Related Work:

Performance issue in mobile applications is relatively new topic and developers have very little knowledge about it. There are few studies done in this area.

In [1], Liu, Yepang, et.al did an empirical study to find out the performance bugs in 8 famous and large scale android applications. From the bug tracking system of repositories, authors manually identified 70 performance bugs, which they further classified into 3 main categories. According to their finding, GUI lagging bug category is most concerned by developers with 75.7% of performance bugs followed by energy leak with 14.3% and memory bloat with 11.4%. To validate their results, authors developed a static code analyzer, which is capable of detecting two types of performance bugs anti-patterns, which they identified from analysis of 70 performance bugs. In our paper, we are doing a large scale study comprising of 2440 open source repositories and focusing on performance related commits to find out the key issues that degrade the performance in android apps.

Similar to our work, a qualitative study on the energy aware commits is done in [2], in which authors started with analyzing the 2189 commits from GitHub Archive, which they further simplified in a set of 371 commits, which are distributed over 371 non trivial real time applications. According to author's observations, developers more rely on low level energy management methodologies such as frequency scaling etc. Also poor implemented techniques for saving energy may impact on the correctness of app. In our study, we are focusing on performance aware commits by analyzing 486 commits obtained from a large scale study of 2440 open source android applications.

Related to developer's perspective on performance issues and their best practices in android apps, Linares-Vásquez, Mario, et al. did an empirical study, surveying 485 apps and library developers from GitHub [3]. According to their findings, developers mainly rely on tools for performance profiling as well as for debugging their android apps. Another interesting observation of authors was related to best practices is that, developers mostly use multithreading to fix and improve performance bottleneck. In our study, we are mainly focusing on the performance related commits, which developers write/commit after doing change in source code file (also add or remove any file). This study helps us to understand, which type of performance bottleneck developers frequently encounter while fixing/modifying source code.

There are also few studies that focusing on the detection of performance bugs through tools [1] [4]. In our study, we analyzing performance related commit messages to find out different kinds of performance issues in android apps.

In this paper, we are doing a quantitative and qualitative study of performance commits to find out the major concerns of performance in android apps. To best of our knowledge, it is first large scale study of performance related commits in android apps. We are considering the sample space of 2440 open source android apps whose source code is publically available and also having the register app on Google play store. Our work is a baseline for the researcher and developers in this direction of research.

Reference:

[1] Liu, Yepang, Chang Xu, and Shing-Chi Cheung. "Characterizing and detecting performance bugs for smartphone applications." Proceedings of the 36th International Conference on Software Engineering. ACM, 2014.

[2] Moura, Irineu, et al. "Mining energy-aware commits." *Proceedings of the 12th Working Conference on Mining Software Repositories*. IEEE Press, 2015.

[3] Linares-Vásquez, Mario, et al. "How developers detect and fix performance bottlenecks in Android apps." *Software Maintenance and Evolution (ICSME), 2015 IEEE International Conference on*. IEEE, 2015.

[4] A. Nistor and L. Ravindranath. Suncat: Helping developers understand and predict performance problems in smartphone applications. In ISSTA'14, pages 282–292, 2014.