Abstract

This paper presents the effect of saving Android application execution time on saving energy consumed by optimized applications. An algorithm for optimizing instructions on a Smali code-level proposes to provide execution time. The Smali optimization algorithm relies on replacing high execution times instructions with lower execution times ones and equivalent in behavior. MySMALI compiler is designed to support the proposed optimization algorithm and applied on Android applications. Optimized APK files are generated for optimized applications. Measurements of APKs execution times are taken. Measurements prove that the percentage of optimization in execution time is approximately 26.27%.

The paper provides code-level estimates of the energy consumption of Android applications. A programmatic method about reading operating system files is applied to determine resource consumption by the applications. Energy measurements are also recorded by a power monitor (PowerTutor) for Android-based mobile platforms. The measurements of resources (Memory,
CPU, Disk) consumption prove that the optimized compiler helps to save the consumption percentage of Android applications about 19.9%. The memory consumed is provided by the optimized compiler to approximately 20000 Kbyte and 31.7 KB size of files. The time that the optimized process of application consumes from the CPU time is reduced from 26% to 5%. The results demonstrate that the providing execution times of applications can save energy consumed to approximately 8.4%, and can save the power consumption by up to 14%.

References

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Index Terms

Computer Science
Software Engineering

Keywords