Scope And Challenges Of Mobile Analytics In Digital Learning

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Abstract: Big data is a term for vast data sets containing large, more varied and complex structure with the difficulties of storing, analyzing and visualizing for further processes or results. Research for Big Data will focus on analysing the challenges and contingencies associated with the immense, unstructured, enormous and dynamic nature of Big Data. These Big Data attributes are fitted poorly for relational models of conventional database systems and end-user requirement for complicated, real-time decision-making stay unmet.

Big data is now a reality: The volume, variety and velocity of data coming into your organization continue to reach unrivalled levels. Big data is difficult to work with using most relational database management system. "Big Data" has required of IT specialists in Software AG, Oracle Corporation, IBM, Microsoft , SAP and Dell. They have spent a large amount on software firms just only for data management and analytics.

Big data requires advanced technologies to effectively process a bulk of data within optimized time limit. In private sector eBay uses two data warehouses at 7.5 petabytes. Everyday amazon has to handle millions of back-end operations.

Research of big data leads to Mobile analytics also. Mobile is changing the way people communicate, work and play, enhance their knowledge and this is driven by mobile apps which are increasingly being using in digital education. Every day people are engaged in exciting new forms of learning.

Mobile analytics studies the behaviour of mobile application visitors and consumer engagement. Data collected as a part of mobile analytics typically includes page views, visits, no. of visitors and countries along with information specific to mobile devices such as device model, device capabilities, service providers, Web page tagging and Visitor identification. Extraction of these useful informations for developer will help of gaining richer and deeper insights and getting an advantage in the competitive market and create smart learning environment in context of user convenience. In this paper, we focus on overview of set of tools that provide capabilities as event tracking with better extraction of data with associated challenges.

Keywords:Smartphone, mobile browsing, visualization, security, IT enterprise, mobile analytics, big data .

I. INTRODUCTION

The mobile app is the first non-web platform to be built for user conveniency. The increasing popularity of cell phones and other digital devices capable of connecting to the Internet, coupled with the dramatic increase in popularity of powerful smart phones. It is essential for us to understand how users interact with and move through the app.

Unfortunately the number of available experts for deploying mobile apps across diverse networks, devices, and application stacks is currently lacking. In situations like this, app Analytics Tools are a strong champions for the appropriate use of measurement to help determine the quality and efficacy of deployed sites and applications.

The process of extracting , collecting and analyzing the immense and unstructured data to find useful pattern, is mobile analytics. These unstructured data includes streaming data on daily basis, weblogs, social media posts, pictures, downloaded data, emails, chat messages, audio and video files. It leads to huge competitive opportunity in market. Certainly big data has 3 main characteristics: variety, volume , velocity. Mobile analytics is explored in digital learning to enhance it. Basically digital learning is as application or content delivered on demand via digital devices like fablets, tablets, phones.

Lifecycle metrics, Acquisition and user metrics, Engagement metrics , Outcome metrics. these are designed to measure the entire mobile customer journey - from discovery to download to engagement. It enhances the creativity of app experiences that would be more useful in data-driven decisions at each stage of the app lifecycle:

Mobile analytics shares many terms and concepts that are, at first, familiar to marketers who have experience with online analytics. A smart phone and a desktop computer can both access the web and find the same content using a browser built by the same company. The same metric reported for a desktop user does not mean the same as it would for a mobile user. [1]

Most of the companies are looking for these analytics concept to achieve their business goals.

The key to this difference is in understanding how the context and capabilities of mobile interact with consumer behaviour. The most important difference is the nature of consumer engagement, which is heavily influenced by the intimacy and personal nature of mobile. At the heart of mobile analytics is an understanding of this engagement. [2]

II. NEED OF MOBILE ANALYTICS

The importance of Mobile Analytics and the role of it is important to understand how its capabilities will affect the overall performance of organization.

Mobile app analytics helps to monitor real-time user engagement and thereby enhance user experience of the app users. Further, for mobile development companies, mobile

app analytics help to track and measure ROI return on app investments. They can get information by tracking the user activity with app.[3]

Mobile analytics will become a more powerful tool because smart phone users produce more data. The reports are designed to give useful data to developers about who is using their apps and how they're using it.

The marketers realized that understanding the functioning of mobile transactions was a critical part of determining what type of data it should send to customers.

The big data is already producing enormous amounts of information, and marketers are hassling to perceive meaningful cycle to help them present the most appropriate ads to the right users at the right time and place.

The mobile app analytics companies help best app development companies to make their app stand out in the marketplace. They help to attract, engage the relevant consumer and contribute to growth in revenue from the app. It helps to make closer to get know right users, right relevant data on right time.

1. Develop an efficient mobile marketing strategy.

Without analytics marketers have no base to build strategy. Analytics will help elucidate a measurable goal. Does app have an decent return on investment for overall campaign? Which tactics should opt for procuring the highest returns?

It's very difficult to give all these questions to build a successful marketing campaign.[4]

2. Sharping the end user experience

Mobile Web analytics are useful for understanding how consumers consume content, which screen are repeated frequently , which have highest quit rate and what changes can be made to optimize their browsing behavior. Optimizing the app performance is a biggest problem for developers; cause and effect scenarios via analytics reports shows which part of app need attention in order to improve the over all user experience.[5]

3. collecting Real-time data :

Data collection is the pillar of engaging business campaigns. Mobile analytics harnesses the power of data to create more relevant, engaging messages that can increase. Constant monitoring can give up-to-date knowledge to filter the user experience by using interactive visualization, an interface to apply filters and various views of data. A complete cycle of perception of data on how individuals use apps or web page to improve user engagement is key to succeeding with mobile analytics. [6]

4. To Deliver custom content :

Customized reports provide a base for organizations to look at their data. Once businesses have established the programs and features that work for their customers, they can better justify future investments. With the addition of data on the connecting device, mobile sites can be increasingly

optimized to meet the specific expectations of each consumer.

5. To detect the mobile device

Which mobile devices downloading app? It is important to measure the efficiency of mobile marketing strategy to get know which mobile devices should be centralized in focus for future development. For instance, if we notice that more android users downloading this particular app, you can look into and can gain a better understanding of target demographic. [7]

III. CHALLENGES OF MOBILE ANALYTICS

Mobile Analytics technology is growing field in research area, and definitely this system of tracking is an important for feedback and improvement and functional system for monitoring and customizing the performance of a company's web presence.

Mobile devices are rapidly growing segment of the web-viewing market. Mobile app analytics are critical for marketers to develop a successful app. It shows in what way the user uses app through performance analytics and in-app analytics.

These include, smart phones (Android, iphone, Blackberry, Windows), tablet devices , dedicated mobile devices like the new Chrome Book, and even the few remaining non-smart phones that can view web content.

The mobile analysis industry faces a number of challenges that need to be addressed openly. [8] Certainly Mobile Analytics faces challenges as compared to Web Analytics. One of the most central functions of Analytics is the ability to identify a site visitor as new, unique, returning. There are many techniques for handling this in traditional Analytics, but some of these may not work in the mobile arena. Many mobile browsers do not offer java script functionality.[9]

1. Implementing Analytics across mobile is hampered by data silo.

A data silos is a collection of fixed data that an organization does not regularly use in its day-to-day operations-

The variety of data available in the mobile ecosystem necessarily brings with it a high level of complexity. SMS, mobile web, app behaviour data, app store data, location-based data, and mobile adand QR code data all tend to reside in separate data silos. Stitching this information together is challenging , and the mobile marketing industry should endeavour to break down these silos.[10]

2. Visitor identification

Visitor identification is the most important aspect of usable mobile analytics and some technical aspects are here but JavaScript and HTTP cookies are so unreliable on mobile browsers. As a result, some mobile web analytics solutions

only detect or count user visits per day. The best solutions provide reliable, persistent, and unique user identities, allowing accurate measurement of repeated visits and long-term customer loyalty.

For example , If a device's IP address is using for identifying the visitor, it may create problems. The IP of a mobile device is assigned by that device's ISP gateway. but, mobile devices oftenly switch ISP during a single browsing session. Say, user visit a website outside of his home. he needs to complete his task after getting back into your car. phone switches to the car's hotspot. Then it uses wifi of his home. It means he has gone through three distinct networks. It's an extreme example. Now the main problem is – will analytics identify it as different user or single one. Mobile Analytics have another solution by knowing Manufacturer, model, memory, screen resolution, etc. but it's also not successful because of deleted cookies.

3. Web page tagging

Retention reports visualization is a concept in mobile analytics which is not supported by any existing analytic tools. Retention visualization analyses means how often a user downloading a particular app and engaging with it.

JavaScript is a way, but this is not completely effective for all smart phones and cookies is not supported by all operating system. [11]

4. Need of Privacy

Privacy remains a paramount issue- Consumers expect that their information should be private with consumers transparency, notice, and choice. While the mobile marketing industry works to develop a self- regulatory approach , analytics partners should be mindful that consumers must be able to strive with any mobile device.

There are some considerations to keep in mind as well when implementing mobile analytics programs. network and local infrastructure failure, what may be technically or legally possible in one country may not be possible in another.

5. IP address

For desktop web browsing, the network address of the client machine usually gives some form of user identification and location. For mobile web browsing, the client IP address refers to the internet gateway machine owned by the network operator. For devices such as the BlackBerry or for phones using Opera Mini browser software, the IP address refers to an operator-owned internet gateway machine in Canada or Norway.

6. mobile data traffic

Mobile data traffic is a major cause of mobile web browsing. It is needed to get carrier revenue in mobile data traffic.

IV. EXISTING MOBILE ANALYTICS TOOLS:

Now we are going to discuss about some popularly used mobile web analytics tools and mobile app analytics tools that are built to analyze and improve the performance of mobile websites and apps. There is some free analytics tool and some are paid.

1. Google Analytics

By using mobile web or app analytics tool marketers can get know which device should be targeted. this tool tells how accessible and user-friendly the website or app is. This analytic tool gives some information regarding to metrics:

- Acquistion which means to find out about your new users who is entering .
- Mobile App Audience (to know new vs. returning statistics, country/language, app version)
- Mobile App Behavior (for event tracking, get reports on speed and crashes)
- Mobile App Conversion (set up goal, track conversion and see goal flow). This tool does not provide cohort analysis to track retention.

2. MixPanel

MixPanel provides web and mobile app analytics solution. The positive point of this tool is to get benefit of real-time data, funnel analysis, in-depth analysis and cohort analysis to track retention.
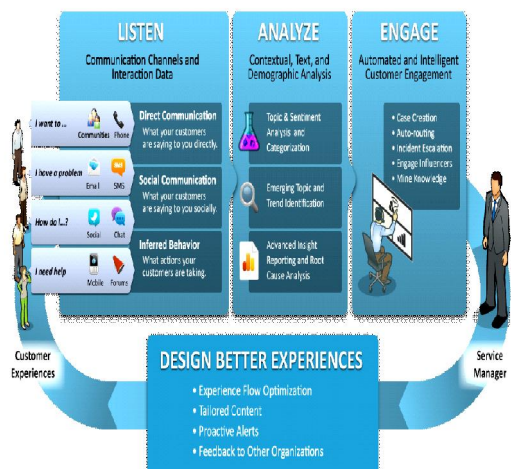
V. SIGNIFICANCE OF ANALYTICS :

It's a most important thing is to apply accurate strategies on bulk of data in order to get desired improvements that leads to better decision making report.

Most of the companies are using free analytic tools which may leads to wrong decision making concept.

Many top companies are using analytics tools like google analytics, Segment.io, flurry, MixPanel etc. flurry is using by google, skype, facebook. but still flurry does not support cohort analysis or real-time analysis.[12]

VI. GROWTH IN ANALYTICS :

Everyday the number of analytics business is increasing drastically. With increasing in demand, many companies are offering job that would be helpful for youth and users will get innovative experience also. At present, companies are hiring big data analysts as that is the most challenging and demanding job profile. [13]
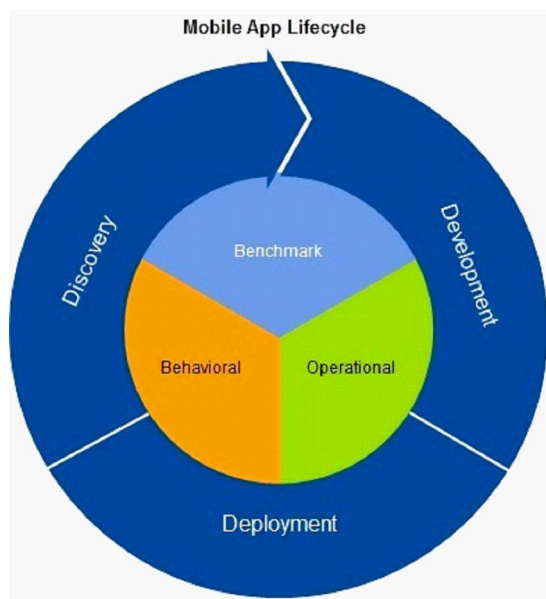
VII. KEY BENEFITS OF MOBILE ANALYTICS

Allows you to gauge the engagement and conversion behavior of mobile channel visitors

- Creates opportunity for responsive design
- Enables you to conduct channel-based targeting and drive better ROI from the mobile channel

- Allows you to gauge the performance of paid mobile campaigns
- Identifies prospects for incremental media spend
- Executives can make better decisions
- Visibility of business performance
- Customer satisfaction
- Accurate information will help to identify current trends and opportunities in competitive edge.

VIII. LIMITATIONS OF MOBILE ANALYTICS :

A large Amount of data is naturally generated by Internet users, also has a

significant limitation: The material is not listed in any systematic way.

There is wide scope in this research area , but the main point is how can the data analysed in practical way it's difficult to say and implement also.

therefore Sampling is probably a way but practically it's not successful . The reason is data is coming online by developers as well as users. Technical changes are done frequently to achieve business goals.

Google analytics that is the most widely used mobile analytics tool. more than 10 million websites are getting the benefit but still it has some general limitations regarding to session, reports, and goal achievement.

Actually all big data research is based on assumptions that user's data collection after posing them online.

Secondly, data security is main concern.

IX. CONCLUSION

Today mobile market is expanding dynamically. Device management is very difficult function. A strong competition is among the marketers because of same customers. They switches to different providers for low cost net plans, latest services to get better user experiences. There is need to track this dynamic industry and provide better IT enterprise.

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