

Designing a Cloud Analytics Service Framework for Mobile Advertisement and Marketing: A Review

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Abstract

If we talk about data earlier, it was not much larger and complicated because earlier the use of internet and technologies were not in use as it is in current days. Nowadays large amount of data is generated in every second, that's why Cloud environment became very challenging because of its popularity with the communication, networking and storage theorizes [5]. Today our modern era is significantly dependent on Internet and Mobile applications. Today's generation prefer to communicate with each other virtually rather than meeting with each other face to face so they use many mobile application or online application for communication using internet and technologies. Survey statics shows that mobile advertisement is rapidly growing that majorly focuses on marketing. In this paper we have surveyed different scenarios of mobile advertisement and marketing that how different methods, algorithm and approaches is being used for mobile advertisement and marketing.

Keywords: *Cloud Environment, machine learning, mobile devices, mobile advertisement and marketing, e-commerce.*

INTRODUCTION

The cloud computing is a large scale dynamic distributed computing model popularized with the communication, networking, storage theorizes and power that delivers on-demand services and provides benefits for using the accessible resources that's why all kind of users can access the cloud services and resources very efficiently and easily. All the Information can be prepared by the usage of high and parallel computational processors basically and remotely through cloud administrations. Following are the strings related with on-request quintessence and vulnerabilities of distributed computing. There are five noteworthy attributes of distributed computing; on-request self-administration, wide system get to, asset pooling, quick versatility, estimated administrations; and it has three administration models which are as pursue; programming as-an administration (SaaS), stage as-an administration (PaaS), foundation as-an

administration (IaaS); and furthermore distributed computing has four sending models, these are; open cloud, private cloud, network cloud, half and half cloud [9]. Cloud computing is scalable and works on pay-per-use environment where the users have to pay for the used resources only.

It provides sharing of information and different resources, that is used by anyone in the world and from anywhere at very minimum cost and efforts. Now a day large volume of data is being processed and stored and multiple users shares the cloud services, this scenario is gowning rapidly with respect to time so the cloud environment became challenging with respect to storage, communication and networking [5].

Advantages of cloud computing

- It has the potential to save the cost.
- It can save the storage space as users can upload photos, documents, and

videos to the cloud and then retrieve them according their convenience.

- It provides backups for the file and folders.
- Provides better security for protecting the data.

Mobile advertising is that kind of advertisement that uses mobile devices like laptop, smart phones, tablets etc. and it is a form of digital online marketing [4]. There are following types of mobile advertisement: (a) text adds that can be done through SMS, (b) call adds, (c)image text and banner adds that occurs in mobile web site, mobile games and in downloaded app [6].

These mobile advertisements are based on user's web browsing and searching history, geographic location of a user, andwith data collected through user's conversation or chat. Mobile devices have smaller screens in comparison to the computers or laptops, so this kind of digital advertising is usually optimized for small displays that gives a lot of information clearly and in a few words [4][6].

Mobile advertisement also works as hand in hand with digital online mobile marketing, that uses personal data of user's and technology such as location services for providing ads based on user's location habits and preference [1]. Some mobile advertisements may appear only when a mobile user is in close to a certain store

Mobile adds placement works through a way of a programmatic bidding process for placing the advertisement, in which advertisers makes an efforts or to attempt to achieve for the right to place an advertisement on a mobile device in real time. Demand-side platform (DSP) is an infrastructure that allows for this process. By the use of such platforms advertisers are allowed to optimize their performance

which are based on a number of key performance indicator (KPI), such aseffective cost per action (cap) effective cost per click (epic) Mobile Advertisement gives three different Opportunities to the Advertisers and marketers: 1) the customer engagement challenges due to huge mobile datasets, 2) adoption of unique and exceptional changes 3) impact and effects of mobile advertisement on digital marketing. [1]

TERMS RELATED TO MOBILE ADVERTISEMENT:

Banner Advertisement:
Banneradvertisement uses rectangular graphic display that is present at the top, bottom and sides of a website. Leader board is a former type of banner advertisement.

Banner ads are the one that are image-based, not that are text-based and are a popular form of online advertising. Objective of banner advertisement is to promote a brand and to make the users visit on the advertiser's website [8]. Banner advertisement is also known as display advertising that contains animated or static images that are usually available in high-visibility areas on high-traffic websites.

Mobile Marketing: Mobile marketing canbe used for the promotion of goods or services to an individual who is constantly connected to a network through technology. Mobile advertisement is an example of mobile marketing. Promotion of goods and services can be done through in the form of SMS text messaging, MMS multimedia messaging, downloaded apps, game marketing, mobile web sites. One of the major advantage of mobile marketing is that many users of mobile devices carry them around with them wherever they go [6][8] [14] [11].

Second screen advertisement:
Objectiveof secondary screen advertisement is to provide mobile ads that

are relevant to first-screen content in order to capture the attention of a user [2]. It is dependent on multitasking. In current scenario more than 80% of users uses mobile phones, tablets and laptop while watching television.

Direct to Consumer Advertisement:

Direct to consumer advertising (DTC advertising) is a type of marketing that uses TV, radio, print, social media and other forms of media that aimed to remind the customer's need for a product and for informing about the product [2][6].

Digital marketing: Digital marketing is away of reaching a consumer through internet, mobile devices, social media, search engines, display advertising and other channels [8] [11]. Digital marketing can be widely used for companies, political parties and other ideas. Internet (a.k.a. online) marketing differs from digital marketing. Online marketing is different from digital marketing because it can only take place through the Internet, whereas digital marketing can take place over the telephone, on a subway platform, in a video game or via a smartphone app.

UNDERSTANDING OF MOBILE ADVERTISING AND MARKETING

With the advancement in mobile, these cloud technologies are trying to make the world smaller in terms of connectivity. It is an open challenge for cities to manage and improve the technologies that can help out in solving real administration problem which related to each city.

Mobile advertising and marketing are helping us to know the world very closely not only they are providing us with services at our door steps. The mobile communication technology is playing avital role in individual's life in terms of communication or in any kind of work [2][3].

Mobile devices help in establishment of an active network that helps to make a proper communication and sharing of resources. It makes easy for us to check the e-mails time to time, and help us to manage all our bank transactions, transfer of money, buy tickets and much more [2][3][6].

It often provides us with facility to stay in touch with the world by means of streaming news and articles, not only this you can even watch TV shows without any time limit. With these facilities its making our life easier as mobile devices are the treasure of information which you can access anytime [2][6].

As mobile technologies are developing over a period of time, it's affecting the commercial activities of every single corporation related to this field and with the growing time as it is providing the customers with new dimensions in term of selection resulting the main cause in mobile marketing.

This type of mobile marketing is not just a simple term, it not just promotes mobile communication technology but also uses it to stand in today's competitive era and give a tough competition to other competitors.

Mobile devices are based on wireless connection and trying enhance in features with every passing day. They are not only portable but also consumes less resource and gives more result, this is the only reason for their increasing demand which has increased the marketing rate of the mobile devices [7] [12] [15].

MAJOR CHALLENGES OF MARKETING IN MOBILE ADVERTISEMENT

The term mobile advertisement and marketing is based on process by which each consumer come to know about the activities going on in there surrounding so that they can be the part of various

activities such as sales, offers, messages and contests via mobile device.

Every customer should utilize these latest technologies and be a part of this modern pattern. It provides us with a feature of text, audio and video communication. This type of communication methods has given a new direction to mobile marketing and advertisement [2]. There is a need of proper advertisement that clears every query of customer related mobile marketing, if once a customer gets to understand the features of mobile devices it will help in accelerating the speed of mobile marketing. Advertisement section is important because it makes the customer aware of the activities going on in the world and helps to be a part of it. Every proper advertisement enables the customer to participate in field of technologies and compare the plans that may help and promote mobile marketing. It promotes active communication between the customers [13] [14].

Mobile advertisement is directly proportional to mobile marketing as the ratio of advertisement increases, the ratio of marketing also increases. It provides us with the advertisement related to our situation or position as if you are college student then it will provide with the information of placements or post-graduation schemes. If you are working in a company, it will show you the advertisement of jobs you were searching for. These advertisements will depend upon your age, location, job and various fields of interest. The advertisement medium is remarkably increasing with each passing days, it provides us with privacy of information and transactions. No doubt it is a secure medium and worth trusting for confidential works, it also gives a wide range of option in advertisement and marketing field [10] [7].

NEED FOR SURVEY ON MOBILE ADVERTISEMENT AND MARKETING

As per the survey done, the medium of mobile advertisement lies in various categories like SMS, MMS, E-mails and Bluetooth. Every survey ended up on same conclusion that these advertisements are allowing customers to get any service depending upon their location or need [1][2]. These advertisements may also depend on the basis of chats which one customer has with another. This is only possible due to the growing marketing strategy and technologies too.

To excel in the field of marketing one should have a proper plan to execute it and new approaches to meet the requirement of customers. Once these advertisements get to satisfy the customer then the marketing rate would gradually increase [7].

The need of survey is necessary because it tells about the growth ratio in field of marketing and advertisement. With survey, chance of improvement also increases as it gives us a perception to widely enhance the rate of marketing and advertisement.

When an advertisement comes to a point ending up irritating the customers with various services, it is necessary to understand the need of customers and privacy too. So any advertisement should ask for a permission or works depending upon the consent of customers [2][6] [10] [13] [14] [15].

Bluetooth is a great invention of corporation as a customer gets to transfer any data with high speed connection, as it is a wireless connection it makes customers work easy.

HISTORY OF MOBILE ADVERTISEMENT AND MARKETING

In 1973 Martin Cooper had invented a portable handset when he was a project manager at Motorola. The idea of cellular communications was introduced by Bell

Laboratories and its being three decades after that idea. In the early 1990s cellular or mobile phones made a commercial debut in the marketing sector after twodecades. Mobile phone functionalities were limited to calling and dialling only in the early age of 1990s.

The digital technology has introduced data services When the second generation of mobile telecoms (so-called 2G) was introduced by Radiolinja (now Elisa) in Finland on the GSM standard (now the world's most common mobile technology with over 2 billion users) in 1991, in which SMS text messaging was the first service. The first SMS text message was sent by person to person in December 1994 in Finland. SMS (Short Message Service) had being rapidly began to grow, and became the largest data service in the world. 74% of mobile users uses SMS text messages in 2007.

One major advantage of SMS is that, users are able to send and receive the messages without being noticeable while in the middle of conference or conversation. The users can enjoy some privacy by sending and receiving SMS text messages in an unobtrusive way even in environments like in restaurant, café, bank, travel agency office, and so on [2].

It being six years after the launch of SMS, when a Finnish news provider offered free news headlines through SMS, sponsored by advertising then the first case of advertising had appeared on this new data media channel. Due to this many rapid experiments in mobile marketing and mobile advertisement has taken place, and the world's first conference was held in London in 2000 for discussing the mobile advertisement which was sponsored by the Wireless Marketing Association (which later merged into the Mobile Marketing Association). The name of first books were Ahonen's M-Profits and Haig's Mobile Marketing, these books

are used for discussing the mobile advertisement in 2002. All over from the world many mobile operators launched their own mobile advertisement arms, like D2 Communications in Japan, the joint venture of Japan's largest mobile operator NTT DoCoMo and Dents, Japan's largest ad agency, Aircross in South Korea, owned by the parents of SK Telecoms the biggest mobile operator.

When iPhone gets released in 2007, the advertisement struggled to keep up with the innovation because of this sudden changes happened in mobile marketing industry.

And then the new generations came 3G and 4G in which apps came in every form and shapes like. Fitness trackers and gaming app, maps and social media. In 2014, developers had started to build ads into mobile apps. Mobile ads had to be seamless and engaging after. It was found that most of the users were spending most of their time playing *candy crush* or stalking exes on social media apps. Paid media mechanism has been used for gaining the attention of people which makes the mobile marketers to enhance the overall advertisement experience. from 2017 people started to use mobile phones more often everywhere at any time and there is no surprise that we see hundreds, sometimes thousands, of ads every day that leads to more evolution in mobile advertisement and marketing [7].

SURVEY ON MOBILE ADVERTISEMENT AND MARKETING

Most of the people still thinks mobile advertisements are of no use and it consist of flashy, annoying banners that causes accidental clicks on the mobile devices. But in reality, currently mobile advertisement has significantly become popular in term of marketing.

Today Marketers have experienced a wide

range of mobile ad options, and lot of money has been made through these mobile advertisements. According to the Ad Age article, around \$88 billion has been made by online add revenue, and mobile ad revenue has been increased by 66%, that is ten times more than desktop advertising's growth [1][3][5].

their time on mobile phones but 12% of ad budgets has been used by business for mobile advertising.

On the contrary 22% of the time has been used by the consumers that he spends on desktop computers and 23% of the budgets has been used by the advertisers for advertising on that platform [2].

In current scenario people utilizes 25% of

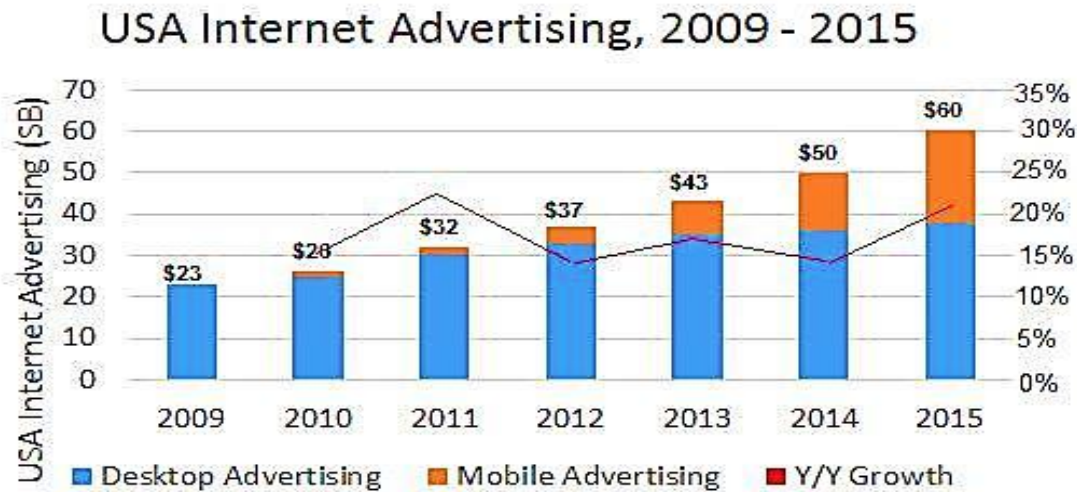


Figure 1: In 2015, the total global digital advertisement has gained around \$168 billion according to Statista Digital Market Outlook, and this year, it has reached to \$228 billion and further, it is trying to reach \$332 billion by 2021.

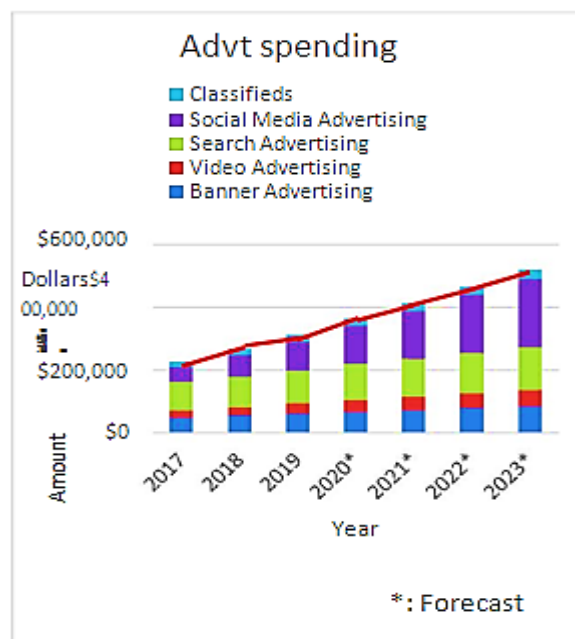


Figure 2: Digital advertising spending worldwide, 2017-2023, in millions (Based on data from Statistica.com).

LITERATURE REVIEW

Jerry Gao and Chandrasekar Vuppalapati in the following paper “Building a Big Data Analytics Service Framework for Mobile Advertising and Marketing” has proposed a location based add recommendation system through decision making approach in order to provide relevant adds for the end users. They have used pilot data analytics approach for the merchants to view their end user. Their project currently supports offline advertisement. The major drawback of this paper is, it does not provide online modelling for the advertisement in the mobile phones.

Assist. Prof. Dr. Selda Ene and Assist. Prof. Dr. Betül Özkaya in the following paper “The Role of Mobile Advertising on Consumers' Purchase Decisions: A Research on Consumer Attitudes towards Mobile Advertising” has presented an approach for gaining the attention of consumer using mobile advertisement applications through various sampling methods and factor analysis. In this paper the authors have presented the positive and negative attitude of consumer through various mobile advertisement.

Dhruv Grewal, Yakov Bart, Martin Spann and Peter Pal Zubcsek in following paper “Mobile Advertising: A Framework and Research Agenda” has proposed a framework for finding the current scenarios in the mobile advertisement such as providing the consumers better outcomes and relevant offers in term of marketing. It majorly focuses on accounting for market factors. they have proposed a framework for research agenda in order to simulate the additional work in the advertisement and marketing field.

Shalini N Tripathi and Masood HSiddiqui in the paper “Effectiveness of Mobile Advertising: The Indian Scenario” proposed a framework for revealing that, how effective the advertisement is, on the

basis of consumer response and purchase decision through percentage and Likert's scaling technique. The major challenges of this paper are in term of marketing communication for satisfying the customer needs. Consumer response has been examined through Analytic hierarchy process (AHP).

In the paper “Big Data Analytics Service Framework for Advertising and Marketing” Mr. Ganapati V Ourasang, and Mr. Prakash V Parande has proposed a location based add recommendation system through decision making approach in order to provide the relevant adds. It currently supports only offline modelling for advertisement. This paper shows how to handle the huge volume of storage that is rapidly increasing because of increase in digital marketing which leads to increase in service time. Map reduce technique has been used for avoiding the service time problem.

Antoine Lamarre, Simon Galarneau and Harold Boeck in the paper “Mobile Marketing and Consumer Behaviour Current Research Trend” has presented a direction for analyzing the consumer behaviour on the basis of articles that were published between year 2008 to year 2010 and these articles were subcategorized as follow: the role of Trust, Acceptance & Adoption, Satisfaction & Loyalty, Attitudes towards mobile marketing and Value Creation. This paper majorly focuses on research area of mobile advertisement and advertisement and encourages the mobile advertisements.

In the paper “Study of Mobile Marketing Communication in India” Rakesh Roushan, Mita Mehta and Arti Chandani has presented the behaviour of Indian consumer towards the increased mobile marketing communication and acceptance level on the basis of gender, city, profession, age, income, education etc.

From the survey it was concluded that customers are positively reacting at these mobile marketing based communication but acceptance level still varies with different variable so the marketers need to develop the strategies according to the acceptance level of mobile marketing by Indian consumer.

In the paper "Online advertising and its impact on consumer behaviour" Dr. Parul Deshwal has explained the following objectives: 1. To understand the core concept of Online Advertising. 2. To Study the effect of Online Advertising on Consumer Behaviour. 3. To know the importance of Online Advertising. This paper also presents the goal of advertisers, that is to make their ads more involving with the customer and brand loyalty.

In the paper "Marketing insights for mobile advertisement and consumer segmentation in the cloud era: A Q-R hybrid methodology and practices" Ki

Youn Kim and Bong Gyou Lee has proposed a theoretical consumer typology framework for discovering and theorize the customer typologies based on Q theory's subjectivity in a qualitative approach and then verify these theoretical concepts through Q-R empirical method. The results of these theorizes and concept can be used in advertisement marketing and customer relationship management domains.

In the paper "Enabling Privacy-assured Mobile Advertisement Targeting and Dissemination" Zhenkui Shi, Xiaoning Liu, and Xingliang Yuan has proposed a practical targeted mobile advertising service framework for achieving the accurate target while protecting the user's privacy through a privacy-preserving matrix factorization protocol via homomorphic operations. They have also used private information retrieval (PIR) to allow the users in order

to obtain the most relevant adds and accurate ratings without revealing the profiles of users and accessed encrypted ads. he needs to enter correct username and password.

CONCLUSION

Today our modern era is significantly dependent on Internet and Mobile applications. Today's generation prefer to communicate with each other virtually rather than meeting with each other face to face so they use many mobile application or online application for communication using internet and technologies that's why large data set is created in every seconds and it provides complication for handling the big data and take more service time.

The objective of this study is to know the state of the art in the field of mobile advertisement and marketing, particularly in the cloud computing environment. We have gone through the work of prominent researchers in the field, we find that different researchers have used different approaches for advertisement and marketing.

From the survey it was concluded that the existing systems for mobile advertisement has service time problem and it do not support the online modelling for adds.

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