TOPICS IN INTERNET RESEARCH

(CS-678)

PROJECT PROPOSAL

Browser Crash Analysis on Low Memory Mobile Devices

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Introduction

According to statcounter, Android overtook Windows as world's most used operating system this year. This can easily be credited to the expansion of internet, driven primarily by the expansion of mobile broadband. However not everyone can afford a premium device, Low-End devices are still dominant in developing countries. The issue with entry level phones is that the user is bounded to limited by specifications of the phone, so the apps may or may not run smoothly because of certain factors. Identification of those factors is the first step towards resolving them. In case of a browser, this becomes even more complicated as now we are dealing with a dynamic data-set. This problem is crucial for prevention of entry level users from leaving the internet because of bad user experience.

Goals

The objective of this project is to analyze several factors that lead to a browser crash on a low-end device. We will be targeting android followed by chrome as browser, our decision is motivated the percentage share of each software (Android 74.6% and Chrome 56.34%). Specifically, the project will investigate the following:

- Finding the main reasons behind the browser crashes on Low End devices. This entails things such as identifying the exact factors due of which a browser crashes and how each of those factors present are contributing toward that error.
- Reproducing those crashes under a controlled environment.
- Validating the enlisted reasons and measuring their input towards the browser crash.
- Proposing a solution to resolve the problems that causes a browser to crash.

Related Work

Google had announced recently an initiative to design customized OS and Application store for low end mobile devices in developing countries. Android Go is a whole new version of Google’s operating system designed specifically for those with low-end devices that don’t pack much RAM or processing power. It’s a lighter version of the Android OS and makes the system more optimized for devices with lower performing specs. Google’s VP of Project Management for Android and Google Play was quoted as saying last year, “I think that the data that we are seeing from industry analysts and what our manufacturing partners tell us is that there are many, many devices shipping -millions of devices shipping -every year with 1 GB RAM and below". There is no other known related work in terms of browser crashes.

The goal of this project is to investigate when memory crashes happen in a browser on such low memory devices and to design and implement solutions for avoiding and managing memory crashes.

RESEARCH METHODOLOGY

We will start with filtering through the already provided documents from developers of android and then we will explore some tools. We look through the present tools such as Android Studio Profiler and Showmap for analyzing the memory state of a mobile device. The best possible way would be clear the device of any extra application and having only installed chrome. We would the then see the see the trend in free memory heap as we start putting load on a browser. For initial we load static pages with memory intensive objects. After getting an estimation of memory base points the such as Kswapd limit and lmk threshold, we will begin loading simple yet memory intensive pages to see how often it concludes to crash. Finally, after getting sure of one reason we will start finding another one (Given we are able to find the first one)

PLAN OF WORK & TIME SCHEDULE

1. **Proposal -** that presents the need to study browser crashes on low-end devices and the practical ways in which the proposed study should be conducted.
2. **Mid-project Report** - composed of an abstract, introduction and analysis of the relevant technologies and identification of problems and drawbacks.
3. **Final Report -** a complete research summary that describes our contribution towards the study of crashes, with possibly giving suggestions towards the solutions.
4. **Final Presentation -** present our work to the audience and share our knowledge about the challenges and constraints that were incurred during the project.

References

- https://www.softwaretestinghelp.com/mobile-testing-low-end-devices/
- http://gs.statcounter.com/os-market-share
- https://developer.android.com/topic/performance/memory-overview
- https://developer.android.com/studio/profile/memory-profiler
- https://android.googlesource.com/platform/system/core/+/master/lmkd/README.md
- https://chromium.googlesource.com/chromium/src/+/HEAD/docs/memory-infra/memory_benchmarks.md

Github Repository

- https://github.com/abdul-manaan/Topics_Project