A Study of the Relation of Mobile Device Attributes with the User-Perceived Quality of Android Apps (Journal-First Abstract)

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Abstract—The number of mobile apps and the number of mobile devices have increased considerably in the past few years. To succeed in the competitive market of mobile apps, such as Google Play Store, developers should improve the user-perceived quality of their apps. In this paper, we investigate the relationship between mobile device attributes and the user-perceived quality of Android apps. We observe that the user-perceived quality of apps varies across devices. Device attributes, such as the CPU and the screen resolution, share a significant relationship with the user-perceived quality. However, having a better characteristic of an attribute, such as a higher display resolution, does not necessarily share a positive relationship with the user-perceived quality. App developers should not only consider the app attributes but also consider the device attributes of the available devices to deliver high-quality apps. The original paper is published in the Empirical Software Engineering journal communicated by Lin Tan.

Index Terms—Empirical study, User-perceived quality, Mobile app, Device attribute, App attribute

Overview

Online app markets, such as Google Play Store, are very competitive for app developers due to the exceeding increase in the number of mobile apps. Google Play Store uses a star-rating mechanism to quantify the user-perceived quality of mobile apps. Having considered the importance of high star-ratings, recent studies continue to explore the relationship between app attributes, such as the User Interface (UI) complexity, and the user-perceived quality. However, the user-perceived quality reflects users’ experience when using an app on a variety of mobile devices. Hence, the user-perceived quality of an app should not solely be determined by app attributes.

In this paper [1], we study the relation of both device attributes and app attributes with the user-perceived quality of Android apps. We study 20 device attributes, such as the memory capacity and the display size, and 13 app attributes, such as the code size and the UI complexity. Our study is based on 30 Android-based mobile devices and 280 Android apps. We build linear mixed effect models to identify the device attributes and the app attributes that share the most statistically significant relationships with the user-perceived quality.

We find that: (i) The user-perceived quality varies across devices. Users of some devices perceive apps to be of higher quality in comparison with users of other devices. (ii) Device attributes, such as the CPU performance, have a significant relationship with the user-perceived quality of apps. However, having a better characteristic of an attribute, such as a higher display resolution, does not necessarily share a positive relationship with the user-perceived quality. (iii) Both app and device attributes share a significant relationship with the user-perceived quality. However, some device attributes, such as the CPU performance and the display resolution, share a stronger relationship with the user-perceived quality than other app attributes, such as the number of UI inputs.

The findings of this paper help both device manufacturers and app developers. Manufacturers can focus on the attributes that have a significant relationship with the user-perceived quality. App developers should be careful about the devices for which they make their apps available as device attributes share a significant relationship with the user-perceived quality.

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