

## **Preface to the Empirical Software Engineering Special Issue on selected papers from RE'19**

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Welcome to this special issue that includes selected empirical studies in Requirements Engineering (RE).

The selected studies extend research presented at RE'19, the 27th IEEE International Requirements Engineering Conference. The RE conference is the premier international forum for researchers, practitioners, educators, and students to present and discuss the most recent innovations, experiences, and concerns in the discipline of requirements engineering. RE'19 had the theme "*RE and Collective Intelligence in the Days of AI*" and was held in Jeju Island, South Korea from September 23-27, 2019 [1].

Four papers employing empirical methods stood out at RE'19 as exceptional contributions. The authors of these candidate papers were invited to submit extended manuscripts for this special issue. The submitted manuscripts were each rigorously peer-reviewed by three reviewers, and three were accepted for inclusion in this special issue.

**Summary of the papers.** The first article, "Are there gender differences when interacting with social goal models? A quasi-experiment" by Catarina Gralha, Miguel Goulão, and João Araújo, aims to understand the impact of different cognitive styles on interacting with iStar 2.0 models, which are used to model software requirements. The manuscript describes a study with 180 participants, where the participants created, modified, and reviewed iStar 2.0 models and accuracy, speed, and ease was measured. The study collected data using eye-tracking, EEG and EDA sensors, and participants' feedback. The study found that participants with cognitive styles frequently seen in women solved the tasks with lower speed but higher accuracy while participants with cognitive styles frequently seen in men were better at identifying relevant information. The results show the importance of diversity in software teams.

The second article, "Feature Requests-based Recommendation of Software Refactorings" by Ally S. Nyamawe, Hui Liu, Nan Niu, Qasim Umer, and Zhendong Niu, proposes a new learning-based approach to recommend software refactorings that can enable software systems to adapt to new requirements. The approach was evaluated on 55 open source Java projects, and the results indicate the recommended refactorings achieve high accuracy. The approach can help software projects respond more quickly to new or changing requirements.

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The third article, “Automated Demarcation of Requirements in Textual Specifications: A Machine Learning-Based Approach” by Sallam Abualhaija, Chetan Arora, Mehrdad Sabetzadeh, Lionel C. Briand, and Michael Traynor, proposes an automated approach for demarcating requirements in free-form requirements specifications and develops a prototype tool, DemaRQ, based on the new approach. Through an empirical study with 33 industrial requirement specifications and a user study with software requirements experts, the approach and associated prototype tool were found to be accurate and useful to practitioners. This new approach and its associated tool can help requirements engineers quickly determine which statements in a requirements specification represent requirements.

Collectively, these three contributions represent diverse and relevant examples of empirical research in RE. They all aim to assess the quality and maturity of proposed solutions, an essential step to foster further research and progress towards adoption by practitioners.

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## References

[1] Daniela E. Damian, Anna Perini, Seok-Won Lee: 27th IEEE International Requirements Engineering Conference, RE 2019, Jeju Island, Korea (South), September 23-27, 2019. IEEE 2019, ISBN 978-1-7281-3912-8

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