Using Social Media for predictive Data Analytics in Productivity increasing Decision-Making Process

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Abstract
Data is wealth, it can be used in 'N' number of ways as per the needs of an organization. Prediction takes more important in building a marketing strategy. With the traditional marketing the seller found difficulties to target the right audience for their business. In addition to that, spending a huge amount for printed materials and distributing to the uninteresting customer. This paper will give an overview of marketing and predicting and deciding the sales using the huge data that are generated in their respective business. Digital Marketing is to promote the business with minimal cost and also it will target the right audience which can be selected by sellers. In this paper, digital marketing is enhanced by extracting the data of the user from the huge volume of data for increasing productivity by association rule mining and social network analysis. At this paper, predicting, investigating and implementing the digital marketing methods by using big data would be the right selection for the success of the ventures..

Keywords: Digital Marketing, Predictive Analytics, Social Media, Big Data Analytics, Association Rule Mining.

I. INTRODUCTION

H In our day-to-day life, no one has time to go through any ordinary boring method of advertising, people choose to go with optimal way of choosing the products and services, their time is limited as technology emerges every day, few things will be outdated and certain will be updated, if there is a XYZ company, they can't survive without being updated to the current technology.

There are Difficulties in Business to people choice of selection for Marketing, every marketing strategy got unique chances to attract customers to their business, but the problem comes on the Prediction of outcome for general marketing, it is highly tough to find the reach the number of customers it reached about their services or products. It is hard to find the reach to the customer as it is uncertain. Digital marketing is a universal event and Marketers are slowly changing their marketing expenditure towards digital way. The target audience is largely hard to find as it is not easy to judge a people who had seen our advertisement about us in a newspaper or TV irrespective of a number of times displayed. To overcome this setback, this paper discusses Digital and its impacts on the business towards the customer and society. Digital World-it is obvious

the usage of mobile phones has been increasing day by day, the total number of persons rapidly added to the count of the mobile phone users, as mobile increases, it is straight that usage of internet and technology increases in human's life that is the biggest advantage of the Digital world. Target Audience-they are the people who have to be focused that will give us a high possibility of selection of products among a certain number of people.

Issues in Traditional marketing

There are few disadvantages of usual marketing, it can't be rectified as new technology comes every day, and setbacks will come to the existing methodology that we found.As the audience is open in the traditional, it is highly difficult to see the conversion in these types of marketing. Selling of mobile phones to only people who need of the product Cost- As we have to pay a huge amount of money even for telecasting with duration of few seconds about our products to the customer, business people started to reduce the budget for allocation of money to these types of marketing

Track- one of the important setbacks is tracking, it is Unable to track who has seen the advertisements

of the products, it may be either TV or Newspaper, it is uncertain about the count of the people.

Digital Marketing

It is the method of selling our product or service through digital way like social media, ad words and so on. The digital marketing emerged from the 1990s and 2000s has changed the way businesses make use of technology and digital marketing for their advertising. Digital marketing is getting familiar as it uses devices connected with the Internet. Search Engine Optimization (SEO) is the best way to explore digital marketing.

Advantages of Digital Marketing

1. Promotion of business through funny or value-basedthings,People will get into the advertisement only if it is different and unique, when we post our product with a few funny and inspirational things, the possibility of seeing the advertisement will last till it ends.

2. Without big investment we can get the conversion, the money that we need to spend on digital is less cheap than any other marketing that a business can take into account.

3. Target the audience and then we can reach the target people so that only people who need that the service or the product can be viewed by them and we can track the people who had viewed it.

4. It is possible to acquire International Clients when we post our advertisement on the World Wide Web, it can reach to the buyer easily when we post our things as per the customer needs

Crucial Things of sales marketing

It is the most important concepts of modern marketing. The marketing mix includes product, place, price, and promotion. The goal is to discover a mixture of marketing policies that will attain the clients at least cost.

Product-it is the end product that goes to the customer.

Place-it is of no use when you don't choose your selection of a place to sell your products,

Price-Competitor will always fix our price on the market, it cannot be blindly judged and fixing a price

Promotion-Within a few seconds he will verdict whether he/she has been convinced with the product Reasons for digital Promotion using big data &

Social Network Analysis

There are several reasons behind the choice of selection among many types of marketing in these trends, one biggest reason for the choosing of digital marketing is the time that it takes to reach the customer. It is much easier to sell our product to the people rather than to sell it to the people who are not all interested in it.

Big Data in Digital

Data is an asset in the era of computing as the generation, storage, retrieval all helps in finding the needs and interest of the user. Data is the term which is an essential component of any fields, where it needs to store the details of any individual. Big data is the generation of the huge volume of datasets with different forms such as velocity, variety, volume and so on. It is a high volume of high velocity, complex, distinct data that need tools to capture, process, store the information. Big data is the data that cannot be handled by traditional database management tools as the data gets increased every day in the global world. Technology gives chance to capture quality data, increase customer relationship, customer insights, customer relationship management (CRM).

Big Data Analytics

In addition to data generation, meaning and the value of the data is more essential in the computing world. Data analytics is the method of using algorithms to find the patterns, relationship of data by analyzing it. Big data analytics supports companies exploit their data and make use of it to increase productivity, which can increase operations, profits and retrieving the customer to them again.

Cost reduction. As Hadoop and cloud-based analytics have the potential for storing and processing large amounts of data, it can reduce the cost in many ways compared to the traditional database.

Decision making. The speed of Hadoop enables the users to process the large volume of data and then to make a decision from the large data sets that are available in the server.

New products and services. As the analytics can extract the customer history and all the records, which can be used in knowing the details of the interest of the customer that can increase the productivity.

There are different 'V's that are associated with big data such as volume, velocity, variety, validity, veracity, vulnerability, and visualization.

Social Network Analysis

It is the process of mapping and scaling the connectivity among people, companies, groups, URLs and other information entities. It consists of the network which has main components such as links and nodes, the node is called as individual identity such as humans, and links are the relationship between the people in the network.
Contribution

The major contribution of the paper includes following four significance

- The significance of big data analytic tools in digital marketing.
- Analysis of social network medium
- Explain the impact of various digital marketing strategies
- Increase in Profit by using the data analytics in customer's big data.

II. RELATED WORK

Data analytics as a service (DAAS) has replaced traditional management solutions by remote service providers. It is essential for small businesses as it will be costly to buy analytics tools and licenses. The process will happen in remote service applications, that permits clients to control analytical tools for the data and payment can be done based on the volume of the data used by them. Even the people who don't have much knowledge on the tools still can see the insights from the data store by the interactive dashboards. The data are hosted and reviewed remotely and the company will receive the credentials details with various levels of privileges according to their needs. The main data fuel for any marketing campaign is the data that are used in the internet every day, despite the availability of offline data, like the details of the customer like name, address and so on, still the digital marketing has the upper hand in this scenario as the cost factor is minimum comparing to the offline marketing, Email Marketing is the best example to justify the two marketing types.Marketing people should have enough knowledge in online marketing channel and the application of the channels like email, Paid Search, Social Media Marketing, ad words, search

engine optimization and content marketing to offer the value to the consumer, where the search information, transactions of the customer, social media posts and other big data sources that are in internet. Big data results will improve highly in every iteration of the business campaign.

The data is produced by mining the online data that are available on the internet. Automated tools are used in web mining to open and extract the details of the customer from the documents of the web and the servers, where both unstructured and unstructured data from browser activities, logs of the server, site and link structure, content of the web page and many other resources can be tracked for the betterment of the business. The data that are extracted from user's browser activity by using special tools to find search information of the user and detect customer characteristics and interests that can be used to sale the same related products to increase the profit of the business.Social media has flourished in all parts of the world. Everyday a user spends almost 2.5 hours on social media on an average that helps digital marketers to get a wide range of data from their preferences and find the interest by tracking their likes, share, comments and posts.It is the process of getting the quality information from the people by the internet, where there are people will be connected who have similar interests and the data can be collected either in a paid or unpaid way such as surveys, running polls among the social media and other platforms.

Each transaction done by a business gives valuable data about customers, irrespective of it is financial, logistical, or any other related possible ways. Applying big data to digital marketing is not as costly as traditional marketing ways. There are service providers who give database management solutions, to small companies with high volumes of data. But with the fluctuating needs, service providers now giving the data analytics service well, which is an optimal solution for the small businesses with dashboards, even the marketers from the non-tech background, the working is like data will be hosted and also monitored frequently.

III. EXISTING PROMOTIONAL SCHEME

There are certain methods that are being carried out by the companies for the sales prediction, decision making and other parameters that are

involving with the customer. The customer's data are acquired in so many ways such that data has to be filtered depending upon the needs and required actions have to be taken for the same.

Methods of digital marketing

The following strategies are used throughout the globe by the companies for the increase in sales of their business

Reachable Audience = Email Subscribers + social media / Consumer Overlap Rate

Online advertising

This is based on internet advertising through which business will send the message about the products. Internet-based advertising gives the content and ads that best contests to customer happiness.

Email Marketing

Every $1 spent on Email Marketing will make an average ROI (Return on Investment) of $38, the main advantage of using email marketing by digital marketing professionals is that the mail can be sent to the only users who are interested in the related product and gives high conversion rate. It is less costly when comparing to other media exposure.

Social Media

Customers will take more time on social media rather than other websites category.it is assumed that 25 percent of their whole time online was spent on PC ad 35 percent of the whole time was on mobile devices.

Approximately 20 percentages of their whole time online were used on a personal computer (PC) and 30 percentages of whole time online on a mobile device. Devices such as tablets, PC's, Laptop, players and e-readers have risen the familiarity for using social media.

Facebook

It is the media which changed the era of marketing, it is the place where users share their posts, likes, comments, photos, music, videos and interests with their friends. Digital marketers got 'n' number of opportunities to share their products as paid ads based on many factors such as demography, gender, location, age, education, work and interests. The Potential reach helps us to reach desired audience such as even 10 Lakhs people with stipulated amount of time.

Blogs

Blogs can be used in the 'n' number of ways as it can be globalized and reach the audience throughout the world, blogs will help the marketers to post the related message that interest the user, thereby getting the attention of the customer.

LinkedIn

An online profile will enable to find professional opportunities sharing news, ideas and opinions. The main mottos are that it acts mainly as a career and introduction portal, still paid advertising and marketing can be done for businesses.

Affiliate Marketing

The essence of affiliate marketing lies in supporting the audience(so-called affiliates) that are not dependent on the sponsor to do the commission-based sales activities by means of affiliate networks.

Own marketing

These can be done by the people of the organization where they have to create certain standard things about them that tell about them, their profile, services they give, type of products they sell, support towards the products after the sale.

Online Reviews

Out of 100, 70 Percentage of consumers check online reviews or ratings before purchasing any products in e-commerce site,When people see the review of the others about the product they want to buy, they will be definitely impressed with the product if they see the points about the review in a positive way, it is vice versa when he/she gives the negative comment about the product.

Search Engine Optimization (SEO)

The objective is to improve the website's listing in search engine results when the user the querying the results for his search. SEO is done by enlightening the website's search engine friendliness. The search engine works on the concept of user types a word in the search box, after that numerous results are displayed in the window, but in the back end, a search engine is a software that collects information from the application about the web pages.

Keyword research

It is the process of researching and selecting words and phrases that users mostly use to search for (any search engine) that connect to the business, product or services.

Primary search engine

It is the top search engine that indexes all the websites of the related searches in a web, the traffic will be generated to your site by the primary search engine, the traffic depends on how you work on SEO

Secondary Search Engines

It focuses on specific users and doesn't generate high traffic but it can be used in regional and specific focused individuals. SEO can be done in two different forms, On page and Off page optimization.

Pay per Click (PPC)

This is also stated as sponsored search or paid search. Companies will pay the amount only when a customer clicks on their website and the corresponding product. The most familiar Pay Per Click(PPC) tool is Google Ad Words, and Google Analytics for monitoring and analyzing the results.

Display advertising

It is the process of displaying in the banner ads on the respective websites or in emails. The objective of the marketers is to create a unique path to make awareness about the brand where it is not essentially converted into direct clicks.

IV. INTEGRATION OF PREDICTIVE ANALYSIS & ASSOCIATION RULE MINING FOR DIGITAL MARKETING

In this digital era, people are engaged with so many gadgets to monitor and track their daily needs such as appointments, social networks, apps, fitness and so on, before the rise of this digital age, marketing professionals worked on their traditional ways to get the attention of the customers by Television, print media and other offline modes.

Digital Marketing changed the traditional ways to increase the customers in short span of time and targeting the only interested customers of the product that helps the companies to increase the sales as well as to decrease the cost. Big data plays a vital role in digital marketing as there are huge data that are generated everyday by so many means such as social media, transaction and so on, it challenges the digital marketer's professionals to choose the optimal and quality of data that are to be used to do campaigns of their product.

Big data gives the valuable insights about the users that been used by the marketers to make better marketing strategies, the biggest advantage of it is the digital marketers can focus directly on the interest of the customer by making the better content and can target the right audience with the right content. Decisions will be taken from the marketers on studying the big data.

Predictive Analytics

The data-driven method permits businesses to see the past, choose that had worked for the company, and see the effect of it in the future in a simulated environment and depending upon the preferred output apply the strategy. Search Engine Optimization, Paid Search, Content Marketing are the methods of digital marketing supported by Big data. Search Engine Optimization is the most efficient method of digital marketing with a huge volume of data generated every day. Online data is the fuel which gives any successful digital marketing campaign.
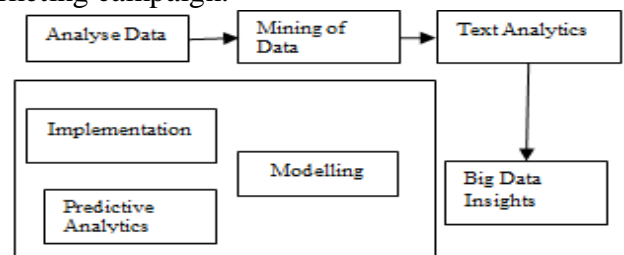

Fig 1: Predictive Analysis Processing of sales

Social Network Analysis

Network Notation

A network is more than links and nodes, as it contains more information about the lines and vertexes in the graph. Graph theory is the formal way to notate the network with edges and vertex.

Network N = (U, L, FU, FL)

Graph G = (V, L) where

V_s=Vertex set

L_s=line set

Function FU possess (F: V → X)

Function FL possess (F: L → Y)

The set of lines are the addition of an undirected edges E and directed arcs A

The Expression can be written as (L = E U A)

Elements e of E (Single edge) have unordered pair of units u and v (vertices) from U

The Expression can be written as E (u: v)

Elements an of A (Single arc) have ordered a pair of units u and v (vertices) from U,

The Expression can be written as A (u: v)

Degree Centrality

The network activity can be measured by quantifying the number of connections a node has that is called as degree centrality. If a node possessesahigh degree of centrality then it means that a particular node is most active in the network.
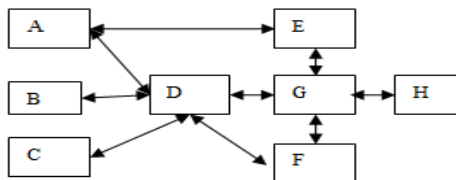

Fig 2: Social Network Flow

In the above network, there are eight nodes such as A, B, C, D, E, F, G and H with 9 relationships among the nodes to establish a strong network. The above flow explains the social network analysis in a simple way where A can be any identity and the other nodes with the same. Betweenness Centrality is the node which is a bridge for the other nodes, here node H is getting the information from the node 'G' , so node 'G' is a bridge or betweenness centrality in the network.

Closeness Centrality is the nodes which possess the shortest path to reach the maximum nodes in the network, Node G satisfies that particular constraint in this network. Similarly a network consists of Network Centralization, Network Reach, Network Integration, Boundary Spanners, Peripheral Players and Client Feedback. Here the nodes can be titled with all the social media of a company. Then the network can be constructed and analyzed with regards to the sales and the promotion.

The objective of using social network analysis in the predictive analysis is to visualize the data models and the flow of relationships between the nodes in the network, the nodes with most activity in the network have high responsibilities and that particular node can be monitored for the reviews and the comments about the products

V. ALGORITHM

The algorithm is a sequence of instructions that are carried out to produce a solution for a particular problem or situation; it describes and explains the all possible ways to obtain the solution for a particular problem.

Here the algorithm can be used to decide the best method to use the data for achieving a high percentage of the sale.

Step 1 : Choose the Appropriate tool for the data analytics

Step 2 : Aggregate the previous data with sales parameters

Step 3 : Find the Positive and negative reviews of those previous sales

Step 4: Analyze the reason for negative reviews about the product

Step 5 : Data analyzing can be carried out by Term Frequency, Association Rule Mining, and Sentimental Analysis

Step 6 : Construct the social network in terms of sales, reviews, social media, and other

Step 7 : Visualize the data by the social network analysis tool

Step 8 : Fine tune the network respect to the requirement

Step 9 : Decide the optimal choice to increase the productivity

Step 10: Iterate until the best choice has been obtained

Association Rule Mining

There are two conditions which association rules use works,

I.   Support and
II. Confidence.

Association rules must satisfy

- user-specified minimum support and
- user -specified minimum confidence.

Rule: A → B

$$Support = \frac{Frequency\ (A, B)}{N}$$

$$Confidence = \frac{Frequency\ (A, B)}{Frequency\ (A)}$$

Apriori Algorithm

It works on level-wise search, then k-item sets (k=size) are used to use (k+1)-item sets. Here recurrent subsets are extended once and it can be called as candidate generation process. Groups of

candidates are checked against the data. To quantify candidate item sets, hash tree structure and breadth-first search method are used in this algorithm [17].

CIk : Candidate itemset with size k

RIk : Recurrent itemset with size k

RI1 = {Recurrent items};

For (k=1; RIk != null; k++)

do begin

CIk+1 = candidates generated from RIk;

For every changes in time t in database D

do Increment the count value of all candidates in CIk+1

RIk+1 = candidates in CIk+1 with min_support

End

Return FIk;

Products	Number of Sales
P1	10
P2	2
P3	1
P4	5
P5	4

Products
P1
P4
P5

a)C1b.)L1

In the above scenario, the algorithm extracts the products with a high number of sales, it is just the sample data set, and similarly it can work on big data and extract the product sales.

VI. EVALUATION& RESULTS

The above association rule mining helps us to produce the high productivity list and the predictive analysis will help us
to predict the sale along with social network analysis which maps the relationship among the data in the big data on predictive analysis, As all three predictive analysis, social

network analysis, association rule are different in each perspective, still here on taking the features of each enables to forecast and make decisions efficiently.
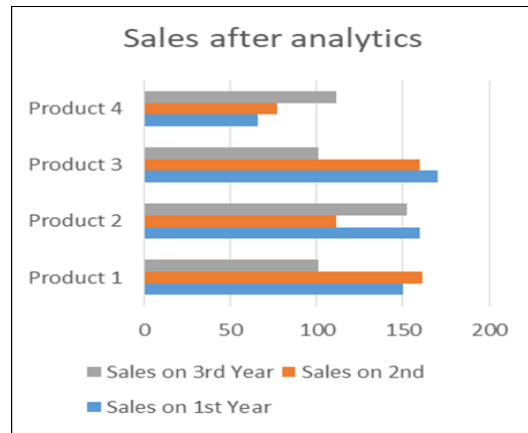

Fig 4: Sales with Predictive analytics

The above graph shows that significant increase in the sale with using analytics and social network analysis in the available data

VII. CONCLUSION

Digital marketing has changed the working of a marketing professional to attract the customer and increase the profit and ROI, whereas in traditional tools, marketers make use of offline media, these digital marketing tools along with big data help the marketers to extract the quality data from the huge volume of data. Email marketing, social media marketing, content marketing and all strategies are using the data of the user from his previous history, logs, records, transaction. Social network analysis and association rule mining along with predictive analysis help to predict the data more accurate and faster. In this paper, it states about the methods of digital marketing tools and the applications of the data in the respective marketing environment, then the marketing can be implemented on the extracted data from the huge volume of data that is generated, Insights helps the marketers to fine-tune the strategy and increase the sales.

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