

# Report on the 11th International Workshop on Quantitative Approaches to Software Quality (QuASoQ 2023)

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## 1. Introduction

After a successful 10<sup>th</sup> QuASoQ workshop, we have again included the following topics of interest:

- New approaches to measurement, evaluation, comparison, and improvement of software quality
- Application of metrics and quantitative approaches in agile projects
- Case studies and industrial experience reports on the successful or failed application of quantitative approaches to software quality
- Tools, infrastructure, and environments supporting quantitative approaches
- Empirical studies, evaluation, and comparison of measurement techniques and models
- Quantitative approaches to test process improvement, test strategies, or testability
- Empirical evaluations or comparisons of testing techniques in industrial settings
- Mining software repositories

Overall, the workshop aimed to gather researchers and practitioners together to discuss experiences in applying state-of-the-art approaches to measure, assess, and evaluate the quality of both software systems and software development processes in general and software test processes in particular.

As software development organizations are constantly forced to develop software in the "right" quality, quality

specification and quality assurance are crucial. Although there are many approaches to dealing with quantitative quality aspects, choosing a suitable set of techniques that best fit the specific project and organizational constraints is still challenging.

Even though approaches, methods, and techniques have been known for quite some time, little effort has been spent exchanging real-world problems with quantitative approaches. For example, only limited research has been devoted to empirically evaluating the risks, efficiency, or limitations of different testing techniques in industrial settings.

Hence, one main goal of the workshop was to exchange experience, present new promising approaches, and to discuss how to set up, organize, and maintain quantitative approaches to software quality.

## 2. Workshop History

The QuASoQ workshop series has been started in 2013. Since then, the workshop has always been organized as a collocated event of the Asia-Pacific Software Engineering Conference (APSEC).

These are the past workshop editions:

- **10<sup>th</sup> QuASoQ 2022**  
virtual (Japan) | CEUR Vol-3330
- **9<sup>th</sup> QuASoQ 2021**  
virtual (Taiwan) | CEUR Vol-3062
- **8<sup>th</sup> QuASoQ 2020**  
virtual (Singapore) | CEUR Vol-2767
- **7<sup>th</sup> QuASoQ 2019**  
Putrayaya, Malaysia | CEUR Vol-2511
- **6<sup>th</sup> QuASoQ 2018**  
Nara, Japan | CEUR Vol-2273
- **5<sup>th</sup> QuASoQ 2017**  
Nanjing, China | CEUR Vol-2017
- **4<sup>th</sup> QuASoQ 2016**  
Hamilton, New Zealand | CEUR Vol-1771
- **3<sup>rd</sup> QuASoQ 2015**  
New Delhi, India | CEUR Vol-1519
- **2<sup>nd</sup> QuASoQ 2014**  
Jeju, Korea | IEEE Xplore

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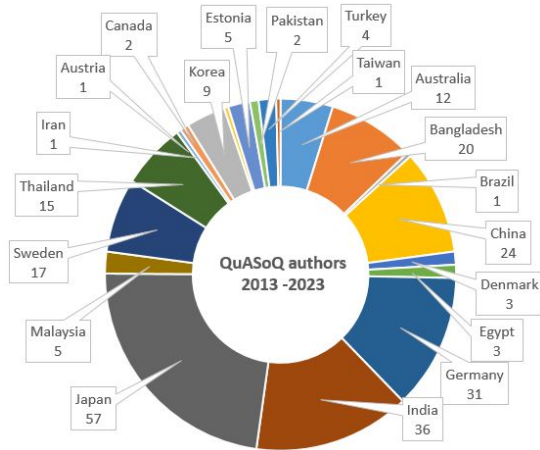


Figure 1: Origin of QuASoQ authors

- **1<sup>st</sup> QuASoQ 2013**  
Bangkok, Thailand | IEEE Xplore

Since the first edition, 72 papers have been presented; the average acceptance rate is 77 %. The chart shown in figure 1 depicts where the authors of accepted papers come from.

### 3. Workshop Format

After the workshop had to take place virtually in the last three years due to the COVID-19 pandemic, we were delighted to be able to hold the workshop again this year in the context of the APSEC in Seoul. However, as some authors couldn't get a visa in their home country in time, two presentations had to be held on Zoom.

Based on our former experience, we wanted the workshop to be highly interactive. To have an exciting and interactive event sharing lots of experience, we organized the workshop presentations applying the **author-discussant model**.

According to this workshop model, papers are presented by one of the authors. After the presentation, a discussant starts the discussion based on pre-formulated questions. Therefore, the discussant had to prepare a set of questions and know the presented paper's details. The general structure of each talk was as follows:

- The paper's author presented the paper (20 minutes).
- After that, the paper's discussant opened the discussion using their questions.
- Finally, we moderated the discussion among the audience (5 minutes).

The presentations were divided into two sessions with a coffee break in between. Each session was accompanied by a moderator who tried to ensure the schedule was kept to.

### 4. Workshop Contributions

The following five papers were submitted and accepted by the program committee for presentation and publication (the speaker is set in bold), covering very different topics.

- Sanghoon Rho, **Philipp Martens**, Seungcheol Shin, Yeoneo Kim, Hoon Heo and Seunghyun Oh  
*Coyote C++: An Industrial-Strength Fully Automated Unit Testing Tool*
- **Kun Cheng** and Shingo Takada  
*Software defect prediction based on JavaBERT and CNN-BiLSTM*
- **Natsuda Kasisopha**, Songsakdi Rongviriyapanich and Panita Meananeatra  
*Proposals for Improving the Assessment of Medical Device Software in Thailand*
- **Rabaya Sultana Mim**, Toukir Ahammed and Kazi Sakib  
*Identifying Vulnerable Functions from Source Code using Vulnerability Reports*
- **Danyang Wang**, Jiaqi Yin, Sini Chen and Huibiao Zhu  
*Formalization and Verification of Go-based New Simple Queue System*

### 5. Summary of the Presentations and Discussions

About 12 researchers attended the workshop and participated in the discussions. The participants received the author-discussant model well; it led to intensive discussions. Hereby, other participants, apart from the discussant, also joined the resulting discussions.

The presentations and subsequent discussions showed that we still need new approaches to code-related quality assessment. This was clearly demonstrated by the tool for automated unit testing of C++ programs presented by Philipp Martens. Similar tools do not currently exist, so a comparison with such tools is impossible.

Determining buggy code using defect prediction methods can help developers and testers detecting defects more specifically. Kun Cheng's contribution introduced this topic. The same applies to the topic presented by Rabaya Sultana Mim. The presented approach allows developers to quickly identify vulnerable code in existing applications.

Natsuda Kasisopha's talk clearly showed that we need new approaches for particular domains, in this case, medical devices, so that companies can develop such products in accordance with the applicable regulations and standards.

In his contribution, Danyang Wang shows the use of formal procedures, CSP and model checking, to evaluate relevant properties of software. It became apparent that this is not easy and cannot be applied to every type of software.

In summary, during this workshop, the participants proposed and discussed different approaches to assess and evaluate relevant aspects of software and software development processes.

It should not go unmentioned that the workshop had to be held in a hybrid format as two speakers were unable to travel to Seoul. We integrated them into the workshop by means of a Zoom call.

## 6. Acknowledgments

Many people contributed to the success of this workshop. First, we want to give thanks to the authors and presenters of the accepted papers. Furthermore, we want to express our gratitude to the APSEC 2023 workshop organizers; they did a perfect job and supported us in running the workshop in a hybrid mode.

Finally, we are glad that these people served on the program committee (most of them for many years) and supported the workshop by soliciting papers and writing peer reviews:

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