

# A Report on the PhD Symposium Track: ISEC 2020

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## ABSTRACT

Innovations in Software Engineering Conference (ISEC) is the flagship annual conference of iSoft, which is an arm of ACM India and serves as the India chapter of ACM SIGSOFT. The 13th edition of ISEC is to be held at IIITDM Jabalpur during the period February 27-29 2020, and will hold a PhD Symposium. The objective of the PhD Symposium is to provide for a forum for junior as well senior level PhD students working in the field of software engineering to present their work in a friendly setting, to get feedback on their direction from experts, to present posters about their work to the ISEC attendees, and to interact and network with each other. This report summarizes the motivation for this symposium and the plan for the event, and lists the full set of accepted submissions.

## CCS CONCEPTS

• **Software and its engineering;**

## KEYWORDS

software engineering

## ACM Reference Format:

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## 1 AIM AND SCOPE

Software engineering research has seen a huge ramp up, both globally and in India. The reasons are the increasing and diverse domains in which software is deployed, and also the rich algorithms and techniques that researchers have adapted from various areas of computer science and applied to software engineering tasks. Well-regarded software engineering conferences such as ICSE and ASE have been conducting *doctoral symposia* for several years now to satisfy the desires of doctoral students to obtain feedback about their work and their future directions in a friendly venue. These symposia also provide a venue for these scholars to network with their peers. These symposia are complimentary to research tracks of these conferences in letting the students broadly summarize their thesis work without focusing on presenting a specific well-evaluated technique. ISEC conducted its first PhD symposium in

2019 [1]. Encouraged by the success of that event, a symposium is being organized as a track within ISEC 2020 as well.

## 2 CALL FOR PAPERS

A call for submissions to the PhD Symposium 2020 was published on ISEC's web site, and was also circulated widely by email. Submissions were invited under two categories:

- **Preliminary:** Research scholars submitting in this category were expected to have identified a well-defined problem statement for their Ph.D. work, potential approach(es) for its solution and possible ways of completing the work (evaluation methodology, metrics for success, target conferences to communicate their work). Ph.D. students in the first three years of their research could submit papers in this category.
- **Mature:** Research scholars submitting in this category were expected to present a well-defined problem, a concrete solution and evidence to defend their approach. Ph.D. students anticipating to complete their doctoral dissertation in one or two years were asked to submit papers in this category.

In both categories above, submissions were to be formatted in the ACM conference format, and were to not exceed four pages (including bibliography and appendices, if any).

Travel grants were announced for research scholars to attend the Ph.D. Symposium and the main conference to present their work.

The Call for Papers was put out in the first week of November 2019, and the final deadline for submissions was December 8th 2019.

## 3 SUBMISSIONS AND REVIEWING

Submissions and reviewing were managed using a separate track for the PhD Symposium under ISEC's main site in *EasyChair*. A total of four submissions were received, with all four being in the preliminary category. The following committee of reviewers reviewed the submissions, with each submission receiving three reviews:

- Swarnendu Biswas, IIT Kanpur
- Atul Gupta, IIITDM Jabalpur
- Uday P. Khedker, IIT Bombay
- Raghavan Komondoor, IISc Bangalore
- Lov Kumar, BITS Pilani, Hyderabad
- Akash Lal, Microsoft Research India
- Chittaranjan Mandal, IIT kharagpur
- Raveendra Kumar Medicherla, TCS
- Suvam Mukherjee, Microsoft Research India
- T. V. Prabhakar, IIT Kanpur
- Girish Maskeri Rama, Siemens Research
- Manas Thakur, IIT Mandi

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Three of the four submissions were accepted for presentation in the symposium. Additionally, authors of all four submissions were provided the opportunity to present their work via posters to all the ISEC attendees. The final versions of the accepted papers will also be hosted on the iSoft web site.

The list of accepted submissions, along with their abstracts, is provided in the appendix of this report.

## 4 CONCLUSIONS

We believe that this PhD Symposium would be very beneficial to the participants by giving them constructive feedback and ideas as they explore their PhD thesis research. We recommend that the symposium be conducted in subsequent years as well, and that the visibility of this symposium be improved in order to attract and benefit a wider set of scholars.

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## A ACCEPTED SUBMISSIONS

- (1) “Improving Software Maintainability Using Optimum Refactoring Sequence”, by Sandhya Tarwani and Anuradha Chug. **Abstract:** The surface indication of deeper problem in the source code are bad smells and if they are not removed in the early phases of the Software Development Lifecycle (SDLC) then they get accumulated making the source code complex and difficult to maintain. This is the reason why software maintenance is the most expensive phase. Refactoring is the process of removing these bad smells without altering the external attributes, but one should apply it in a controlled manner. In this study, we aim to propose a method in determining the refactoring technique sequence well in advance that will improve the maintainability value so that software maintenance team can complete their work within budget and time constraints. The basic approach used in every objective is to prioritize the classes with the help of proposed metric that are critically affected by the presence of maximum number of bad smells. The goal of this paper is to enhance the quality of the software and to reduce the maintenance cost by predicting the sequence with the help of i) Machine learning algorithms along with a new proposed metric that will help in determining the sequence ii) Various Meta-Heuristic algorithms and to figure out the best among all used iii) Deep learning algorithms impact on bad smells and refactoring sequences iv) Proposing a new hybrid approach to determine the sequence and v) Lastly, comparing all the methods and to figure out the best approach in terms of improvised maintainability value.
- (2) “Understanding Android Application Masquerades”, by Anand Tirkey and Ramesh Mohapatra. **Abstract:** Android has revolutionized the smartphone industry since its unveiling in 2008. It has become the major choice of mobile operating system, modelled after Linux open-source ecosystem. This openness and general end-user accessibility has made android an open-ground for privacy breach and data theft, through masquerading rogue

android apps. In this research paper we put forward a novel method to recognise masquerading android applications by deploying supervised machine learning algorithms over Object-Oriented software metrics based dataset. First, android apps are collected and decompiled into a repository. Object-Oriented software metrics are then calculated for each app using its decompiled source codes, which forms the tuple of our dataset. Every tuple is tagged either as malware or benign using VirusTotal service. Consequently, this dataset is provided as input for machine learning algorithms. The malware recognising power for each machine-learned models can be evaluated using accuracy and AUC (area under ROC curve).

- (3) “Prediction of Web Service Anti-patterns Using Machine Learning Framework”, by Sahithi Tummalapalli, Lov Kumar and Lalita Bhanu Murthy Neti.

**Abstract:** Service-Oriented Architecture(SOA) can be implemented via web services which are a product framework that reinforces machine to machine communication over a system. Web services suffer from some setbacks due to bad programming practices design and implementation. These are called "Anti-patterns". Anti-Patterns are counter-productive and poor design practice choices that are conjectured to make software systems harder to maintain. Web service anti-patterns lead to evolution and maintenance problems in software systems. The prediction of anti-patterns in the early stages helps the developers and testers in fixing the design issues. This stimulates the researchers to focus on the detection of web service anti-patterns, to help the unskilled software developers and designers to improve the quality of services being provided.

## REFERENCES

- [1] Meenakshi D’Souza and Subhajit Roy. 2019. The ISEC 2019 Ph.D. Symposium. In *Proceedings of the 12th Innovations on Software Engineering Conference (Formerly Known as India Software Engineering Conference) (Pune, India) (ISEC’19)*. Association for Computing Machinery, New York, NY, USA, Article Article 30, 3 pages. <https://doi.org/10.1145/3299771.3300169>