: 48
Department of Computer Science ...... Lubbock, TX
CS3383-Theory of Automata, Summer 2016 | Class Size: 12
CS3361-Concepts of Programming Languages, Spring 2016 | Class Size: 32
CS4352-Operating Systems, Spring 2016 | Class Size: 46
CS2413-Data Structures (C Programming), Spring 2016 | Class Size: 31
CS2413-Data Structures (C++ Programming), Fall 2015 | Class Size: 36
GR18FZ-GRE and GMAT Preparatory Exam, Summer 2015 | Class Size: 20–30
RM28FZ-Remedial Math, Summer 2015 | Class Size: 20–30
DS18FZ-Discovery, Summer 2015 | Class Size: 20-30
MATH1634-Calculus I, Fall 2008 | Class Size: 28
MATH2534-Calculus III, Fall 2008 | Class Size: 20
MATH3433-Differential Equations, Spring 2008 | Class Size: 28
CMPS1033-Computing for Science Majors, Spring 2007 | Class Size: 36
CMPS1013-Computer Concepts and Applications, Spring 2007 | Class Size: 32
HIGH SCHOOL MATH AND COMPUTER SCIENCE TEACHER, American School of Kosova .......Oct'06-Jun'07
Algebra II and Advanced Algebra II, Fall 2006 | Class Size: 32–42
Introduction to Computer Science, Fall 2006 | Class Size: 20–34
Web Design and Computer Applications Fall 2006 | Class Size: 20–34
Mathematics Division Ferizaj, Kosovo
Calculus I and Calculus II, Fall 2005 | Class Size: 30–38
Geometry I and Geometry II, Fall 2005 | Class Size: 30–38
Linear Algebra, Spring 2006 | Class Size: 30–38
Statistics and Theory of Probability, Spring 2006 | Class Size: 30–38
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Guest Lectures

	CSCE3444–Software Engineering, "Refactoring of Object-Oriented Code and Detection of Code Smells," $University\ of\ North\ Texas$, Department of Computer Science and EngineeringJul 14^{TH} , 2021
	CSCE3444–Software Engineering, "Software Evolution and Maintenance–A Developer's Mindset," $University\ of\ North\ Texas$, Department of Computer Science and EngineeringJul $12^{\text{TH}},\ 2021$
	CSCE3444–Software Engineering, "The Interplay between Functional and NFRs in Agile Projects," $University\ of\ North\ Texas$, Department of Computer Science and EngineeringJun 14^{TH} , 2021
	CSE40793–Software Development Practices, "Learning Code Smells for Leveling Up Code Quality," $University\ of\ Notre\ Dame$, Department of Computer Science and EngineeringNov $6^{\text{TH}},\ 2020$
	CSE40793–Software Development Practices, "The Model–Driven Testing and Design Processes," $University\ of\ Notre\ Dame$, Computer Science and EngineeringOCT 27^{TH} , 2020
	CS4365—Software Engineering II, "Introduction to Software Testing: Graph—Based Coverage Criteria," Texas Tech University, Department of Computer Science
	CS4365—Software Engineering II, "Introduction to Software Testing: Software Testing Terminology," $Texas\ Tech\ University$, Department of Computer Science
C	CONFERENCE TALKS
	$\frac{\text{Krasniqi R., "Capturing Contextual Relationships of Buggy Classes for Detecting Quality-Related Bugs"}}{(\text{ICSME}, NIER Track), Bogota, Columbia$
	$\frac{\text{Krasniqi, R.,}}{\text{(ICSE, Doctoral Track), Melbourne, Australia}} \\ \text{(ICSE, Doctoral Track), Melbourne, Australia} \\ \dots \\ \text{(May } 16^{th}, 2023$
	Krasniqi R., "Hierarchical Topical Modeling Approach for Recommending Repair of Quality Bugs" (SANER, Research Track), MACAO SAR, CHINA
	$\frac{\text{Krasniqi, R.,}}{(\text{NLPBSE, Workshop Track}), \text{ Melbourne, Australia}} \\ \frac{\text{Krasniqi, R.,}}{(\text{NLPBSE, Workshop Track}), \text{ Melbourne, Australia}} \\ \frac{\text{Modern Software Development Cross-Domain Environments}}{(\text{NLPBSE, Workshop Track}), \text{ Melbourne, Australia}} \\ \frac{\text{NLPBSE, Workshop Track}}{(\text{NLPBSE, Workshop Track})} \\ \frac{\text{May } 20^{th}}{(\text{NLPBSE, Workshop Track})} \\ \frac{\text{May } 20^$
	$\frac{\text{Krasniqi R.,}}{(\text{EASE, Research Track}), \text{G\"{o}teborg, Sweden}} \frac{\text{Concerns in Bug Report Descriptions for Efficient Bug Triaging"}}{(\text{EASE, Research Track}), \text{G\"{o}teborg, Sweden}} \dots \dots \dots \dots \dots \dots \dots \dots \dots $
	$\frac{\text{Krasniqi R.,}}{\text{(COMPSAC}}, \text{ "Recommending Bug-fixing Comments from Issue Discussions in Support of Bug Repair"}}{\text{(COMPSAC}}, \text{Research Track)}, \text{Madrid, Spain} \dots \dots$
	Krasniqi R., "Extractive Summarization of Related Bug-fixing Comments in Support of Bug Repair" (APR, Workshop Track), Madrid, Spain
	$\frac{\text{Krasniqi R.,}}{(\text{SANER, Research Track}), \text{Honolulu, HI}} \\ \frac{\text{Concerns across OSS Defect Reports}}{(\text{SANER, Research Track}), \text{Honolulu, HI}} \\ \frac{\text{Concerns across OSS Defect Reports}}{(\text{SANER, Research Track})} \\ \frac{\text{Concerns across OSS Defect Reports}}$
Ι	NVITED TALKS
F	PANEL
l	Topic: Interested in Pursuing a Ph.D: What it's all About?
	$\label{eq:event:cse} \textit{Event:} \ \ \text{CSE Seminar Series, University of North Texas, Denton, TX} \ \dots $
S	SPEAKER
	Topic: Detecting Scattered & Tangled Quality Concerns in Source Code to Aid Maintenance & Evolution Tasks Event: Tapia Doctoral Consortium, Gaylord Tevan Resort & Convention, Grapevine, TX. SEP 13 ^{NTH} , 2023

PRESS COVERAGE

CSE Ph.D Student Recognized as NCWIT Aid	C Finalist for Research on New Approach to Source Code Detection
Denton, TX, May 23^{rd} , 2023	[Press Link]
UNT Engineering Grad Student Receives 3M	Γ People's Choice Award
Denton, TX, Dec 9^{th} , 2021	$\cdots \cdots \cdots \cdots \cdots [\textbf{Press Link}]$
MENTORSHIP EXPERIENCE	
AnitaB.org, Mentoring Program	
Reini Lin, (1 on 1) Mentoring	
University of North Texas, Undergrain	DUATE MENTORING
Blessing Sundire, Senior Thesis	
University of Notre Dame, Undergrad	UATE MENTORING
Yalin Luo, Senior Thesis	
INDUSTRY EXPERIENCE	
features to incorporate SDLC standards. Assi	mark healthcare system. Participated in the development of the core isted in technical walkthroughs and provided coding specifications, eases of Highmark's online patient healthcare platform.
an enterprise resource planning project. Mai	e Reports/XML Publisher applications utilized by business users in ntained the Processor Profile application and ensured the smooth aptions to business operations. Troubleshot and resolved tickets by tions.
PROFESSIONAL SERVICE	
Invited Journal Reviewer	
Reviewer, Software Quality Journal (SQJO) .	
	Process (JSEP)
Reviewer, Journal of Software: Testing Verific	eation and Reliability (JSTVR)2022
Invited Program Committee	
$\begin{tabular}{ c c c c c c c c c c c c c c c c c c c$	ware Engineering (ICSE)
PC Member, International Conference on Soft	tware Analysis, Evolution and Reengineering (SANER) $\dots 2024$
PC Member, International Joint Conference (ISSTA/ECOOP)2024
PC Member, International Conference on Soft	tware Engineering for Artificial Intelligence (CAIN) 2023–2024
· ·	uation and Assessment in Software Engineering (EASE) 2023–2024
· ·	bile Software Engineering and Systems (MOBILESoft) $$. 2022-2023
PC Member, International Conference on Mir.	ing Software Repositories (MSR)

INVITED EXTERNAL REVIEW COMMITTEE

Reviewer, NCWIT Aspirations in Computing (AiC) 2023 Reviewer, Graduate Women in Science National Fellowship (GWIS) 2020–2022 Reviewer, International Conference on Requirement Engineering (RE) 2020			
Invited Organizing Committee			
Session Chair, International Conference on Software Engineering for Artificial Intelligence (CAIN)			
Invited Student Volunteer			
Outreach and Leadership			
$Student\ Volunteer,\ Texas\ CSTA\ Chapters\ Conference\ and\ Digital\ Divas\ (UNT)$			
PROFESSIONAL AND ACADEMIC ASSOCIATIONS			
Professional Memberships			
Academic Memberships			
Society of Women Engineers (SWE-UNT)			
ADDITIONAL INFORMATION			
Google Scholar			