

Developing Real Time Tracking of User Behavior, with Google Analytics for Mobile Phone Devices

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Abstract

Sony Mobile has a quite large internal user group with the purpose of investigating the usability of their mobile devices. The Telephony Domain was using among other techniques usability testing to evaluate the usability of their products. The performed conventional usability testing has its limitations e.g. the controlled test environment cannot fully represent real life setting and it's very expensive in terms of time and resources. This ultimately results in less test persons and potentially biased results. These drawbacks cannot be overlooked when it comes to determining the next software release influencing millions of mobile device users.

The purpose of this thesis work was to accommodate this problem by examining real time tracking of user behavior and interaction with mobile devices. By utilizing Google Analytics in the Telephony Domain, we could autonomously gather large quantity of real user behavior data from a natural environment. The investigation resulted in the conclusion that Google Analytics & Google Tag Manager solely weren't sufficient for our purposes in aiding information for user behavior.

To account for this, a tool were developed that were to be called Usage Tracker. Usage Tracker works as a complement to Google Analytics & Google Tag Manager by providing further functionality e.g. finding out how many users are using a feature and how these events are distributed over the users. The resulting statistics from Usage Tracker is also presented in a more intuitive way for easy interpretation. Furthermore, a direct consequence of using Usage Tracker is that less data traffic will be required.

I. INTRODUCTION

THIS work was carried out in the Telephony Department at Sony Mobile in Lund, Sweden. The Telephony department is responsible for amongst other things, the Phone application and "Call Settings" in Sony Mobile phones. These applications are subjects of constant updating resulting in frequent new additions of features and modifications of features. They have now become very populated and to determine if a feature is still relevant or has become redundant, Sony Mobile uses e.g. usability testing. The way usability testing is done today in Sony Mobile has its advantages but also its limitations. Our thesis work will be to investigate and develop a way to utilize Google Analytics as a comple-

ment to today's usability testing.

II. THE WORK

In the investigation phase of the work, we realised that the reference implementation wouldn't be enough to answer the relevant questions specified in the task list that we received from the scope owner. Using the reference implementation the statistics generated by GA would only be presenting us the total number of times a certain feature had been activated. This number would be accumulated by all of the users together and we wouldn't by any means be able to calculate out exactly how many times an arbitrarily individual had activated something. No indications if the number

of activations are evenly distributed over all the users or if there's a small percentage of users that made up for a large portion of the total number. The majority of the tasks were not about finding out how often a feature was activated but instead they were about finding out how often something was used and how many uses it. These two questions may sound similar but hold very different meanings and would mean for us to create our own Usage Tracker.

I. Example

Take for an example where we have button B1 and button B2 and we want to find out which of the two buttons most users are actively using. By using the reference implementation it would only be able to present us the number of times B1 and B2 have been clicked upon from a total number of users' perspective. Lets say B1 have received 500 clicks and B2 has received 700 clicks by the total number of users. This tells us that B2 have been clicked upon 200 times more than B1, what it doesn't tell us is how many users and how many times an individual user have clicked on B1. Therefore there's no way to tell if the usage of the feature is even amongst all of the users or if it's only a small percentage of the total users that represents the accumulated value.

III. RESULTS

The work resulted in a tool, Usage Tracker, that uses GA. However, instead of reporting every time a feature is being activated, it will only report once when a specific time interval has been reached. In this interval we can guarantee that a user has only reported once and the reported value is the number that has been accumulated over this time interval. The time interval amongst other parameters is modifiable over the air with GTM through a simple web interface.

The tool consists of two main parts called Counter and Toggle. A Counter is used to measure the number of activations of a feature

for each user. I.e. number of times a specific user has answered a phone call with the Bluetooth headset when it's connected as opposed to answering from the phone. When the time interval is reached the value that contains the number of activations is put into a corresponding slot and then sent to GA.

A toggle is used to measure which setting is toggled for a feature. I.e. which "Equalizer" setting has been selected. When the time interval is reached the toggled setting will be reported to GA.

To make the data more readable in GA we're presenting the data differently from the orthodox way. For easy access to data concerning each task, we have chosen to categorize all information for a given task under its task name. E.g. all features to the main feature "Call Settings" in "Phone Settings" will be grouped together in the event reports under the common name "Call Settings". This allows for fast access to all data concerning the task "Call Settings". This simplifies the navigation to the feature of interest and following is an example of finding data concerning the feature "Slow Talk". The first step is to select a Main Feature, in this case "Call Settings". The next step is to locate "Slow Talk" in the list that appears. "Slow Talk" is a checkbox which means that we can collect two types of data for this Feature. Either the number of times a specific user has toggled it, and the numbers of users that has it enabled or disabled. To get this information just select the corresponding one in the list that appears, either "Slow Talk" or "Slow Talk toggle".

In addition from separating Counters and Toggles there's also support for filtering the data after e.g. Country, operator, report interval, phone model etc.

In Figure 1 below, we can see an example of how the Counter data for the "Slow Talk" feature may look like and in Figure 2 we can see how the Toggle data for the "Slow Talk" feature may look.

Event Label	Total Events
	52 % of Total: 3.68% (1,414)
1. 0	12 (23.08%)
2. 1	15 (28.85%)
3. 2-5	10 (19.23%)
4. 6-10	15 (28.85%)

Figure 1: How the values for a Counter looks like

Event Label	Total Events
	22 % of Total: 1.56% (1,414)
1. Disabled	16 (72.73%)
2. Enabled	6 (27.27%)

Figure 2: How the values for a Toggle looks like

IV. DISCUSSION & CONCLUSIONS

Using Usage Tracker together with today's internal usability testing allows us to obtain heaps of quantitative data and at the same time qualitative data from the users. This helps in determining which features to keep and which ones that can now be omitted, allowing more resources to be spent on high demanded features.