SETSCI Conference Proceedings,
4 (1): 553-555, 2019

ISAS 2019
3rd International Symposium on Innovative Approaches in Scientific Studies
Section: Engineering and Natural Sciences
April 19 – 21, 2019, Ankara, Turkey

User Experience Analytics for Android Platforms

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Presentation/Paper Type: Oral / Full Paper

Abstract – For every function of an application almost in every page, there major and minor tasks of user. As an example, for the weather application, major task of user is checking weather degree, the minor one is humidity or wind. How many times did you checked wind? How much people checking the wind? Almost every weather application has these features. There is cost to develop building these kinds of functionality for almost none. These details are also increasing the complexity of GUI that causes the bad user experience that causes the lower user-base. Thus, tracking the user behavior is crucial for every application. The paper User Experience Analytics for Android Platforms is proof of concept that lets analytics experts to track user gestures, watch user session, activity recordings and touch heatmaps for every screen, for deep understanding of UX and user behavior. As a second part of this android project there is a reporting module that insist of Exact Touch (Dot) Map, Heat Map, Gesture Statistics, Activities and Session Recordings in order to provide insight for the product development team.

Keywords – User Experience, UX, Analytics, Android, Mobile, Heat Map, Mobile Screen Gesture Statistics

I. Introduction

This paper focuses on tracking the user experiences on the android applications. Because, after developing the product visibility of usage is disappearing. There are logging and crash report methods to increase customer satisfaction. But this is not enough to see how user is using which functionality of application. Developer is implemented for what, how customer is using.

There are related products for similar approach that is Google Analytics and Yandex Metrica. Both have traffic analysis, audience and ad hoc reporting. Yandex Metrica has also behavioral analytics in terms of accurate session replay, click heat maps, form analytics and heatmaps. These all features for the web applications. Developers paste one-line java script code into their application, then they can use all the functionality for free. For mobile Yandex has App Metrica that is mainly using user agent methodology to gather online user metrics data. There is also a start-up company called "appsee", they have additional functionalities according to App Metrica for almost all mobile platforms, but that is not free.

This paper User Experience Analytics for Android Platforms focuses on tracking users' touches, gestures and activities for Android platform. There is also reporting module to review user's data.

II. Materials and Method

A. Concerning Problems

Mobile market shares exponentially increasing. Because of that there is a need for to increase visibility of user experience to keep more user in. Since making a usable product doesn't mean that there is user friendly or user experience. (Robier, 2016) Building user base is one of the money-making methods of mobile app developers, that is mainly based on user experience which is missing point of the application development. However, this is crucial for the products that needs crossing the chasm.

According to technology adoption life cycle there is a chasm between early adopters and early majority. One of the traditional targeting methods of marketing a product is analysing the mainstream market, market share and demographic data of customers. But for the high-tech marketing instead of using traditional targeting, persona analysis would be better for the high-tech products. Successful products have their own languages like gestures, words and user experiences. For instance, twitter calls their content as "tweet.". Instagram's focus is mobile, and its gestures are scrolling and double tab. These are the main elements of crossing the chasm. (Moore, 2014).

Also, most industrial accidents are caused by human error: estimates range between 75 and 95 percent. How is it that so many people are so incompetent? Answer: They aren't. It's a design problem (Norman, 2013). After developing application, there is a beta testing to improve application. But there is no UX testing focus. Developers have no idea whether their application has design problem or not.

B. Related Work

There are related works in terms of Google Analytics, Google Play Analytics, Yandex Metrica, App Metrica and Appsee. Google Analytics' and Yandex Metrica are for the web applications, and Appsee is for the mobile platforms.

Firstly, Google Analytics is online user metric tool. Google Analytics' User ID functionality. User-ID enables the association of one or more sessions (and the activity within those sessions) with a unique and persistent ID that you send to Analytics. Any engagement, like link clicks and page or screen navigation, that happen while a unique ID is assigned can be sent to Analytics and connected via User-ID. (About the User-ID feature, 2018)

Secondly, for the Android Mobile Applications analytics there exist Google Play App analytics that is has no capable to show touch maps, gestures and detailed session activities by comparison google analytics, that is for only web applications.

Thirdly, Yandex Metrica is another online user metric tool for web developers. In addition to Google Analytics, Yandex Metrica has behavioral analytics that includes session replay, form analytics, click & scroll heat maps are in-page analytics power pack available right out of the box, for free. (Yandex Metrica, 2018)

Fourthly, Yandex App Metrica has behavioral segmentation that view user properties, activity and engagement and group them by behavior patterns based on their activity data. This app is logging which button is clicked to generate statistics report but there is no detailed session recording like Yandex Metrica.

Lastly the most similar one is paid one Appsee. First feature is Appsee's user recordings allow developers to see their app through their user's eyes. They supply you with powerful user feedback on your app's UX and a complete picture of your user journeys. Appsee's User Recordings analyze users on the single-user level and record all taps, swipes, and actions. Second feature is touch heatmaps. Appsee automatically tracks all touch gestures (taps, swipes, pinches etc.) and aggregates them into a touch heatmap for each screen in app. There is also automatic event tagging feature that is similar with Yandex Metrica. Appsee automatically detects all screens, gestures and user actions in app to use improving application workflow. (Features, 2018).

C. Approach

User Experience Analytics for Android Platforms paper aims to provide visibility of how users using the product. The android project consists of two parts. First one is gathering the user's touches, gestures and logging the activities with its time stamps. The other part is using first part's data to generate reports that are needs for business analytics. The differences of this project from related works are gathering Android's core activity lifecycle data for activity reporting and for the gesture frequency report to increase consistency of application language. That is one of the supporting elements of crossing the chasm.

In this paper there is no specified domain of application like e-commerce or social networking. There is an empty screen that includes live gesture and touch coordinate listener with two buttons. Also, there is android's core activity life cycle methods to listen user's activity. Lastly, there is timer that produce duration of user sessions. These are the proof of concept to show how to track user's activity and produce session reports.

D. Materials and Method

In today's competitive environment the is a hurry for development of software product. Companies need to ship their product fast. But developing usable product to solve customer's problem is not enough. Customers need to have fun that is user experience. Because, there are many alternative products. To make a difference in this competitive environment, product development team needs more visibility. Data gathering by using user agents to show online user metrics is not enough to increase user experience. According to writer Geoffrey A. Moore, to have a successful product, companies needs to produce this product's own language by using words and gesture patterns. In addition, to decrease error tolerance of customer targeting, companies need to track their customers more.

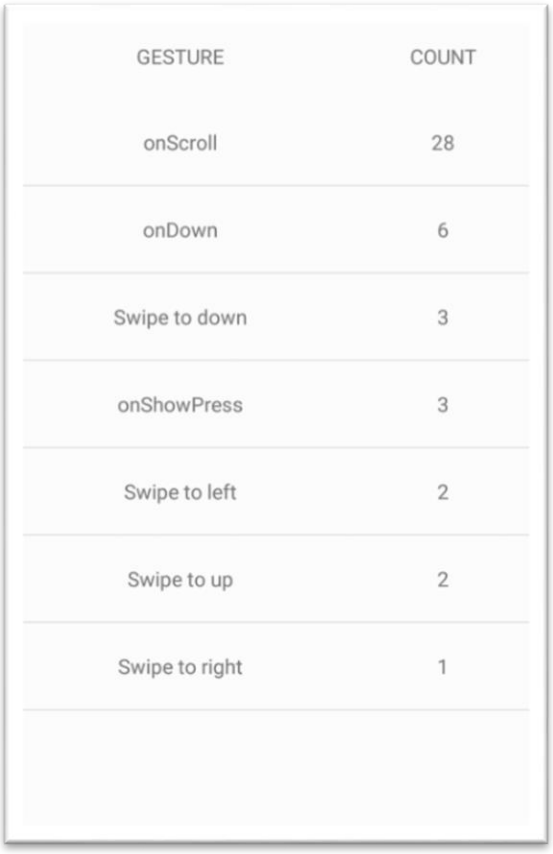
Several materials used for this paper. Required screen format will be android smartphone or and tablet representation for client view. Menu structures will consist of pages that are located as buttons below of the screen. The end-user can easily navigate between the pages of the mobile application. The android project needs a local SQLite database for android tablets or smartphones. The packaged mobile application installed on Sony Xperia XA1 mobile device. For android devices, the version should equal or higher than Android 5.x.x. Development Environment is Android Studio 3.2.1 with JRE 1.8 and min sdk 22 to target sdk 28. Browser for SQLite Version 3.10.1, Qt Version 5.7.1, SQLCipher Version 3.15.2. used for the browsing database. Sony Xperia XA1 device is used for the testing.

In this paper, the solution starts with user tracking in the Android Platforms. There are touch listener, gesture listener, stop watch and activity listener. First part of solution is start with touch listener that listens user's screen touches according to resolution of screen then records that data as integer of pixel x pixel. Then that data becomes input for gesture listener. Secondly, Boolean gesture methods of Tap, Double Tap, Press and Long Press are in the Motion Event library of core Android. To catch Boolean swipe and scrolling gestures, methods needs to have distance between two or more touches. These data are inserted into local database to generate touch map, heat map and gesture frequency report. Touch map and heat map increases visibility of how customers using the product. Gesture frequency report is input for the creating a product's gesture pattern language.

Second part of this android project is creating session and activity reports. Session reports created by using android's Core activity life cycle library methods of onCreate, OnDestroy, onStop, onRestart, onStart, onPause, onResume that developers can understand where user is. In addition to these there exist a timer that calculates duration that how many second does user spent where. Activity reports data includes uses session IDs from session class and gestures from gesture listener class and gesture's duration from stop watch class.

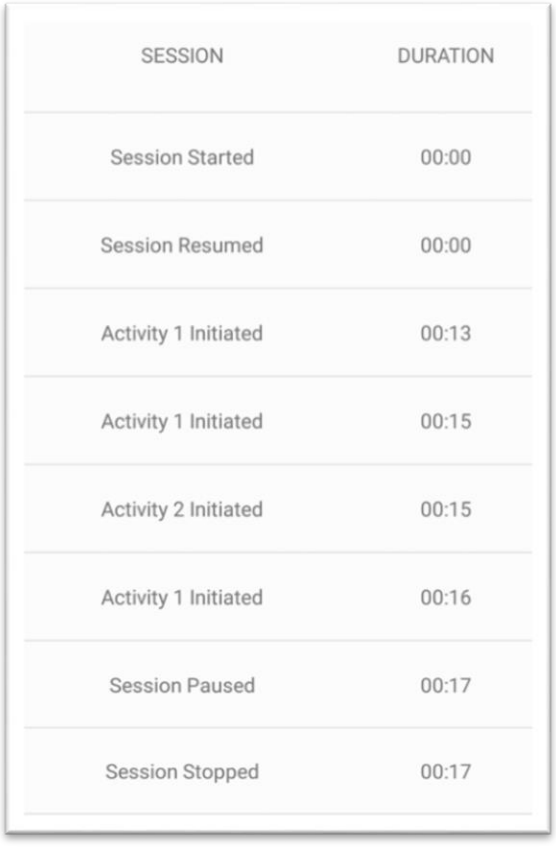
III. RESULTS

By using user touches and user sessions, a reporting module is implemented to visualize these gathered data in terms of Dot Map, Heat Map, Gesture Frequency, Activity and Sessions. These reports are valuable inputs of improving product's user experience and unique characteristics. Below figures represents the results of User Gestures and User Sessions.



GESTURE	COUNT
onScroll	28
onDown	6
Swipe to down	3
onShowPress	3
Swipe to left	2
Swipe to up	2
Swipe to right	1

Fig. 1 User Gesture Report Screen Shot



SESSION	DURATION
Session Started	00:00
Session Resumed	00:00
Activity 1 Initiated	00:13
Activity 1 Initiated	00:15
Activity 2 Initiated	00:15
Activity 1 Initiated	00:16
Session Paused	00:17
Session Stopped	00:17

Fig. 2 User Session Report Screen Shot

IV. Conclusion

The software development lifecycle trend becomes agile. Because, customers' consuming products or contents fast. Thus, companies need to ship their product fast. Developing usable product to solve customer's problem is not enough. In order to win this run, companies need to make difference. In today's need is user experience. Still it doesn't mean that user friendly. Customers would prefer a fun while solving their problem. User experience equivalent to fun, usable is equivalent to solving problem that is also core engineering definition. But, in this competitive environment, computer engineering discipline must to think user experience. Since, computer science was built the communication of machines. For instance, HTTP is still working for communicating machines which makes computer science hard to understand and makes computer scientist vision machine oriented instead of human oriented.

In order to emphasize importance of user experience in software development, this paper's focus is development of the proof of concept that tracking user behaviour for the android mobile applications. By using user's touch events and Android's core activity lifecycle functionality, this app is generating reports for Touch Map, Heat Map, Gestures Frequency Statistics, User Activity and User Session Recordings. These are the basic key metrics of analysing user behaviour in the application.

V. Future Work

For the future work, this implementation might be tried on different platforms like IOS, Ionic or Native Mobile environments. Another study might be software product's gesture pattern style.

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