Nikitha Rao

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Google Scholar

Education

- **Carnegie Mellon University**, Pittsburgh, USA *August 2021*
  Ph.D. in Software Engineering.
  Advisors: Prof. Vincent Hellendoorn and Prof. Claire Le Goues
  Research Interests: Artificial Intelligence for Code, Large Language Models for Code.
  Cumulative GPA: 4.08/4.0
- **PES University**, Bangalore, India *2015 - 2019*
  B.Tech in Computer Science and Engineering with a specialization in Data Science.
  Advisor: Dr. Gowri Srinivasa
  Cumulative GPA: 9.48/10.0

Publications

10. **AI for Low-Code for AI** [preprint]
    Nikitha Rao, Jason Tsay, Kiran Kate, Vincent Hellendoorn, and Martin Hirzel
    Under submission, 2023. (12 pages)

9. **CAT-LM: Training Language Models on Aligned Code And Tests** [ASE 23]
    Nikitha Rao*, Kush Jain*, Uri Alon, Claire Le Goues, and Vincent Hellendoorn (* equal contribution)
    Automated Software Engineering, 2023. (12 pages)

8. **Comments on Comments: Where Code Review and Documentation Meet** [MSR 22]
    Nikitha Rao, Jason Tsay, Martin Hirzel, and Vincent Hellendoorn
    Mining Software Repositories, 2022. (5 pages)

7. **SoftNER: Mining Knowledge Graphs From Cloud Incidents** [EMSE 22]
    Manish Shetty, Chetan Bansal, Sumit Kumar, **Nikitha Rao**, and Nachiappan Nagappan
    Empirical Software Engineering (SEIP Special Issue), 2022. (15 pages)

6. **Search4Code: Code Search Intent Classification Using Weak Supervision** [MSR 21]
    Nikitha Rao, Chetan Bansal, and Joe Guan
    Mining Software Repositories, 2021. (5 pages)

5. **Neural Knowledge Extraction from Cloud Service Incidents** [ICSE - SEIP 21]
    Manish Shetty, Chetan Bansal, Sumit Kumar, **Nikitha Rao**, Nachiappan Nagappan, and Thomas Zimmermann
    International Conference on Software Engineering, 2021. (12 pages)
    🏆 **Nominated for the IEEE Software Distinguished Paper Award (5/41)**
    🏆 **Featured on VentureBeat:** Microsoft's SoftNER AI uses unsupervised learning to help triage cloud service outages.
    🏆 **Featured on Techzine:** Microsoft's SoftNER AI evaluates disruptions in cloud services

4. **Handling Class Imbalance with POISE: pAUC Optimization in Supervised Experiments** [MLADS 20]
    Nikitha Rao, and Sreangsu Acharyya
    Preprint of full paper available. (9 pages)
    🏆 **Best Short Paper Award** at MLADS-SYNAPSE, 2020.
    Microsoft internal Conference on Machine Learning and Data Science for Asia-Pacific region
    [Acceptance Rate ≈ **8%**]

3. **Analyzing Web Search Behavior for Software Engineering Tasks** [IEEE BigData 20]
    Nikitha Rao, Chetan Bansal, Thomas Zimmermann, Ahmed Hassan Awadallah, and Nachiappan Nagappan
    IEEE International Conference on Big Data, 2020. (10 pages)

2. **Product Insights: Analyzing Product Intents in Web Search** [CIKM 20]
    Nikitha Rao, Chetan Bansal, Subhabrata Mukherjee, and Chandra Maddila
    International Conference on Information and Knowledge Management, 2020. (4 pages)

1. **Studying Ransomware Attacks Using Web Search Logs** [SIGIR 20]
    Chetan Bansal, Pantazis Deligiannis, Chandra Maddila, and **Nikitha Rao** *(alphabetical order)*
    International Conference on Research and Development in Information Retrieval, 2020. (4 pages)

Patents

- **Identification of Content Gaps based on Relative User-Selection Rates between Multiple Discrete Content Sources** filed with the USPTO. *October 16, 2020*
  Co-inventors: Chetan Bansal, Junia George, Casey Gossard, Dung Nguyen, Dave Ludwig, and Curtis Anderson.
- **ExtraQuery Context-Aided Search Intent Detection** filed with the USPTO. *October 9, 2020*
  Co-inventors: Chetan Bansal, Joe Guan, Mark Wilson-Thomas, Nachiappan Nagappan, and Thomas Zimmermann.
- **Automatic Recognition of Entities Related to Cloud Incidents** filed with the USPTO. *June 19, 2020*
  Co-inventors: Manish Shetty, Chetan Bansal, Sumit Kumar, Nachiappan Nagappan, and Thomas Zimmermann.

Awards and Honors

- **Google Collab Ph.D. Fellowship**, awarded $100,000 in total. *2021*
- **Graduate Dean's Scholar Award**, Computer Science, UCLA *(declined in favor of CMU).* *2021*
- **Computer Science Excellence Fellowship**, Computer Science, UIUC *(declined in favor of CMU).* *2021*
- **Dean's Distinguished Graduate Fellowship**, Computer Science, UC Davis *(declined in favor of CMU).* *2021*
- **Chair's Award**, Informatics, UC Irvine *(declined in favor of CMU).* *2021*
- **Best Short Paper Award** at MLADS-SYNAPSE. *2020*
- **Best Outgoing Student Award** for class of 2019 (360 students), Computer Science, PES University. *2019*
- Five time recipient of the **CNR Rao Scholarship**, Computer Science, PES University. *2016 - 2019*

Work Experience

- **IBM T.J. Watson Research Center, Yorktown Heights, NY** - *AI Research Intern* *May - August, 2023*
  Advisor: Anuradha Bhamidipaty
  Project: Built a unified dialogue-based domain-specific question-answering system using LLMs.
- **IBM T.J. Watson Research Center, Yorktown Heights, NY** - *AI Research Intern* *May - August, 2022*
  Advisor: Dr. Martin Hirzel
  Project Domain: AI for Code
- **Microsoft Research, India** - *Research Fellow* *July, 2019 - July 2021*
  Advisors: Chetan Bansal, Dr. Subho Mukherjee, Dr. Nachi Nagappan, and Dr. Tom Zimmermann
  Project Domains: Machine Learning for Software Engineering, Data Science, and Web Search
  Additional Responsibilities: Research Fellow representative for the Diversity and Inclusion committee.
- **Microsoft Research, India** - *Research Intern* *January - June, 2019*
  Advisor: Dr. Sreangsu Acharyya
  Project Domain: Data Science
- **Carnegie Mellon University, Pittsburgh** - *Research Intern* *Summer 2018*
  Advisor: Prof. Shawn Blanton
  Project Domain: Machine Learning
- **Indian Institute of Science, India** - *Summer School Program* *July, 2017*
  Was among the youngest students selected for the 5^{th} Summer School Program conducted by the Computer Science and Automation Department.

Ongoing Projects

- **Teaching Large Language Models to Debug Code Collaboratively** *September, 2022 - Present*
  Collaborators: Vincent Hellendoorn, and Claire Le Goues (CMU)
  Even tools such as ChatGPT or Copilot tend to generate code containing subtle bugs that are hard to find for inexperienced developers. In this work, we leverage the execution of code generated by these LLMs as a signal. Specifically, we employ several such models working in tandem: one observes the failing execution and generates debugging instructions, which other models use to repair the generated code before presenting it to the developer. By observing this interaction we can then teach these models to collaboratively debug the code they, or regular developers, generate.

Teaching

- **Neural Code Generation** (11891), CMU - Teaching Assistant *Spring 2024*
- **Applied Deep Learning** (17644), CMU - Teaching Assistant *Spring 2023*
- **Applied Machine Learning**(17634), CMU - Teaching Assistant *Spring 2023*

Talks

- **CAT-LM: Training Language Models on Aligned Code And Tests** *November 2023*
  JetBrains Research [Recording]
- **Code Generation and Alignment** *November 2023*
  Guest Lecture for Advanced NLP (11711), CMU [Website]
- **A Unified Dialogue Based Domain-Specific Question-Answering System Using LLMs** *August 2023*
  IBM T.J. Watson Research Center, Yorktown Heights, NY
- **Prompting and Tuning LLMs** *April 2023*
  Guest Lecture for Applied Deep Learning (17644), CMU
- **Introduction to Deep Learning** *March 2023*
  Guest Lecture for Applied Deep Learning (17644), CMU
- **AI for Low-Code for AI** *August 2022*
  IBM T.J. Watson Research Center, Yorktown Heights, NY
- **Search Insights: Analysing Web Search Behavior to Mine Insights** *July 2021*
  Microsoft Research, India
- **Partial-AUC Optimization to Handle Class Imbalance** *August 2020*
  Microsoft Research, India

Service

- **Mentoring**, Ask Me Anything session on Grad School Applications with Research Fellows at MSR India. *2023*
- **Sub-reviewer**, FSE 23. *2023*
- **Shadow PC**, MSR 22. *2022*
- **Reviewer**, JSERD. *2021*
- **DNI Representative at MSR** *2019-2021*
  I was the Research Fellow representative in the Diversity and Inclusion (DNI) committee at Microsoft Research India. We took several initiatives that include workshops on LGBTQ+ sensitization, talks and workshops for women, panel discussions and an annual diversity and inclusion day dedicated to increasing awareness for all new interns and research fellows. I also started a virtual book club during the pandemic to help reduce isolation and to increase awareness on DNI topics, which received a lot of positive feedback.