Rohith Pudari

PhD Student, Electrical and Computer Engineering

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Education

PhD. Electrical and Computer Engineering — Toronto, Canada
University of Toronto, Advisor: Prof. Shurui Zhou. — 2022 - Ongoing

M.Sc. Computer Science — Victoria, Canada
University of Victoria, Advisor: Prof. Neil Ernst. — 2020 - 2022
Thesis: AI Supported Software Development: Moving Beyond Code Completion. [PDF]

B.Tech. Information Technology — Hyderabad, India
Jawaharlal Nehru Technological University, GPA 9.2/10 — 2015 - 2019

Research and Experience

University of Toronto. Graduate Researcher — Toronto, Canada
Advisor: Dr. Shurui Zhou — 2022-present

- Exploring LLMs for resolving real-world GitHub issues, with an emphasis on refactoring issues.
- Working on aligning Stack-Overflow questions to documentation pages.

University of Victoria. Graduate Researcher — Victoria, Canada
Advisor: Dr. Neil Ernst — 2020-2022

- Explored the current limitations of large language models for code such as Copilot, and created a taxonomy to moving beyond code completion to AI-supported software engineering.
- Performed a qualitative study on finding the best ways to identify and model the topics of software design by mining public question answering platforms (stack-overflow and stack-exchange), which can be used to identify changing design approaches, validating ml-based code generation for design smells and recommending related design discussions.
- Created a server to conduct a survey for collecting insights on how software developers interact with various levels of autonomous bots on GitHub.

Deloitte, Data Scientist — Hyderabad, India
Advisor: Dr. Anitha Jadhav — 2019 - 2020

- Created architecture for a server cluster to support access and analysis of data to employees spread across the world.
- Created a custom AI model for a fortune 500 pharma company to predict risks and demand of products using various factors and add it to the reports.
- Combined models through ensemble modelling, created pipelines for real-time data monitoring using data visualisation techniques.

Deloitte, Research Scientist Intern — Hyderabad, India
Advisor: Dr. Anitha Jadhav — 2019

- Created tests and wrote documentation for a internal tool for detecting code smells and test coverage report.
- Implemented a ML application where risks associated for a product is calculated using custom questionnaires thereby providing risk mitigation plans.
- Worked under Governance, Risk and Compliance - Data Collection and Analysis

Google, Software Engineering Intern — Bangalore, KA
Advisor: Praveen Singh — 2018

- Created the visual flow builder for the DialogueFlow web interface.
- Worked on creating Dialogue-flow intent generation process and scaling up the payment gateway for the google payment application in India.
- Gave multiple talks on the usages and ways to integrate DialogueFlow into existing softwares at conferences and meetups.

Life Of Girl, Software Engineering Intern Hyderabad, TS
Advisor: Dr. Sikinder Khan 2017

- Created a chatbot, to connect the local police department (SHE team) to help women safety, This received a government funding and eventually got implemented in local police network.
- Deployed an AI model to create personalised responses for the chatbot, where it further used DialogueFlow as its backend.

Sreenidhi Institute of Science and Technology, Undergraduate Researcher Hyderabad, India
Advisor: Dr. Subhani Shaik 2015-2019

- Performed a comparative study based on optimization techniques for software cost estimation, which improved the accuracy of software cost estimations by coupling Bayesian multi-class algorithm with existing optimization techniques. The developed model is empirically validated using different evaluation metrics through a statistical framework.
- Worked on creating custom AI models to perform facial and expression detection and exploring ways to make them scalable for real-world use
- Designed a parallel computing algorithm to perform pattern mining in datasets.

Publications

1. R. Pudari, S. Zhou, I. Ahmed, Z. Dai and S. Zhou, *"Aligning Documentation and Q&A Forum through Constrained Decoding with Weak Supervision,"* 2023 IEEE International Conference on Software Maintenance and Evolution (ICSME), Bogotá, Colombia, 2023, pp. 346-351, doi: 10.1109/ICSME58846.2023.00043. [LINK].

2. Rohith Pudari, Neil Ernst, *"From Copilot to Pilot: Toward AI Supported Software Engineering".* arXiv preprint arXiv:2303.04142 (2023) [LINK].

3. Roshan Lasrado, Rohith Pudari, Neil Ernst, *"What Do Developers Discuss About Design? Exploring Design Knowledge in Stack Overflow and GitHub".* arXiv preprint, (2021)

Open Source Projects

SwiftSyft, Openmined
https://github.com/OpenMined/SwiftSyft

- Contributed a lazy implementation of the data loading functionality and added support for web socket schemes for the repository.
- OpenMined is set out to build the world's first open-source ecosystem for federated learning on web and mobile. SwiftSyft is a part of this ecosystem, responsible for bringing secure federated learning to iOS devices making it easy to train and inference PySyft models on iOS devices.
- PySyft makes it possible to write software which can compute over information you do not own on machines you do not have (total) control over. This helps to utilize training data located directly on the device itself, bypassing the need to send a user's data to a central server.

Smith-Waterman algorithm optimization
https://github.com/HarisSmajlovic/smith-waterman-optimization

- Made performance optimizations for Linear gap Smith-Waterman algorithm, which is hard to parallelize due to its sequential nature of instructions.
- Took a base implementation of the Smith-Waterman algorithm, and iteratively improved the data and task parallelism of the algorithm, improved memory access patterns, added SIMD and multicore, and GPU usage to increase algorithmic performance by more than 74x.

Summarizer
https://github.com/rohithpudari/summariser

- A personal use machine learning model developed using Pytorch and Python.
- This project was using data from research papers published on arxiv from 2000 to 2017, using the abstract as the summary of the paper, iteratively including human summaries of articles related to computer science from various news source websites.
- Given a article or a research paper, the model could prioritise sentences and generate the summary of it. I developed it to save time in reading mandatory readings of classes and to quickly skim through many research papers to decide which one is worth reading for my current research direction.

Teaching and Mentorship

CSC2130 - Empirical Research Methods in Software Engineering — University of Toronto
Head Teaching Assistant- [Course Link] — Spring 2024

ECE 444 - Software Engineering — University of Toronto
Head Teaching Assistant- [Course Link] — Fall 2023, Fall 2022

SENG 321 - Requirements Engineering — University of Victoria
Teaching Assistant — Spring 2022, Spring 2021

SENG 275 - Software Testing — University of Victoria
Teaching Assistant — Summer 2021

SENG 350 - Software Architecture and Design — University of Victoria
Teaching Assistant — Fall 2021

SENG 330 - Object-Oriented Software Development — University of Victoria
Teaching Assistant — Fall 2020

Machine Learning Crash Course (MLCC) workshop — Hyderabad, TS
Organizer — Fall 2018

Explore ML workshop — Bangalore, KA
Organizer — Fall 2019

- I planned and implemented the delivery of learning and development experiences to students all over India on campus in a 'flipped classroom' environment.

Facebook Developer Circles, Hyderabad — Hyderabad, TS
Mentor — Fall 2020

- Serving as a mentor for beginners in computer science and helping them engage with the community and learn from the events hosted by the organisation.

Climate Change AI (CCAI) workshop — Long Beach, CA
Mentor — Fall 2019

- I served as a Research Mentor as part of the Climate Change AI (CCAI) ICML workshop program. I provided feedback, advice, and research discussions to a mentee interested in submitting to the workshop

Awards

2019 **Recipient**, Dean's honor Award at SNIST — Hyderabad, TS
2017 **Recipient**, Hyderabad best programmer competition at JNTUH — Hyderabad, TS
2016 **Scholarship**, Outstanding student research fellowship, SNIST — Hyderabad, TS

Invited Talks and Panels

Major League Hacking — Hyderabad, TS
Speaker — 2020

- Gave a talk on best practices in developing machine learning algorithms and ways to tackle bias.

Advances in SE4AI — Bangalore, KA
Panel Member — 2019

- Discussion on how can we use current software engineering methods in the process of machine learning development process.

DevFest Hyderabad by Google — Hyderabad, TS
Speaker — 2018

- Introduced the ways to use Dialogueflow in every application to support chatbots