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Microsegmentation Problems Associated with Multiple Distribution of Qualitative Characteristics in the Analysis of the User Profile

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ABSTRACT

The commercialization of data about users is relevant when the number of properties databases. The importance of an adequate methodology for processing streaming data is due to the effectiveness of targeted advertising aimed at the target audience. However, the collection of information about users faces a number of problems. It's no secret that the information about the device, user and location of the access point in the network is almost open. However, the fact that several users can use the same device can add so-called noise and exclude a potential client from the conditional collections. This study aims to identify qualitative patterns that affect the separation of user profiles with the same data about the physical device.

Key words: target audience microsegmentation, target group analysis, semantic field, user profile

1. INTRODUCTION

During the period of its operation, the Internet has gone from a project designed to create a common environment for the dissemination of data, to a comprehensive global network, the driving force of which is becoming more and more trade. The result of trading in such an area as the Internet, where users themselves control the navigation process, can be determined only by how business takes into account their interests, and for this you need to know who they are, what their needs, desires, preferences, behaviors and more.

The research conducted on the Internet aimed at studying the characteristics of its audience is designed to answer these questions. Its main characteristics include: the volume of the network audience and individual sites, its socio-demographic profile, consumer parameters of the user, preferences in a particular category of goods and services and a number of others [6, 17, 23, 24, 25, 26, 27, 28]. The main features of these case studies of the target audience include: the size of the network audience and individual websites, its socio-demographic profile, consumer characteristics of the Internet audience.

2. METHODS

To improve the quality of the study, the following list of methodological tools was chosen:

1. The method of abstraction - Theoretical-empirical method. This method allows in the process of analytical and design work to escape from the random, situational, non-essential properties, relationships and relationships of the phenomenon under study, as in our case, the main qualitative characteristics of users, and to identify the essential characteristics of the process [16]. Thus, in our distribution, one-time visits to certain resources that are not related to the main direction of consumption will be treated as insignificant errors of distribution.
2. The method of active-activity training - the Use of this method increases the effectiveness of training activities in the implementation of the project. Guided by the methodology of the analogy algorithm, the reconstruction of the analytical mechanism of network user behavior can be identified as a model of active-activity training [21]. The use of this method is due to the need to identify dynamic changes in long-term research in the field of analysis of user behavior with the introduction of elements of influence.
3. Active observation is a Kind of observation method when the observer actively participates in the activity of the studied group, simultaneously registering the details of the behavior of its members. The formation of a model of the user's behavioral profile can not be carried out without active monitoring techniques [5].
4. Method of alternatives - This method improves the quality of the work performed by objectifying the procedure for choosing a method of solving a specific problem, because when it is used, different alternatives, options for action, answering a question, options for solving the problem are put forward; then these options/alternatives are discussed (for example, by a group of experts and with the involvement of a wide range of practitioners) for the final choice of the optimal solution.
5. Method of analysis - Theoretical and empirical method, the division of the whole subject into component parts (sides, features, properties or relationships) for the purpose of their comprehensive study
6. Methods of mutual influence analysis – This method improves the quality of work performed by analyzing the

influence of various factors on the studied problem [13]. Consideration of the reasons for a particular distribution, its availability, volume or lack thereof in certain countries, for example in our case, will be reflected to form a complete picture of the problem.

7. The method of analysis and systematization of data - This method involves the structuring of the materials obtained in the course of analytical actions, followed by the unification of previously disparate concepts and judgments in qualitatively new information. Data analysis and systematization will be used in most project activities to improve the quality of work and in future studies.

8. Analysis method range of subproblem - Method of analysis of the range of subproblem is to decompose the original problem into interdependent components, taken separately, the components of subproblem (as a rule, subject to hierarchical subordination). Then, all possible combinations of the components of the problem are compiled, for each of which a particular draft decision is drawn up. The use of this method will reduce the time of the analysis of the problem and the preparation of the required materials, improve the quality of work.

9. The method of analysis of problems – Choosing the research method subproblem, we couldn't pass the method the main problems. This method is used to solve the problems of choice of alternatives by means of their multi-criteria rating. The method allows to analyze the problem [20]. In this case, the problem is presented in the form of hierarchically ordered: a) the main goal (the main criterion) of rating possible solutions, b) several groups (levels) of the same type of factors, one way or another affecting the rating, C) groups of possible solutions, d) a system of links indicating the mutual influence of factors and solutions.

ti questions are designed to conduct research on the Internet, aimed at studying the characteristics of its audience. Its main characteristics include: the volume of the network audience and individual sites, its socio-demographic profile, consumer parameters of the user, preferences in a particular category of goods and services and a number of others. The main features of these case studies of the target audience include: the size of the network audience and individual websites, its socio-demographic profile, consumer characteristics of the Internet audience.

3. LITERATURE REVIEW

The theoretical basis of the study is a number of modern research in the field of behavioral profile, demand formation, conducting a series of marketing research, which explores the behavioral, psychological and elements of the portrait of the consumer in the network.

Economic theory considers many aspects of human management. One of the main gaps in the consideration of economic science phenomena can surely be called problems with market failures. Theoretically, it is possible to reduce the impact on society of destructive consequences of this phenomenon, however, it is impossible to completely exclude it due to certain laws of the market formation. Targeted advertising, based on the results of marketing activities, including macro-segmentation of users, and later micro-segmentation, theoretically can provide demand formation, which allows to reduce the appearance of some market failures [7]. Qualitative characteristics of user profiles allow us to identify the needs of users, however, a number of problems associated with the identification of a particular user by personnel can add to the study area of noise.

Thus, a model of limited rationality is formed for the consumer, when the user chooses from the presented volume of proposals [18, 19]. A specific user, in a specific period of time. Identifying needs is easier when you use user profiles that synchronize mobile devices with workstations. This element allows you to specify the person of the user. A person, but not a person, as registration on certain resources does not require personal verification. In other matters, it is not required, since the formation of the proposal occurs mainly depending on the identified semantic field, the database of requests in the network and the user's cookies.

The data collected, as discussed above, form the consumer choice model [3, 11]. Note also that the use of the workstation is usually identified as the use of the machine by one user. Identification occurs by comparing a number of factors. In our opinion, it is more important to subject user profiles to a more detailed analysis to identify user psychotypes or time of use of stations, to form a more accurate targeted advertising of goods and services. Similar arguments can be found in the works of foreign contemporaries conducting research in the fields of consumer behavior psychology [4, 14]. These studies note the importance of targeted advertising for individuals.

Streaming segmentation of data on network users the most relevant with the use of new networks. As a rule, there are no particular difficulties in using methods to identify consumer preferences at first glance [8]. A number of Russian providers of network connections for mobile devices limit the ability to distribute network resources. Third-party device connections by third-party users adds noise that harms the analysis of a particular user's profile.

The works of contemporaries reflect the relevance of the problems best. The interest in high-quality information in the modern realities of information resources overload allows to develop this direction in different directions [12]. Creation of software and hardware solutions, theoretical and methodological considerations of the theory of the question and so on, allow us to bring the methods of data collection and analysis to a qualitatively new level.

In considering options for the collection and analysis of information about users of the network raises several natural questions. To give an example of a subjective situation, let's take the average family, we can say that working representatives of this family can see advertising from devices connected to the network at home only during non-working hours. During these periods, ads may be seen by the unoccupied population using devices on the home network. The implemented format of advertising on the Central television with its laws and prohibitions allows you to copy the model and adapt advertising activities for a particular family. Moreover, taking into account the

analysis of search queries, used information resources, the Association of users with certain semantic fields can be analyzed even psychotypes of users to improve the quality of targeted advertising [1, 2].

The research conducted on the Internet is aimed at studying the characteristics of its audience. Its main characteristics include: the volume of the network audience and individual sites, its socio-demographic profile, consumer parameters of the user, preferences in a particular category of goods and services and a number of others. The main features of these case studies of the target audience include: the size of the network audience and individual websites, its socio-demographic profile, consumer characteristics of the Internet audience.

Discussion. Having considered the main directions of research in the analysis of data of network users and distribution errors, it can be concluded that in dynamically changing conditions it is possible to find a model that will increase the efficiency, conditionally, advertising models used as a result of micro-segmentation of the target Internet audience. One of the basic and attracting the most attention is the question of the total number of online users, which characterizes the interest of commercial users of online resources [15]. Interest in this issue is justified by the fact that the effectiveness of paid online application, like most classical media, is more focused on the level of penetration into the environment for which it is specialized [22]. Upon reaching a specific critical value (critical mass), in the case provided for this figure is taken about 10-15 %, the use of methods is identified adequate costs for its implementation and use, and its distribution meets the needs of consumers of such specific goods as advertising in the network.

The limited liability company "Integrated systems" within theoretical researches carried out the analysis of the consolidated image of the user of the Internet. The conducted research provides an opportunity to estimate the approximate number of users and, most importantly, to Assess the prospects for the growth of the Internet audience and the commercialization of the Internet. According to the research of Nua Internet Surveys (www.nua.ie/surveys/) in may 2002, about 580 million people had online access. This reflected at that time less than 10 % of the population of our planet and said that online is in its infancy. According to monitoring specialists , by the end of 2003, users have more than 600 million, and in 2005 - more than 800 million people.

Geographically, web users are distributed quite non-uniformly. Table 1 presents data on their distribution by world regions.

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Table 1: Dynamics of growth of Internet users. Source: International Telecommunications Union [9].

	2005	2010	2017
World population	6.5 billion	6.9 billion	7.4 billion
Users worldwide	16%	30%	48%
Users in developing countries	8%	21%	41.3%
Users in developed countries	51%	67%	81%

Modern realities of the number of Internet users reflect the decline in the number of growth over time.

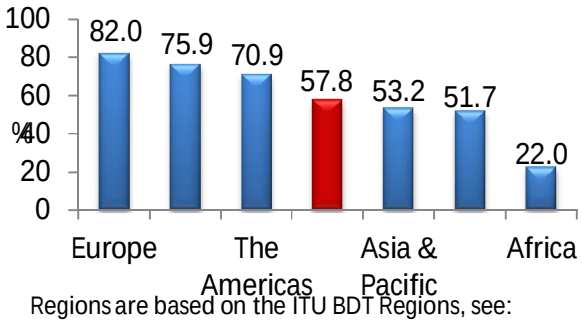

Figure 1: Percentage of households with Internet, by region, 2018 (Joshi, Y., Rahman, Z., 2019)

The degree of development of the network in any country is closely related to the overall level of development of telecommunications infrastructure and computerization in it. As a result, it is not strange that the more developed state in this sense in real time is the United States. More than 60 % of Americans over the age of 12 have online access, and half of them go online every day and spend at least an hour in it.

In Europe, most users belong to Germany and England. The Russian Federation is still lagging behind these States. The prevalence of online in Russia is estimated to be within 10 % of the population of the state.

The growth of online Asian countries is of sufficient interest. In particular, the number of its users in the Land of the rising sun increased by 130 million last year, and now there are more than 800 million In India, more than 700 million people. The rate of growth in the number of users in China and India per year was more than 30 % per year.

By the average amount of time spent online , the 1st place is taken by America. In Europe, the favorite is England, where users go to the Network 5.1. It is followed by Germany and France with a figure of 4.9 hours.

About 2/3 of online users are now male and only in accordance with this 1/3 — female. At the initial turn of online Development, the difference was even more significant , and now from year to year there is a rise in the percentage of the female level and a gradual approximation of the indicator to the global statistics of gender distribution [1].

The average age of online users on average more than 30 years, and there is a gradual rise. As show the conducted researches, a great skill of work in Network own young people aged 18 to 35 years. This surge can be explained by the increased level of use of modern gadgets. Users 20 years ago were not able to provide each family member, conditionally, a device with Internet access. Moreover, the presence of such a device in Russia 20 years ago could be found only in families with high incomes or with activities in the field related to computers.

Internet users have a fairly large degree of education — the minimum number, 66 % graduated from the Institute or have a higher level of education. Contemporaries of scientific thought associate this phenomenon with the availability of education [10].

About 43 % of Internet users are married.

Modern realities of the theory of the question are such that the growth of Internet users is characterized by an increase in new possible consumers of goods and services. Data collected about users can bring commercial benefits to big business, transnational corporations. As for small and medium-sized businesses, the issue is much more acute. The comparative advantages of advertising for small and medium-sized businesses in practice are proved by representatives of advertising agencies and departments of transnational corporations. The influence of integration processes allows the methods of comparative advantages to work more effectively.

The main for Russian the Online now remains question joint number of users. According to the Agency Monitoring.Ru by the beginning of 2001, between 110.5 million of the Mature population of the Russian Federation aged 18 years and older, the maximum audience was 10.3 % (11.4 million people). It connects both intensive, for example, and not very intensive users, but also those who contain only a single skill of visiting online [18].

The number of the largest audience is considered to be an informative indicator of the formation of online audience in Russia.

According to the research of the public opinion Foundation (hereinafter FOM) and open data Yandex.Metrics 29% of all visits occur from mobile devices. These data are the most valuable, as mobile equipment is more personal. From related studies of these companies can be extracted information about the ratio of Internet access from mobile devices, computers and mobile devices and only mobile devices – 29%, 52% and 19%, respectively. The use of different devices is often simplified for analysis by some users. They use certain services that consolidate user information, creating a single user-friendly environment. Retention of information about individuals creates a database which later is possible in varying degrees, to commercialize.

Just an important indicator for the analysis is the time of use of access to the network. Computer at work, access from a router or through a patchcord from a home computer identify the user in different ways. The quality of requests, page visits, correspondence in open social sources – all these data form the user's profile, and as a result, the consumer.

4. CONCLUSION

The analysis of data on the network users allowed to draw a number of significant conclusions. Network users have their own quality characteristics. Access to online at a certain time, the quality of queries, the number of search queries. The consolidated information can be separated into different profiles in case of discrepancies in the average profile parameter.

Internet access time is also important. Let's go back to the example of the average family. The formation of advertising content for the family at different times of the day should take into account the age characteristics, the alleged psycho and exceptional personality traits identified in the analysis of the user profile. Given these indicators, it is possible to increase the effectiveness of spot advertising.

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REFERENCES

1. Cacioppo,**S.High-performance electrophysiological microsegmentation and brain source localization (Book Chapter).** *Handbook of Psychophysiology, Fourth Edition.* 1 January 2016, Pages 101-115 https://doi.org/10.1017/9781107415782.006
2. Cacioppo, S., Weiss, R.M., Cacioppo, J.T. **Dynamic spatiotemporal brain analyses of the visual checkerboard task: Similarities and differences between passive and active viewing conditions.** *Psychophysiology.* Volume 53, Issue 10, 1 October 2016, Pages 1496-1506 https://doi.org/10.1111/psyp.12723
3. Chung, H., Ahn, H.-S., Jasin, S. (Rescaled) **Multi-Attempt Approximation of Choice Model and Its Application to Assortment Optimization.** *Production and Operations Management.* Volume 28, Issue 2, February 2019, Pages 341-353 https://doi.org/10.1111/poms.12916
4. Fatas-Villafranca, F., Fernández-Márquez, C.M., Vázquez, F.J. **Consumer social learning and industrial dynamics.** *Economics of Innovation and New Technology.* Volume 28, Issue 2, 17 February 2019, Pages 119-141 https://doi.org/10.1080/10438599.2018.1433582
5. Huseynov, S., Kassas, B., Segovia, M.S., Palma, M.A. **Incorporating biometric data in models of consumer choice.** *Applied Economics.* Volume 51, Issue 14, 22 March 2019, Pages 1514-1531 https://doi.org/10.1080/00036846.2018.1527460
6. Joshi, Y., Rahman, Z. **Consumers' Sustainable Purchase Behaviour: Modeling the Impact of**

Psychological Factors. *Ecological Economics.* Volume 159, May 2019, Pages 235-243 https://doi.org/10.1016/j.ecolecon.2019.01.025

7. Maloletko, A., Volkov, D., Vishnyakova, V., Shatsky, A. **The effect of supply chain and consumer preferences on the formation of economic model.** *International Journal of Supply Chain Management.* Volume 7, Issue 5, October 2018, Pages 684-689
8. Mämmelä, O., Suomalainen, J., Ahola, K., Ruuska, P., Majanen, M., EUitto, M. **Micro-segmenting 5G.IoTBDS 2018 - Proceedings of the 3rd International Conference on Internet of Things, Big Data and Security.** *3rd International Conference on Internet of Things, Big Data and Security, IoTBDS 2018; Funchal, Madeira; Portugal; 19 March 2018 ðo 21 March 2018.* Volume 2018-March, 2018, Pages 17-28 https://doi.org/10.5220/0006662700170028
9. McGuire, L., Beattie, G. **Talking green and acting green are two different things: An experimental investigation of the relationship between implicit and explicit attitudes and low carbon consumer choice.** *Semiotica.* Volume 2019, Issue 227, 1 March 2019, Pages 99-125 https://doi.org/10.1515/sem-2017-0138
10. Novais, L.R., Maqueira, J.M., Bas, Á.O. **Current status of research on Customer Segmentation and Supply Chain Flexibility. The Future Challenge of Microsegmentation | [Estado actual de la investigación sobre Segmentación de clientes y Flexibilidad de la cadena de suministro. El desafío futuro de la Microsegmentación].** *Direccion y Organizacion.* Volume 62, July 2017, Pages 16-34
11. Oganyan, V.A., Vinogradova, M.V., Volkov, D.V. **Internet piracy and vulnerability of digital content.** *European Research Studies Journal*. Volume 21, Issue 4, 2018, Pages 735-743
12. Sánchez González, P. **Halal tourism in Perú: An opportunity for business? | [Turismo halal en Perú: ¿Una oportunidad de negocio?].** *Opcion*. Volume 33, Issue 82, 2017, Pages 533-549
13. See-To, E.W.K., Ngai, E.W.T. **An empirical study of payment technologies, the psychology of consumption, and spending behavior in a retailing context.** *Information and Management.* Volume 56, Issue 3, April 2019, Pages 329-342 https://doi.org/10.1016/j.im.2018.07.007
14. Shangguan, Q., Yuan, H. **Design of mobile application interface based on brand image.** *AHFE 2018 International Conference on Human Factors in Communication of Design, 2018; Orlando; United States; 21 July 2018 ðo 25 July 2018. Advances in Intelligent Systems and Computing.* Volume 796, 2019, Pages 121-130 https://doi.org/10.1007/978-3-319-93888-2_14
15. Sheu, J.-B., Choi, T.-M. **Extended consumer responsibility: Syncretic value-oriented pricing strategies for trade-in-for-upgrade programs.** *Transportation Research Part E: Logistics and Transportation Review.* Volume 122, February 2019, Pages 350-367
16. Volkov D. V. **Analysis of the structure of the modern monetary system.** *Economy: yesterday, today, tomorrow.* 2016. Vol.6. No. 10A. P. 161-170.
17. Volkov D.V., Akhtian A.G., Dgibabov M.R., Semennikova A.I., Kusina O.A. **The effective use of human capital through the reduction of working time.** *International Journal of Environmental and Science Education.* 2017. Т. 12. № 1. С. 35-46.
18. Volkov, D.V., Maloletko, A.N., Kaurova, O.V. **Formation of bounded consumers' rationality based on micro-segmentation.** *European Research Studies Journal*. Volume 21, Issue 4, 2018, Pages 754-762
19. Volkov, D.V., Vinogradova, M.V., Kulyamina, O.S. **The synthesis of modern consumer preferences with the use of social networks in supply chain.** *International Journal of Supply Chain Management*. Volume 7, Issue 5, 2018, Pages 851-857
20. Bokarev T. ***Ways to promote the company on the Internet / Conference "Russian perfume and cosmetics market: a look in the XXI century***, 2000 – 295 p.
21. Burdinsky A. A. **Internet marketing as a new tool for business development** / *Marketing and marketing research in Russia*, 2000. – № 2. – 307 p.
22. Bushueva L. I. **The Role of Internet services in practical marketing activities** / *Marketing in Russia and abroad*. – 2001. – № 4. – 237 p.
23. Gadzhieva U.B. **Socialization of Personality as a Factor in the Mental, Intellectual and Spiritual-Moral Development**. *International Journal of Medicine and Psychology*. 2018. Volume 1. Issue 2. Pages 17-20
24. Narkevich L.V., Narkevich E.A. **Financial condition analysis in the crisis management system.** *Russian Economic Bulletin.* 2018. Volume 1. Issue 4. Pages 10-24
25. Tsahaeva A.A., Aminov U.K., Aminova D.K. **Driving forces of the development of adaptive behavior of personality: methodological considerations.** *Modern Scientist.* 2017. № 8. Pages 44-47
26. Gadzaov A.F., Dzerzhinskaya M.R. **Mathematical methods of analysis of the periodic components of economic processes.** *Modern Economy Success*. 2018. Issue 1. Pages 14-18
27. S.V.R.K.Rao, M.Saritha Devi, A.R.Kishore and Praveen Kumar **Wireless sensor Network based Industrial Automation using Internet of Things (IoT)**. *International Journal of Advanced Trends in Computer Science and Engineering*. 2018. Volume 7 No. 6 (2018). Pages 82-86 https://doi.org/10.30534/ijatcse/2018/01762018
28. Ramakrishna Rath, R.Tamilkodi, K V Mishra and K Jose Cherian **Utilizing Contemporary Benchmark Protocol for Sharing Mobile Ad-hoc Network Environment.** *International Journal of Advanced Trends in Computer Science and Engineering*. 2018. Volume 7 No. 6 (2018). Pages 96-98 https://doi.org/10.30534/ijatcse/2018/04762018