Guest Editors Introduction: Special Issue on User Feedback and Software Quality in the Mobile Domain

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published in
Information and Software Technology
2019

DOI (link to publisher)
10.1016/j.infsof.2019.05.005

document version
Publisher's PDF, also known as Version of record

Information and Software Technology 112 (2019) 176–177

Contents lists available at ScienceDirect

Information and Software Technology

journal homepage: www.elsevier.com/locate/infsof

Editorial

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The global adoption of mobile devices has increased dramatically over the last few years and mobile devices have become part of our everyday lives. As a consequence, we can observe a continuing growth in the development of millions of software applications that run on mobile devices, commonly referred to as “apps” [1]. The high diffusion of mobile apps has encouraged software engineering research to devise approaches for supporting developers in overcoming the challenges they are facing in this new competitive development market. Moreover, the high availability of customer-, business- and technically-related information about apps that can be found in app marketplaces [2] represents a rich opportunity for researchers interested in (i) investigating and understanding the specific issues of mobile app development, and (ii) building novel methods and tools to help developers during the different phases of an app’s lifecycle.

In the mobile context, recent achievements from the research community focused on the definition of techniques that enable an effective requirements engineering process (e.g., elicitation, user feedback analysis) [3–5], or that allow achieving optimization trade-offs (e.g., performance vs. power consumption) [6] and security/privacy requirements [7,8]. However, there is still a huge potential for researchers to contribute in the mobile computing field.

Due to the relevance of the mobile domain for the software engineering community we decided in 2018 to organize a special issue on this topic. The special issue concerned research challenges and opportunities related to (i) requirements engineering approaches in the mobile domain (e.g., security and privacy requirements in mobile apps); (ii) development and maintenance strategies to ensure high software quality and overall users’ satisfaction; (iii) monetization strategies and other success related aspects of mobile app development. In addition, a particular, overarching focus was also on papers proposing the design and implementation of strategies for user feedback analysis and user involvement (mechanisms for users engagement and fidelization) in the mobile context. It is important to specify that proposed approaches, techniques and empirical studies should have a specific focus on improving software development, thus, have a clear and direct impact on the efficiency of the overall development process.

For this special issue, we received a total of 8 submissions. All submissions went through a rigorous peer review process. Each of them was evaluated by three (in one case four) conflict-free external reviewers. Relying on the reviewers’ assessments the guest editors made a decision about each manuscript acceptance or rejection. The submissions we received concerned different and complementary topics. Specifically, three papers concerned software quality aspects in the mobile context; two papers were about approaches for user feedback and user experience analysis; two papers concerned the development and maintenance (e.g., issue fixing) of mobile apps across different platforms; and one paper proposed an approach for reverse engineering and functional specification for mobile apps. After a rigorous peer review cycle, out of 8 submissions, one submission was selected for inclusion in this special issue. The accepted manuscript proposes an empirical investigation about the internal and external quality of open source apps, with particular focus on mobile software evolution. Specifically, monitoring the characteristics of mobile applications through their evolution is important to facilitate maintenance and development. Thus, a number of code-based and community-based metrics are analyzed in order to understand whether they are significantly related to quality characteristics. A total of 61 versions of three mobile applications are investigated and the analysis of Lehman’s laws shows that only the law of Continuous Growth is satisfied for the selected mobile applications. Analysis using Spearman rank correlation indicate that the internal quality attribute of understandability is positively related to ”number of commits and negatively related to user ratings. No other significant relationship between the internal quality attributes and the success index is observed. The employed method provides an initial basis for repeating the study on a larger data set, with basis for future studies investigating internal and external quality through evolution of mobile applications.

In conclusion, we received interesting papers from the research community. We believe that the proposed approaches open important directions for future research in the mobile domain, and envision such research to tackle three topics related to this special issue:

1) Requirements in the mobile domain: (i) Methodologies and techniques for requirements engineering; (ii) Stakeholders identification, classification and prioritization; (iii) Requirements trade-offs (e.g., performance vs. power consumption); (iv) Mobile technologies for supporting requirements engineering activities; and (v) Security and privacy requirements in mobile apps.

2) App store analytics and quality of apps to improve software development: (i) Apps quality vs. apps success; (ii) Relation(s) between reviews and apps characteristics (rating, pricing, etc.); (iii) Monetization strategies for app developers; and (iv) Security and privacy issues.

3) User feedback and user involvement in the mobile context to improve software development: (i) Gathering, mining and classification of user feedback from different sources; (ii) Motivational issues of end-users to provide feedback; (iii) User experience and App

https://doi.org/10.1016/j.infsof.2019.05.005

recommendation; (iv) Crowdsourcing to support requirements engineering activities; and (v) Mechanisms for users engagement and fidelization (e.g., gamification).

Handling this special issue was a great experience, this would not have been possible without the hard work of all reviewers, which provided important feedback to the authors of submitted papers. We are also very grateful to the great and constant support received by the emeritus editor of the journal, Claes Wohlin, which was critical for the preparation of this special issue.

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References

[1] M. Nagappan, E. Shihab, Future trends in software engineering research for mobile apps, in: Leaders of Tomorrow Symposium: Future of Software Engineering, FOSE@SANER 2016, Osaka, Japan, March 14, 2016, 2016, pp. 21–32.
[2] M. Harman, Y. Jia, Y. Zhang, App store mining and analysis: MSR for app stores, in: 9th IEEE Working Conference of Mining Software Repositories, MSR 2012, June 2-3, 2012, Zurich, Switzerland, 2012, pp. 108–111.
[3] G. Grano, A. Di Sorbo, F. Mercaldo, C.A. Visaggio, G. Canfora, S. Panichella, Android apps and user feedback: A dataset for software evolution and quality improvement, in: Proceedings of the 2Nd ACM SIGSOFT International Workshop on App Market Analytics, in: WAMA 2017, 2017, pp. 8–11.
[4] G. Grano, A. Ciurumelea, S. Panichella, F. Palomba, H.C. Gall, Exploring the integration of user feedback in automated testing of android applications, in: 25th International Conference on Software Analysis, Evolution and Reengineering, SANER 2018, Campobasso, Italy, March 20-23, 2018, 2018, pp. 72–83.
[5] S. Panichella, A. Di Sorbo, E. Guzman, C.A. Visaggio, G. Canfora, H.C. Gall, How can i improve my app? classifying user reviews for software maintenance and evolution, in: 2015 IEEE International Conference on Software Maintenance and Evolution (ICSME), 2015, pp. 281–290.
[6] O.J. Romero, S.A. Akoju, An efficient mobile-based middleware architecture for building robust, high-performance apps, in: 2018 IEEE International Conference on Software Architecture Companion, ICSA Companion 2018, Seattle, WA, USA, April 30 - May 4, 2018, 2018, pp. 97–100.
[7] A. Papageorgiou, M. Strigkos, E.A. Politou, E. Alepis, A. Solanas, C. Patsakis, Security and privacy analysis of mobile health applications: The alarming state of practice, IEEE Access 6 (2018) 9390–9403.
[8] Z. Wang, Z. Ma, S. Luo, H. Gao, Enhanced instant message security and privacy protection scheme for mobile social network systems, IEEE Access 6 (2018) 13706–13715.