

1. Do Energy-oriented Changes Hinder Maintainability?

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Abstract: Energy efficiency is a crucial quality requirement for mobile applications. However, improving energy efficiency is far from trivial as developers lack the knowledge and tools to aid in this activity. In this paper we study the impact of changes to improve energy efficiency on the maintainability of Android applications. Using a dataset containing 539 energy efficiency-oriented commits, we measure maintainability - as computed by the Software Improvement Group's web-based source code analysis service Better Code Hub (BCH) - before and after energy efficiency-related code changes. Results show that in general improving energy efficiency comes with a significant decrease in maintainability. This is particularly evident in code changes to accommodate the Power Save Mode and Wakelock Addition energy patterns. In addition, we perform manual analysis to assess how real examples of energy-oriented changes affect maintainability. Our results help mobile app developers to 1) avoid common maintainability issues when improving the energy efficiency of their apps; and 2) adopt development processes to build maintainable and energy-efficient code. We also support researchers by identifying challenges in mobile app development that still need to be addressed. (0 refs)

Inspecc controlled terms: energy conservation - mobile computing - power aware computing - smart phones - software maintenance

Uncontrolled terms: general improving energy efficiency - maintainability - Wakelock Addition energy patterns - energy-oriented changes - mobile app developers - energy-efficient code - mobile app development - 539 energy efficiency-oriented commits - Software Improvement Group's web - energy efficiency-related code changes

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