# Workshop on GenAI Based Software Engineering

Co-located with ISEC 2024 February 22$^{nd}$, 2024, IIIT Bangalore, India

## Objective of Workshop

The Software Development Life Cycle (SDLC) governs the creation of software systems, encompassing various engineering phases such as requirement specification, design, coding, testing, and maintenance. Software development is an effort-intensive and time-consuming activity whereas systems today need to reflect changes as quickly as possible. Most complex, large-scale software systems of today derive their requirements from existing (legacy) software and partial (incomplete) descriptions. Software development is thus a complex combination of transformation, reverse and forward engineering, involving code, data, and specifications, where data is both structured and unstructured. Expertise from subject matter specialists (SMEs) is essential at each phase, which brings in the important component of knowledge. While Model-Driven Engineering (MDE), Knowledge Engineering (KE), and Reverse Engineering (RE) have mitigated some of the challenges, the emergence of Generative AI techniques holds the potential for a substantial breakthrough. These techniques empower SMEs to construct purposeful engineering artifacts using natural language interactions.

The proposed workshop aims to provide a collaborative platform for researchers and practitioners to delve into the convergence of traditional MDE, KE, and RE methodologies together with Generative AI technologies. By synergizing the strengths of Gen AI, modeling, and knowledge representation for SDLC, our goal is to define a trajectory toward enhanced software engineering practices. We seek discussion on the following pivotal questions:

1. The development of industry-strength software is a multi-skill, long-drawn activity that cannot be effectively addressed by LLMs alone. What's the right augmentation required?

2. LLM is a vast storehouse of general information, but the typical need during software development is rather sharply focused. How best to bear local knowledge to get the required focus?

| Invited Speakers | |
|---|---|
| Aditya Kanade<br><br>*Microsoft Research, India* | [Making LLMs Usable in Large-scale Software Engineering](#) |
| Dinesh Garg<br><br>*IBM Research, India* | [Generative AI for Cobol-to-Java Translation](#) |
| Disha Shrivastava<br><br>*Google, UK* | [Effectively Utilizing Contextual Cues for LLMs of Code](#) |
| Hridesh Rajan<br><br>*IOWA State University, USA* | [Generative AI-based Software Engineering: Opportunities, Challenges, and the Road Ahead](#) |
| Jyothi Vedurada<br><br>*IIT Hyderabad, India* | [Leveraging Large Language Models for Effective Software Development Practices](#) |

knowledge representation can perform far better at times?

5. Can Generative AI play a role in constructing purpose-driven knowledge representations?

6. How can Generative AI enhance the program analysis-driven techniques for understanding programs and extracting knowledge?

7. How does Generative AI outshine other natural language processing techniques in software engineering contexts?

8. How can Generative AI enhance the synthesis of tests and test data for a given set of requirements, and given code?

9. Can problem fixes and change requests be analyzed and implemented expeditiously using Generative AI?

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|---|---|
| *Accenture Labs, India* | |

The workshop aims to foster interactive discussions, enabling participants to collectively shape the future of advanced software engineering. The inaugural edition will feature talks by invited speakers who are exploring one or more of the above questions, interspersed with short experiences of researchers who are exploring specific challenges of software engineering using GenAI techniques. Time permitting, we will have short lightening talks by researchers to share interesting observations and anecdotes.

# Call For Abstract

The Software Development Life Cycle (SDLC) governs the creation of software systems, encompassing different engineering phases such as requirement specification, design, coding, testing, and maintenance. Software development is an effort-intensive and time-consuming activity. Most complex, large-scale software systems of today derive their requirements from existing (legacy) software and partial (incomplete) descriptions. Thus, expertise from subject matter specialists (SMEs) is essential at each phase, which brings in the important component of knowledge. The emergence of Generative AI techniques holds the potential to empower SMEs to construct purposeful engineering artifacts using natural language interactions.

The workshop aims to provide a collaborative platform for researchers from academia, industry, and practitioners. Through this platform, we expect to delve into the convergence of Generative AI, Knowledge Engineering, MDE, Software Understanding, and Software Transformation.

We solicit submissions in the form of one-page (max 500 words) abstracts describing case studies, interesting experiments, best practices, and lessons learned while applying Generative AI to various SE areas, but not limited to the following topics:

| Important Dates | |
|---|---|
| ~~15 Dec 2023~~ | ~~Last date for submit abstracts~~ |
| 22 Dec 2023 | Extended date submitting abstracts |
| 5 Jan 2024 | Notification of selec abstracts |
| 10 Jan 2024 | Publishing list accepted talks |
| 22 Feb 2024 | GenAI4SE workshop |

- Software Development
- AI Code Assistants
- Legacy Modernization
- Reverse Engineering from code,

- Human interaction with LLMs
- Software Verification, Testing and Debugging
- Software Evolution and Maintenance

| Submission Link |
|---|
| **https://forms.gle/4UqNFpSJb6h!** |

**Submission Information :** Abstract should be original work in text format written in english not more than 500 words and submitted via the form. In case of any questions, you can write an email to GenAIForSE.ISECWorkshop@tcs.com

**Acceptance criteria :** Abstracts will be selected based on reviews by the workshop organizing committee. Criteria will be the clarity of articulation of the problem being solved, bringing out the specific need for Generative AI to solve the problem and the novelty of the approach. Authors of accepted abstracts will receive further instructions for submitting camera-ready presentations. At least one of the authors MUST register for the ISEC conference, and attend the conference in-person to present their exploration and innovation at the workshop.

# Program

| Schedule |
|---|
| **Coming soon...** |

# Organizers

Ravindra Naik       Asha Rajbhoj       Manasi Patwardhan       Raveendra Medicherla

program analysis, text analysis, machine learning, GenAI. They excel in extracting domain specifications from legacy code and documents, applying expertise in software modernization, enterprise onboarding, and synthesizing new software systems. He has 20+ publications and 10+ patents to his credit.

Requirement Engineering, Model-Driven Engineering, Meta-modelling, Software Engineering, Enterprise Modeling and Architecture, Artificial Intelligence, Natural Language Processing, Data Analytics and Business Process Modelling. She has over 20 publications and several patents to her credit.

for Code and Program Synthesis, Natural Language Understanding, Neuro-Symbolic systems, and Multi-Modal Multi-Lingual Processing. She has over 30 publications and 5 patents, and serves on the program committees of prestigious NLP conferences like ACL, EMNLP, and NAACL.

application of Symbolic, Generative AI, and Neuro-symbolic techniques to transform software systems and enhance software testing methodologies. His expertise lies in leveraging advanced AI methods to revolutionize software development processes, ensuring efficiency, reliability, and innovation.

# Venue

**Please visit the ISEC Conference page for workshop location and registration.**

For more information, visit.

Home          Contact: GenAIForSE.ISECWorkshop@tcs.com