Aakash Bansal

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Research Interests

Intelligent tools for software engineering, source code summarization, program comprehension, machine learning, natural language processing, program synthesis, software security, and software robustness.

Education

Ph.D.	University of Notre Dame, Computer Science & Engineering Title: *Context-Aware Models for Automatic Source Code Summarization* Committee: Collin McMillan, Toby Li, Joanna Santos, Vincent Hellendoorn	2024
M.S.	University of Surrey, Machine Learning	2017
B.Eng.	Lancaster University, Computer Systems Engineering	2014

Publications

Journal Papers

A. Bansal, B. Sharif, C. McMillan, "Towards Modeling Human Attention from Eye Movements for Neural Source Code Summarization", In Proceedings of ACM Human Computer Interaction, Volume 7, In proceedings of ETRA, Article 167, May 2023.

A. Bansal, Z. Eberhart, Z. Karas, Y. Huang, C. McMillan,"Function Call Graph Context Encoding for Neural Source Code Summarization", In the proceedings of Transactions on Software Engineering (TSE), accepted 2023.

Z. Eberhart, **A. Bansal**, C. McMillan, "A Wizard of Oz Study Simulating API Usage Dialogues with a Virtual Assistant", In the proceedings of Transactions on Software Engineering (TSE), accepted 2020 .

Conference Full Papers

S. Haque, **A. Bansal**, and C. McMillan, "Label Smoothing Improves Neural Source Code Summarization", In 2023 IEEE/ACM 31st International Conference on Program Comprehension (ICPC), 2023.

S. Haque, Z. Eberhart, **A. Bansal**, C. McMillan, "Semantic Similarity Metrics for Evaluating Source Code Summarization", In Proc. of the 30th IEEE/ACM International Conference on Program Comprehension (ICPC'22), Pittsburg, PA, USA, 2022 (45% acceptance rate).

A. Bansal, S. Haque, C. McMillan, "Project-Level Encoding for Neural Source Code Summarization of Subroutines", In proceedings of IEEE International Conference on Program Comprehension (ICPC'21), Held Vrituall, May 2021 (25% acceptance rate). ***Distinguished Paper Award (one of two awarded)***

A.LeClair, **A.Bansal**, C. McMillan, "Ensemble Models for Neural Source Code Summarization of Subroutines", In 37th IEEE International Conference on Software Maintenance and Evolution (ICSME'21), Held Virtually, Sept. 2021 (24% acceptance rate).

A. Bansal, Z. Eberhart, L. Wu, C. McMillan, "A Neural Question Answering System for Basic Questions about Subroutines" , In proceedings of IEEE International Conference on Software Analysis, Evolution and Reengineering (SANER'21), Honolulu, Hawaii, USA, 2021 (25% acceptance rate).

S. Haque, **A. Bansal**, L. Wu, and C. McMillan, "Action Word Prediction for Neural Source Code Summarization", In proceedings of IEEE International Conference on Software Analysis, Evolution and Reengineering (SANER'21), Honolulu, Hawaii, USA, 2021 (25% acceptance rate).

Conference Short Papers

A. Bansal, C. Su, Z. Karas, Y. Zhang, Y Huang, T. J. Li, C. McMillan, "Modeling Programmer Attention as Scanpath Prediction", In Proceedings of The 38th IEEE/ACM International Conference on Automated Software Engineering (ASE 2023) - New Ideas and Emerging Results track.

C. Su, **A. Bansal**, V. Jain, S. Ghanavati, C. McMillan, " A Language Model of Java Methods with Train/Test Deduplication ", In proceedings of The ACM Joint European Software Engineering Conference and Symposium on the Foundations of Software Engineering (ESEC/FSE 2023) - Tool Demonstration track.

Workshop Papers

N. Tang, M. Chen, Z. Ning, **A. Bansal**, Y. Huang, C. McMillan and T. J. Li, "An Empirical Study of Developer Behaviors for Validating and Repairing AI-Generated Code.", 13th annual workshop on the intersection of HCI and PL (PLATEAU'23), Pittsburgh, PA, 2023.

Teaching Experience

University of Notre Dame	Teaching Assistant, Computer Vision	Fall 2018
	Teaching Assistant, Programming Paradigms	Spring 2019
	Teaching Assistant, Programming Paradigms	Fall 2019
	Teaching Assistant, Discreet Mathematics	Spring 2021
	Teaching Assistant, Graduate Operating Systems	Fall 2021

Mentorship Experience

Robert Wallace , University of Notre Dame (2022-23)

In summer 2022, Robert started as a summer REU student for my advisor. I mentored Robert's work and advised him on new techniques for eye-tracking studies. In summer 2023, Robert started his PhD degree, following which I mentored him to develop and administer new eye-tracking human studies.

Presentations and Invited Lectures

Conference Paper Presentation, "Towards Modeling Human Attention from Eye Movements for Neural Source Code Summarization", ACM Symposium on Eye Tracking Research & Applications (ETRA'23), June 2023.

Conference Paper Presentation, "Label Smoothing Improves Neural Source Code Summarization", IEEE International Conference on Program Comprehension (ICPC'23), May 2023.

Invited Talk, "Context-Aware Source Code Summarization", Rochester Institute of Technology, Feb 2023.

Invited Talk, "Context-Aware Source Code Summarization", University of Hawaii at Manoa, Feb 2023.

Invited Talk, "Function Call Graph Context Encoding for Neural Source Code Summarization", NLP+ group, University of Notre Dame, March 2022.

Conference Paper Presentation, "Project-Level Encoding for Neural Source Code Summarization of Subroutines", IEEE International Conference on Program Comprehension (ICPC'21), May 2021.

Conference Paper Presentation, "A Neural Question Answering System for Basic Questions about Subroutines", International Conference on Software Analysis, Evolution and Reengineering (SANER'21) March 2021.

Professional Experience

Graduate Research Assistant, advisor: Collin McMillan, University of Notre Dame (2018-2024)

I worked on several research projects funded by various NSF grants. I developed proof of concept virtual assistant for programmers PAQS. I developed multiple natural language processing based neural networks and encoders to encode large amounts of contextual data. I developed neural networks to encode bio-inspired eye tracking information. I designed and administered human studies with eye-trackers. I also created protocols for domain-specific studies with programmers.

Professional Activities

Program Committee:

2023 2nd Gaze Meets ML workshop at NeurIPS 2023

2022 37th IEEE/ACM International Conference on Automated Software Engineering (ASE'22), Artifacts Track

External Reviewer for:

2022-23 IEEE Transactions on Software Engineering (TSE)

2019 9th IEEE Integrated STEM Education Conference

Community Service:

2022 27th IEEE/ACM International Conference on Automated Software Engineering, AMA Panel

References

Dr. Collin McMillan (cmc@nd.edu, 574-631-1881)
Associate Professor, University of Notre Dame, Notre Dame, IN

Dr. Bonita Sharif (bsharif@unl.edu)
Associate Professor, University of Nebraska-Lincoln, Lincoln, NE

Dr. Toby Li (toby.j.li@nd.edu, 574-631-5375)
Assistant Professor, University of Notre Dame, Notre Dame, IN