ADVERTISEMENT RECOMMENDATION SYSTEM BASED ON USER INTEREST

Dr. G. R. Bamnote[1], Dr. S. P. Akarte[1], Miss. S. C. Shelare[1]

[1]*Department of Computer Science & Engineering PRMIT&R, Badnera, India.*

Abstract: *The report describes and evaluates privacy-friendly methods to reach to the correct customer by posting the advertisement on social networking sites. The purpose of the report is finding good audience for brand advertising. Targeting social-network neighbors resounds well with advertisers, and on-line browsing behavior data counter unthinkingly can allow the identification of good audiences anonymously. This report introduces a framework for evaluating brand audiences with the help of Ads Recommendation. This introduces methods of extracting the specified users of social networks from data on visitations to social networking pages, without collecting any information on the identities of the browsers or the content of the social-network pages. The report introduces measure of Online Recommendation System. Fine-Grained user are sorted are provided to the advertiser by using the Ads Recommendation Algorithm. To implement the Ads Recommendation system, a Social Networking Platform is created. To implement the proposed algorithm Pattern Matching and Machine Learning concepts are used to implement the project. As by using the ads recommendation system the sorted users are provided to the advertiser as it will maximize the actual conversion ratio of user to the customer. Finally, the evidences are provided that the quasi-social network embeds a true social network along with results from social theory offers ones explanation for the increase in audience brand affinity.*

1. INTRODUCTION:

Advertisers at Social Networking Sites like Facebook and LinkedIn have some preferred set of users. On these Social Networking Sites user have to fill some basic information in the profile. By using this basic information of user, Advertiser wishes to reach to the correct customer by showing their advertisements. Online Social Networks offer fine-grained sets of user characteristics – containing user's career, wealth, education information, etc. Advertiser targets the audience according to their characteristics and each user requires different amounts of money for targeting on the Social Networking Platform.[2]

The problem here is to search a correct customer or user on the basis of user characteristics, which addresses as the targeting problem. To solve this targeting problem, The report suggested a proposed algorithm which gave a set of interested area of an user to an advertiser (that is, the advertiser wishes to reach to the audience using the characteristics of a user)[1,2]. Though, the Advertiser is also able to decide a budget for user i.e. how to split the budget among the targeted audience by using the characteristics of user. Advertisers are also able to reach to the maximum number of customers by using the given set of characteristics of interest of user.

- *Social Networking Sites-perspective:* Online Social Networking Sites contains a complete knowledge of each user and their characteristics. To get the complete characteristics of a user, this report suggested a proposed algorithm to solve the targeting problem and proves that it is an approximation to the targeting that gets the optimal number of users. This report defines the marginal increment and iteratively maximizes it.

- *Advertiser-perspective:* No single advertiser can map the list of user according to the user characteristics or cannot distribute it according to the user's characteristics, and hence they cannot use the polynomial time algorithm. Through the empirical data analysis, the strategy of targeting subsets is the only feasible approach (in other words, targeting a set of characteristics of interest to an advertiser will be arbitrarily worse than the direct solution). For evaluation, the research crawls and analyzes more than one million suggested bids from Facebook and LinkedIn.[11] Further, the report suggested a proposed algorithm for the targeting problem based on targeting subsets which found in empirical analysis. This increases the number of reached preferred users by nearly 40% over directly targeting the characteristics of interest, and for a moderate budget, it increases the number of reached preferred users by nearly 20%.

1.1 Motivation:

Social advertising market is growing more as it is able to reach to the customers of all the age group. And also able to covers the remote areas. The reason behind the use social Networking sites as platform for advertisement is that, it will suggest the actual customer to whom the product can

be useful(that is, the conversion ratio is more). It actually motivates the Advertiser to use social networking sites as advertising platform to place the online advertisement. Some surveys on the social Networking Sites also motivate the Advertiser to use social networking sites as a platform. As a Adobe Digital Insights' 2018 State of Digital Advertising Report shows that social media advertisements crowd three times more non-customers than existing customers to retailer websites as of the end of 2017. In short, people are looking at social advertisement and clicking on that advertisement more than ever before. As this survey report shows that young people are connecting to these sites more which are really helpful to the Advertiser.

Now days, Facebook holds high interest for marketers and advertisers. According to The Global State of Digital in 2019 Report, The number of internet users worldwide in 2019 is 4.388 billion, up 9.1% year-on-year. Also the number of social media users worldwide in 2019 is 3.484 billion, up 9% year-on-year and the number of mobile phone users in 2019 is 5.112 billion, up 2% year-on-year. This report shows that the platform is leading the pack by a wide margin when it comes to marketers' preference for paid social media. Facebook is clearly the most used social platform for paid advertising at this time, data from the Social Media Marketing Industry Report shows that marketers are also willing to invest in other platforms to see if and how they work.[35]

Social Networking Site is a way to reach to the younger audience directly. As Adobe Digital Insights' 2018 State of Digital Advertising Report also reveals that 50% of Gen Z (18- and 19-year-olds) and 42% of Millennial (20- to 36-year-olds) think social media is the most relevant channel for placing the ads. As any advertiser has the product which is only helpful to the young generation then this social networking platform is most useful platform. Additionally, insights from Shareablee's State of Social TV 2018 report reveals 70% of respondents between the age of 18 and 24 watch long-form TV shows on various online platforms. Of that group, 47% would continue viewing their favorite TV shows on social media if they were available there. On the basis of above analysis some of the main reasons which motivate to make the project is as follows:

1. The Ads Recommendation System increases the actual conversion ratio of targeted audience.

2. The Ads recommendation System will improve the performance of the system, as it will decrease the cost of the Advertisement.

3. The system will also be able to reach to the all age group users as well as reach to the remote areas too.

1.2 Objective:

Paid social Advertisement is continuing to grow on all the platforms. As more marketers realize the importance of meeting customer`s needs as they are trying to turn the smaller platforms to reach to the core audience. Using the Social Networking Platform the advertiser wants to target the audience. This report includes a Propose algorithm to solve the targeting problem.[1] As the user characteristics will collect from the Social Networking Sites and categories according to the user interest. The proposed algorithm ensures that the Advertisement only shows on the user's wall according to their interest. This will decrease the load on the server and also sorted data will help to decrease the unnecessary searches.

The report uses the Machine learning and Pattern Matching Techniques to reach to the correct customer by collecting the basic information and interest of the user from social networking site like Facebook. The Proposed Algorithm ensure that the advertisement will be only shown to those users to whom the advertisement will be really helpful as it saves the time as well as asset of the Advertiser. The Proposed algorithm is used to search a right customer using pattern matching and Machine Learning technique. As the advertisement database is maintain separately and with this the unique identification number of the user is compare. As it matches the advertisement is send that user account. This will ensure that the user can be customer and can buy the product. The report allow the advertiser to directly send Advertise to the correct customer while uploading the advertisement on the wall of the user, as it will convert the maximum user to the actual customer of a product i.e. the conversion ratio is maximum. So the objective behind using the social media as advertising market is as follows:

- *Implementing the online Recommendation System Using a Social Networking Platform:* Online Recommendation System is use to reach to the correct customer is the main objective of the project. This System uses the characteristics of user which is already collected by social networking site like Facebook.

- *Making a module to update the User profile:* User Profile module helps to get the basic characteristics of the users. While using this basic characteristics pattern matching algorithm is implemented.

- *Implementing Pattern Matching Algorithm to match user characteristics with the Advertiser's requirement:* The pattern matching algorithm is used to target the audience, as the advertisement database is maintain separately with the unique identification number also the user profile is maintain with the

user's unique identification number. As this unique identification number of both matches, the advertisement is automatically post on the wall of the user. This will ensure that the user can be customer who can buy the product.

- *Using Advertisement Recommendation Engine to implement pattern matching and Machine Learning Algorithm:* The Advertisement Recommendation Engine ensures that the advertisement will be post only on the walls of those users to whom the advertisement is really helpful. This is also a main motive of the project as it saves the time as well as asset of the retailer.

2. LITERATURE REVIEW:

To understand the problem the reviews of the previous studies are considered important, the methodology followed to identify the unexplored part of field of study under consideration. In this regard some of the relevant studies have been reviewed in the present study. In the, Marketers have realized that Social networking sites are effective to interact with the people as they use it sale the products and services. Advertising on social networking sites is taking the advertising world by storm. Advertisers are using the social Networking sites on the large scale to promote their products and to share news related to the sale of their product. So following are the list of papers which are helpful for the research to go through this topic.

Mrs N.Nancy Fernandez [4] did an empirical research to understand the effectiveness of social networking sites as a marketing tool. As this social networking sites help the consumers to compare and choose the best product. The paper contains a research of social Networking sites which suggested that it is the fastest growing platform which holds huge potential but is still in its nascent stage in India. Therefore, it is time for the In india it is a need that companies have to make the effective strategies to get the larger share of business through this revolutionary medium and become the innovative firm in the future.

Abu Bashar et al. [6] discuss about the social networking sites experience of consumers and marketers in the State of Punjab. Based on the results of the study and reviewed literature, the paper resulted with the suggestion that the measures for effectiveness of Social Media depends on its factors like its matter should be interesting, informative, interactive and reliable. Social Marketing sites should always alert with the changing tastes and preferences of customers. The paper suggested that the advertisement promotes competition in the market which improves the supply of the better quality products for consumers.

Foster Provost et al. [1] suggested the privacy-friendly methods for extracting the data of user by tracking its searches and liking of pages and posts of the user on social media from browser behavior on user interest generated content sites with the purpose of finding good audiences. Author introduce a framework for evaluating brand audiences and also the methods for extracting the data on visitations to social networking pages, without collecting any information on the identities of the browsers or the content of the social-networking sites pages.

David Sanchez et al. [2] survey the general-purpose search engines that calculate the suitability of the hit counts provide under several perspectives that are relevant for computational linguistics: flexibility of the query language, linguistic coherence, mathematical coherence and temporal consistency. The results of the survey show that, there are significant quality differences between the hit counts of current search engines, and that the most well-known and widely-used search engines do not provide the best results.

Onur Sevli et.al [3] studied an advertising recommendation system which suggested the method to show the advertisement to the correct user using the Twitter platform. For this work, shares of post, news by the a group of users in Turkish have been processed with the natural language processing and big data analysis techniques to send the advertisement to only those users who actually needs the product. This research paper identifies the personal interest areas by categorizing the most commonly used word patterns in the sharing. A web service has been designed which presents to the users the contents, marked by a variety of categories and keywords on advertising database and suited best to the user expectations.

Thirumalaisamy Ragunathana et al.[8] proposed a consumer behavior model using which relevant advertisements can be posted to the consumer whenever they visit the website. The propose model analyzes the process and activities people engage in when searching for, selecting, purchasing, using, evaluating and disposing of products and services so as to satisfy their needs and desires. Author developed a scalable prototype system based on this consumer behavior model using Hadoop Framework which selects and displays relevant advertisements in the web site to the satisfaction of the consumers.

3. SYSTEM DESIGN:

3.1 Proposed System Design:

In this research paper, the below model will reduce the time as well as money of the advertiser. Also by using the software the actual conversion ratio of customers are more compare to other techniques mention above. The design of a

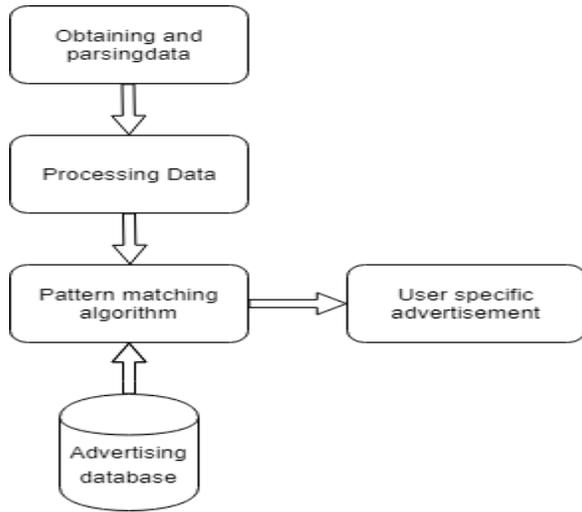system which will actually find a correct customer is discuss in the following section.

Figure 1: Proposed System Design

The architecture of the system contains the actual architecture of model. In the above architecture the searching of the right customer is shown. As the above architecture contains the parsing and collecting block which collect the data or information of a user from social networking site. As this information will be collected from the user profile on social networking site, by using this collected information of a user the advertisement is shown on the user account. Another block contains data processes as here the user data collected initially will be sorted. As a product is related to any IT field then the user will search the in user profile that the user is related IT field or he did his education in IT field or he works in IT sector. If the user relates the needed information then the advertisement will be shown to this user account. This searching of the correct user will be done by the pattern matching algorithm. As the pattern matching algorithm checks the data matches to the user profile or not. The advertisement data is saved in the advertisement database. The advertiser needs and the user profile will compare with each other, for the comparison some keywords like " IT", "computer", "software" etc. are placed in the algorithm. Recommendation system is used to search for these keywords and if it matches then the advertisement automatically posted on that particular user account.

3.2 Detail System Design:

In the proposed model, the user will first register his profile on the social networking site and after that he will be free to use it. By making the profile the user will be able to post anything on the page of its profile. User can also make friends on the social networking site, search them and also update his profile. The friends can also accept or reject the friend request of the user and user also has the right to accept or reject the friend request of the other user. View friends options are also provided in the online network system to search the other users.

Search block is used to search the user. The search block will provide the result and the result will be helpful to the seller. The seller will here search the customer for the product. The related advertisement will be send to the particular user who actually needs it and seller can also gain the profit from it. In the AddSense, the user can upload and edit advertisement. AddSense will provide the option to the seller to add their advertisement and edit it. Also, seller can upload its advertisement through AddSense. After, user login to the system, the option Post is there. Through this Post option the user can post their advertisement on the page and also can post the thoughts, photos etc on the online page which is visible to all the followers of that profile.
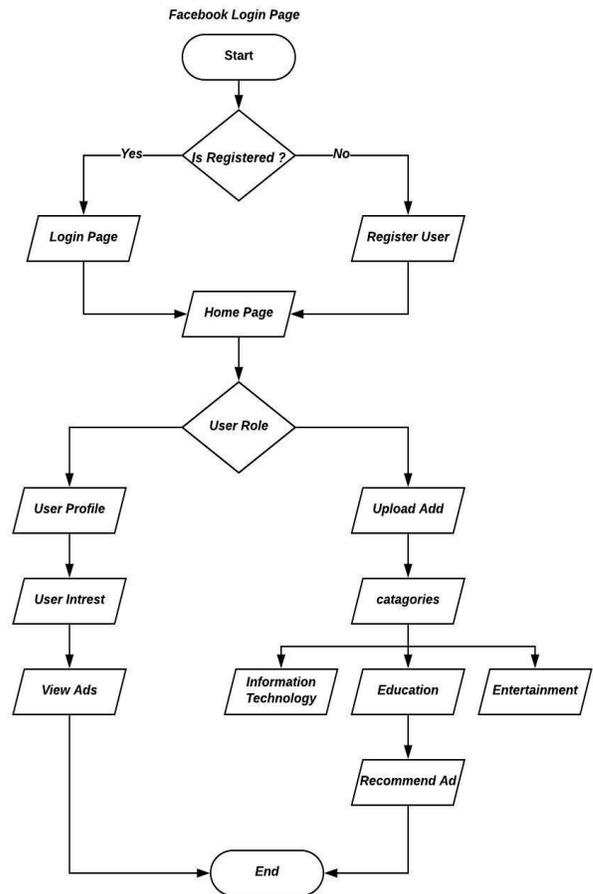

Figure 2: Flow Chart

3.3 Proposed Algorithms:

Steps Involved in Content Based Recommender Algorithm:

Step 1: Create Ad Post with Relevance and details of the ad like its Location, ad Category, Recommendation gender, Ad type etc…

Step 2: Upload add on Social Networking Platform

Step 3: Recommendation engine start working it will categorized ad First

Step 4: According to ad category Recommendation engine will find out people of same category in social networks.

Step 5: Most relevant People will get those add recommendation.

3.4 Stepwise Procedure:

Step 1: Install Xampp

With the installation of Xampp on System, it will also configure Apache Tomcate Server, Mysql and Php automatically.

Step 2: Start Apache Server

The Apache web server checks for the requested web pages and fetches it.

Step 3: Start Mysql Server

MySQL is an open-source relational database management system (RDBMS) which is used to maintain the database.

Step 4: To use the Ads Recommendation System, a social Networking Platform is created.

Step 5: The social Networking Platform contains all the features like Add Friend, View Friend, post Ads etc.

Step 6: On this Social Networking Platform User Needs to register first.

Step 7: Once User login user can be able to View the Post, recommended Ads, Search Friends etc.

Step 8: As User once get the access to account on social Networking Platform, User needs to update profile.

Step 9: Update Profile contains various interested categories like Sports, Education etc. User needs to mention its interest.

Step 10: Also User can upload an Advertisement on social networking Platform with Upload Ads.

Step 11: Whenever Advertiser upload an Ad it will be only shown to the people who are interested in the Advertiser product.

Step 12: This Ad recommendation Process can only be done by considering User characteristics such as Location, Education, and Interest.
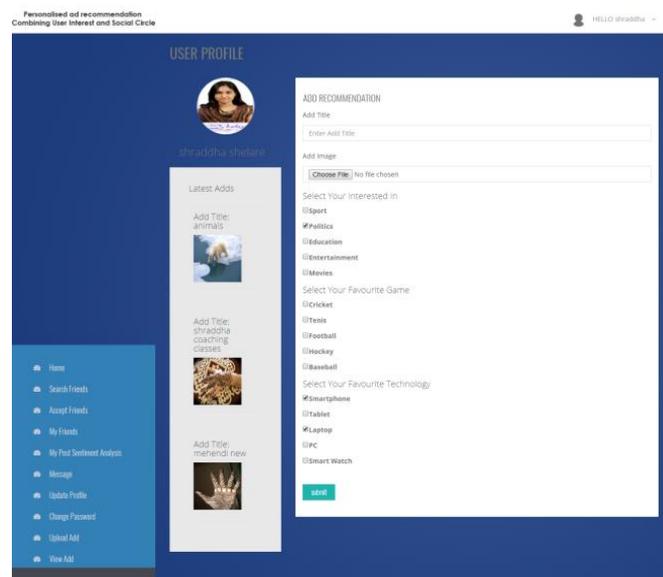
3.5 System Execution details:

3.5.1 Screen Shots

a) **Update Profile1:** To Recommend the Ads to the User, User needs to update its profile with the basic information like sports, education etc.
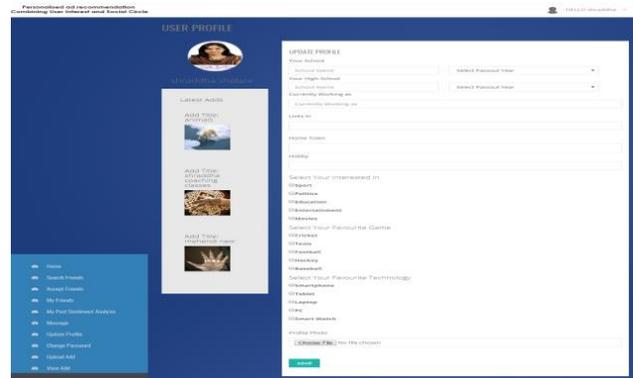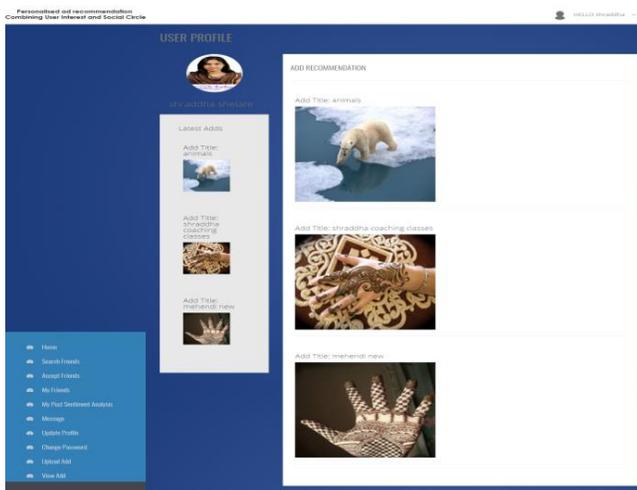

Screen Shot 1: Update Profile Page

b) **Upload Ads:** If an Advertiser wants to upload an ad on this platform then the above upload Ads Module will provide such functionality.

Screen Shot 2: Upload Ads Page

c) **View Ads:** If User Wants to See the Recommended Ads then View ads will show all the uploaded ads here.

Screen Shot 3: View Ads Page

4. CONCLUSION AND FUTURE SCOPE:

4.1 Conclusion:

Social networks are the ideal environments for advertising publishing in terms of fast and economic access to many users. If the right ads are presented to the right user, the expected increase in sales can be achieved. Currently, the social networks try to find out the users areas of interest through the personal information they request in certain intervals. In this way, they present content recommendation through the static profiles they have drawn for the users. However, it must be taken into consideration that user expectations can change instantly. Therefore, users' expectations must be determined dynamically and accurately. Social network shares contain information regarding users' expectations and orientations. The identification of this information facilitates the presentation of ads that suit to the expectations of users.

Twitter is the fastest growing social network of recent times; however, it is new in terms of becoming an advertising medium. Due to this reason it is an environment open for study.

In this study, an advertising recommendation system has been developed. Basic information of the user maintain by the social networking sites are used to know the interested categories of the user. The interested area of users and the advertiser match with each other. If this characteristics of user and advertiser results in match then the ad is recommended to that user. This will save time as well as asset of the advertiser with the more sorted way. With this system based on dynamic data analysis, the word patterns in

user's shares are identified and sorted under categories. In line with these categories, the user's areas of interest are identified. Based on the identified areas of interest, the ads addressing that area of interest are presented to the relevant user. A content filtering method called Ads Recommendation System has been revealed in order to filter the most advertising content that suits best to expectations.

A prototype system has been developed to test the application. This application has been tested on a voluntary group of users actively using Twitter. Based on the feedback received from the users, it has been concluded that the system is successful at the rate of 88%. The presentation of ads in line with the expectations, by correctly analyzing the users' instantaneous expectations, makes the marketing strategy more effective. In this way, users' exposure to unnecessary contents is avoided and it is ensured that the content is delivered to the right audience. It is obvious that this method will yield to increases in marketing activities.

4.2 Future Scope:

The Ads Recommendation System is based on User Interest only. Sometimes it may happen that user may not fill its profile properly, this will result in limitation of this system as the project is totally depend on user interest. In the future scope, The System may consider with the cookies tracking Method. Now days, Snapdeal, Amazon used the cookie tracking System. As we search any product on amazon, it will automatically show us those product ads on facebook, instagram, google etc. In Future, The Ads Recommendation System can be implemented with the follow up ads.

REFERENCES

1. David Sánchez , Laura Martínez-Sanahuja , Montserrat Batet," Survey and evaluation of web search engine hit counts as research tools in computational linguistics", International Journal of Information System, 20 December 2017.
2. Foster Provost, Brian Dalessandro, Rod Hook, Xiaohan Zhang, Alan Murray "Audience Selection for On-line Brand Advertising: Privacy-friendly Social Network Targeting", International Journal of Social Science Research Network, 25 May 2011.
3. Onur Sevli, Ecir Uğur Küçüksille," Advertising recommendation system based on dynamic data analysis on Turkish speaking twitter users", International Journal of Tehnički vjesnik, ISSN 1330-3651 (Print), ISSN 1848-6339 (Online) DOI: 10.17559/TV-20151020205558.
4. Mrs N. Nancy Fernandez," Effectiveness of Social Networking Sites in Marketing", Journal Of Humanities And Social Science (IOSR-JHSS) e-ISSN: 2279-0837, p-ISSN: 2279-0845. PP 72-76.

5. Mahmud Akhter Shareefa, Bhasker Mukerjib, Yogesh K. Dwivedic,∗, Nripendra P. Ranac, Rubina Islam," Social media marketing: Comparative effect of advertisement sources", International Journal of Retailing and Consumer Services.

6. Abu Bashar et.al. Abu Bashar, Irshad Ahmad," Effectiveness of Socialmedia as a marketing tool: An empirical study", ELK Asia Pacific Journal of marketing & retail Management.

7. Yung-Ming Li, Hsuan-Ming Chen, Jyh-Hwa Liou, Lien-Fa Lin ,"Creating social intelligence for product portfolio design", International Journal of Decision Support Systems 66 (2014) 123–134, 17 July 2014.

8. Thirumalaisamy Ragunathana, Sudheer Kumar Battulab, Vedika Jorikac, "Advertisement Posting based on Consumer Behavior", International Jounalof Computer Science Procedia 50 (2015) 329 – 334.

9. Hasan Ziafat, Majid Shakeri," Using Data Mining Techniques in Customer Segmentation", Journal of Engineering Research and Applications www.ijera.com ISSN: 2248-9622, Vol. 4, Issue 9 (Version 3), September 2014, pp.70-79.

10. Virda Setyania, Yu-Qian Zhub,∗, Achmad Nizar Hidayantoa, Puspa Indahati Sandhyaduhitaa,Bo Hsiao," Exploring the psychological mechanisms from personalized advertisements to urge to buy impulsively on social media", International Journal of Information Management 48 (2019) 96–107.