

Consumer Behavior Analysis of Social Media Networks by Using Machine Learning

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Abstract:- With the emergence of Web 2.0 and the development of social media platforms, more and more users buy products from online pages. After the rise of social media such as Facebook platform, e-commerce business is increasing day by day. Social media is a place where daily number of users increase and lots of users spend lots of time on social media. So, it is a huge scope of market for e-commerce business and very important to perceive the behavior of this type of consumer for being successful in online business. The dataset used in this work collected by a survey which contains total 385 data. This paper analyzed which reason influenced consumers to take the decision to buy or not buy anything from social media. After the survey, found that "Special discounts or offers" is the most common reason why consumers bought anything from social media and "Lack of trust" is the main reason not to buy anything from social media. In this paper, performance of different machine learning methods compared for classification of consumer behavior. The results show that the random forest technique provides the maximum accuracy of 97.89%.

Keywords:- Consumer behavior, E-commerce, Machine Learning, Social Media, Purchase Intention, Data Mining.

I. INTRODUCTION

People of all ages are using internet, using social media for communication and also watch news. Marketers are choose social media as a business platforms because there have unlimited clients are available. For doing well in business in online have to understand customer and their purchase intention. In online business always need to know Customer behavior why customer buy products from online and why customer not buy products from online. Customer behavior vary from different perspective such as age, years, gender etc. I took a survey for understanding customer behavior and their purchase intention and why they did not prefer online purchasing also the reason why they make decision for buy anything from social media. Consumers acquiring behavior could be a behavior characterized by clients as they look for offer, dispense, analyze, use and alter the products or administrations they anticipate to fulfill their needs and wants [1]. Examining online buyer behavior has gotten to be a noteworthy calculate in understanding what persuades retail clients to buy, contributing to making strides customer loyalty and retail productivity for scholastic and analysts [2]. Online acquiring behavior speaks to the

method of buying merchandise by online and online impacts. In all later inquire about, shopper behavior and obtaining behavior have been exceedingly impacted by impacts of social organizing, components related to social media, individual certainty, online communication and shopper online look demeanors. It has been noted that social media contain a noteworthy impact on buyer behavior since it gives buyers with the capacity to communicate and associated with other potential. When clients see online posts, input, comments and online advertising advertisements, these hones have affected the considerations of clients [3]. But some time recently making a obtaining choice, the client needs more item information.

II. MATERIALS AND METHODS

With the use of different social media platforms such as Facebook, Instagram, Twitter, WeChat, WhatsApp taking the communication with world so easily, it has turn out to be vital that the information living throughout these social media systems will carry insightful information about the opinion, mood and sentiment of the humans over any product, idea or rules. Several works have been done earlier analyze the social media platforms contents and perform opinion mining over social media platforms data. The authors of have proposed an approach that analyze customer sentiment over twitter social media platform by using deep convolution neural network [4]. For training the feature was set to integrate into deep CNN and analyzing twitter data for predicting sentiments. Text pre-processing has a important role to play for twitter data analysis. This paper is authors applying different Machine Learning methods for learning, analyze and classify the shop information and the product information based on the consumer experience [5]. From the comparison and result, machine learning algorithms has been done outperform than other approaches. The proposed Hybrid Recommendation System (HRS) system has higher accuracy is nearly 98% when compared to other existing techniques. Another approach is applied for analyze customer behavior with enthusiasm analysis [6]. Author has been created enthusiasm levels which indicated consumer's activation, from observations and apply them to prediction of discovery of drop-off consumers. To identify consumer purchase patterns may play a significant role for marketers to understand consumer behavior and the results of proposed GNG neural network machine learning method support validity for identification of consumer behavior patterns [7]. Another research investigates to know about consumer and how consumer purchase behavior can be identified using

artificial neural networks based on information collected from surveys.[8]. Authors have been done many Machine learning techniques, data visualization and natural language processing methods are used to know consumer behavior sentiment analysis [9]. Day by day online shopping increasing rapidly through different social media platforms. To identify the key customer authors using the centrality measures by considering their transaction data of shopping dataset [10]. The improvement of the net has brought about digitalization of information which opens up large records opportunities. Another research attempts to endorse predictive analytics to expect consumer conduct with the aid of using conduct informatics and analytics technique in order that deeper insight into consumer conduct may be obtained to assist predictive analysis if you want to enhance business choice making [11].The outbreak of coronavirus (COVID-19) pandemic has a great impact on the specific factors of our everyday existence, specially, on our buying behavior. During COVID-19 Pandemic to Predict Consumer Behavior using decision tree ensembles with Bagging achieved the best prediction of consumer behavior with the accuracy of 95.3% [12].Lots of techniques are used to find out consumer behavior pattern, Graph mining is one of them. Graph mining is a technique used to extract characteristic patterns from a variety of graph structured data [13]. By using graph mining technology helps us understand about complex purchase behavior of consumers [14].

Proposed Method

This work aims to analyze the consumer purchase intention dataset collected through a survey in order to understand the orientation of consumer behavior present in

the dataset. A number of algorithms were used to classify consumer behavior in order to ascertain the most effective technique. Figure 1 shows the approach of classifying the consumers, commencement from the consumer behavior data collection (Input dataset) by the survey. After finishing data accumulate pre-processing phase start, going through feature extraction and classification phases to arriving the evaluation phase (in this phase results were compared from different machine learning methods).

Data Collection Phase

The dataset used in this work is included of 385 participants purchase behavior collected by a survey. Most of the respondents were from University of South Asia and Jahanginagar university students. Some data was collected from different social media users who participants in the survey.

Preprocessing Phase

In This phase, I prepossessed our survey data in different step by steps. First, I remove noise from data, then going through Bag-of-words, Join words, Remove punctuation, Remove duplicate data, Change to uppercase, Change to lowercase, Remove punctuation, and convert into CSV data process to completing the prepossessing phase.

Feature Extraction Phase

This phase is analyzed the consumers to determine specific features why consumers purchased anything from socialmedia and the reason to not purchase anything from social media. Each and every factor of buying intention decision is represented by a vector, which can be illustrated by the classifier.

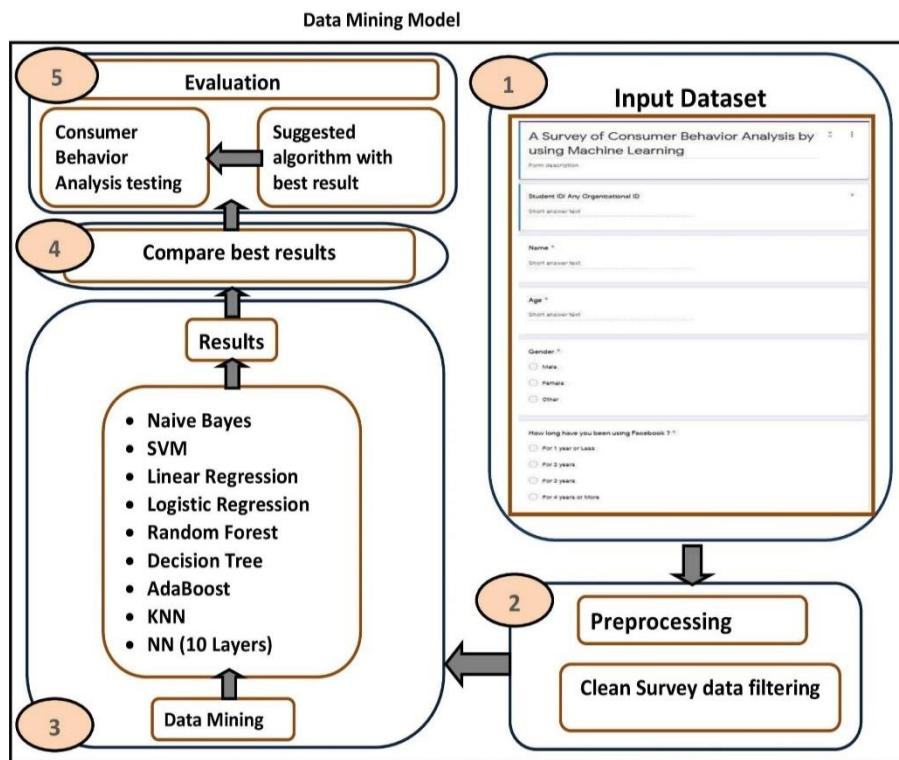


Figure 1: The proposed approach

Classification Phase

In this phase different machine learning methods were used to classify the consumers behavior including Naive Bayes, support vector machine (SVM), Linear Regression, Logistic Regression, random forest, decision tree, AdaBoost, k-nearest neighbor (KNN), neural network (NN) with 10 hidden multilayer perceptron.

Evaluation Phase

The dataset used in this work is included of 385 participants purchase behavior. A number of machine learning algorithms were used to classify the consumers behavior including: Naive Bayes, support vector machine (SVM), Linear Regression, Logistic Regression, random forest, decision tree, AdaBoost, k-nearest neighbor (KNN), neural network (NN). Results from using those machine learning techniques are summarized in the table below.

Table 1: Classification Results of different Machine Learning algorithms

Classifiers	Accuracy%	Sensitivity%	Specificity%
Naive Bayes	79.95	87.07	43.55
SVM	83.91	83.78	88.89
Linear Regression	83.64	83.56	87.5
Logistic Regression	83.91	84.72	68.42
Random Forest	97.89	98.71	94.12
Decision Tree	87.34	87.89	81.25
AdaBoost	83.91	83.97	81.82
KNN	83.85	84.17	42.11
NN (10 Layers)	78.10	82.94	27.27

The results show that the random forest model provides the highest accuracy rate of 97.89% with the highest rate of sensitivity 98.71% and the highest rate of specificity 94.12%.

III. RESULTS AND DISCUSSION

The survey was conducted with 385 participants and contained total number of 14 questions. I divided the questions into two groups. The first group analyzed information about the participants, such as age and gender. The second group of questions analyzed the participant's consumer behavior.

In survey, one of the question asked to the participants that which factors was influencing consumers for purchased products from Social Media. Figure 2 indicated that Special Discounts or offer are the highest rated source of information which influenced most to the participants for purchased from Social media, compared to page advertisements, page ratings, Influenced by others, Having less time and Not sure.

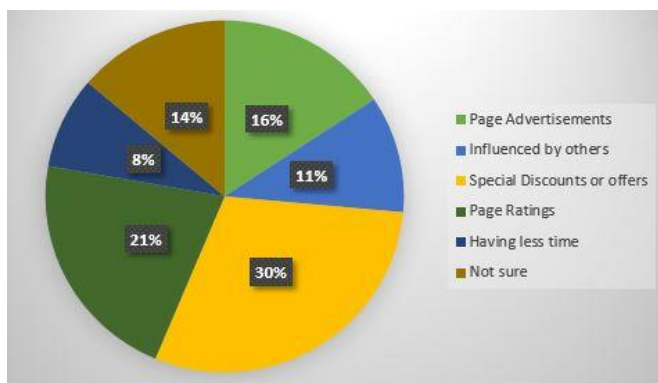


Figure 2: Influencing factors for purchase anything from Social Media

Another question asked to the participants which factors wasn't Influencing consumers for purchase products from Social Me-dia. Figure 3 showed that Lack of trust is the highest rated source of information which caused most to the participants for didn't purchase anything from Social media, compared to Less reliable, Bad Experience, Influenced by others, Slow response and other reasons.

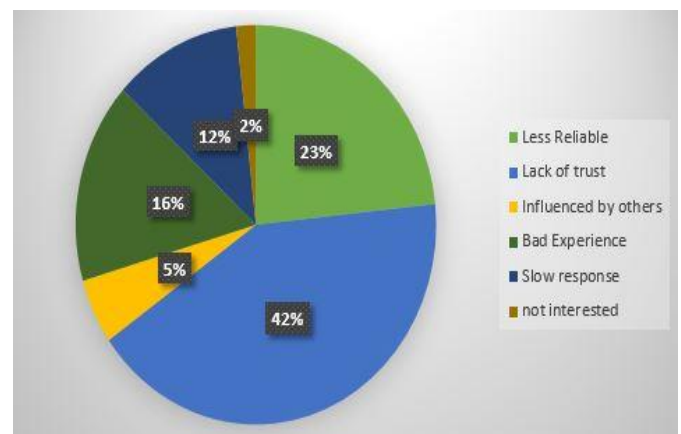


Figure 3: Influencing factors for not purchase anything from Social Media

IV. CONCLUSIONS AND FUTURE WORK

In this research paper, successfully analysis for the consumer behavior on social media platforms. In this research, I tried to analysis why consumer buy anything from social media and why not consumer anything from social media. To collect data i used survey from two universities students. This data is my Primary data and collected some data from Facebook, Journal, this are my secondary data collection. After analyzing I found some buying intention behavior and not buying intention behavior of the consumer. I found that perspective on Bangladesh special discounts or offers is the reason why consumer

bought anything from social media and Lack of trust is the main reason not to buy anything from social media. There had many other reasons to buy and not to buy anything from e-commerce page but most of the reason is special discounts or offers for buy and Lack of trust is the reason not to buy anything. If in e-commerce business can balance this two reason can be more successful in business. In this paper, I also compared performance of different machine learning methods for classification of consumer behavior. The results show that the random forest technique provides the maximum accuracy of 97.89%.

There are many scope for future in this area. Day by day e-commerce business is rising in worldwide. In Bangladesh e-commerce business also rising. In this research paper only data collect from university students. This data are collecting from the young generation consumers. But e-commerce business is based on all generation consumers. This research is done for only Bangladesh users. For further Research can compare our consumer behavior with another country's consumer behavior. With this comparative research i can find some answer how to e-commerce business issuccessful in other country. On the other hand in recently e-commerce business is very popular to rural area. I can research in future for the rural consumers. Social Media platforms are now also used by very large number of unknowing users. For understand those users i can be research from their consumer behavior.

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