

THE «FILTER BUBBLE» EFFECT: HOW RECOMMENDATION ALGORITHMS SHAPE OUR WORLDVIEW AND LIMIT SERENDIPITY

Zinkovsky A.V.

Belarusian State University of Informatics and Radioelectronics, Minsk, Republic of Belarus

Perevyshko A.I. – Senior Lecturer at the Department of Foreign Languages

Annotation. The article is devoted to the problem of the «filter bubble» effect in the Internet. Various definitions of this term are given. Special attention is given to the advantages and disadvantages of these recommendation systems. It is also pointed out the significance of using these recommendation algorithms in forming views of network users.

Keywords: recommendations, algorithms, social media.

Introduction. Today, few people doubt the effectiveness of recommendation systems in commerce, as they have become an integral part of the global digital economy and a major factor in attracting consumers. The Internet has provided users with access to a rich information environment, offering almost limitless possibilities for data consumption. However, a lot of controversy arises around the harm of recommendation systems for users and their potential long-term psychological impact. Many researchers claim that these algorithms contribute to selective perception of information and, as a result, the formation of an information bubble around the user, which limits their perspective. Given the ambiguity of this issue and its growing relevance in our daily lives, it is important to understand the facts and find out how recommendation algorithms actually affect the worldview of netizens in the long run to develop strategies for balanced information consumption.

Main part. The term «filter bubble» was first proposed by Elie Pariser in 2011 in his work of the same name. Originally, the term described how effectively personalized recommendations can restrict users from different points of view or content that is at odds with their preferences, effectively creating a customized reality. Recommendation systems based on algorithms determine which content the user prefers by analyzing their previous behavior, and based on this data, websites show him only the information that corresponds to his interests, while the rest of the information with an alternative point of view is not displayed to the user or is pushed to the periphery. In the course of further research, other definitions of this term have been proposed to better capture the complexity of the phenomenon. So, the «filter bubble» effect can be represented as a focused impact of content corresponding to user preferences, forming a sort of digital echo chamber. Researchers from the University of Michigan have proposed to define the filter bubble effect as a continuous process, and it increases when people with different preferences increasingly consume different types of content, leading to a gradual divergence in their understanding of the world [4]. In this article, we will focus on the initial definition of this term to maintain clarity in our analysis.

In his work, Elie Pariser considers recommendation algorithms as a factor that negatively affects not only an individual, but also society as a whole, creating a fragmented social landscape. In his opinion, the filter bubble can undermine civil discourse and create a threat to democracy by exposing people to various kinds of propaganda and manipulation, as users lose the ability to encounter and debate opposing views [3].

Many studies speak about the effectiveness of recommendation systems from a purely business and technical perspective, emphasizing their ability to optimize user experience. For example, Amazon claims that 35% of their sales were made thanks to recommendation algorithms, which demonstrates their immense commercial power and influence on purchase decisions. Netflix claims that 75% of their users use recommendations. Political scientist Tetlock found that ordinary people often make more accurate predictions than experienced political scientists. This is because experts who study one topic in depth often find themselves inside an information Bubble, becoming victims of their own specialized focus and narrow data sets [1].

These claims can be confirmed by various studies in the fields of psychology and sociology. First of all, this effect is explained by the theory of cognitive dissonance, which is fundamental to understanding human behavior. According to this theory, when conflicting beliefs collide, a person

has an internal conflict and, as a result, he experiences unpleasant emotions such as stress or anxiety. To reduce this unpleasant psychological state, people seeking information are motivated to seek information consistent with their beliefs and to avoid or discredit information that contradicts them, thus protecting their existing worldview [2]. Thus, even when opposing points of view are presented side by side, people still prefer to choose information that confirms their existing views rather than challenging them.

In addition to this factor, the degree of involvement in the subject of the study plays an important role in how the user perceives information. Research shows that people with low engagement in a topic tend to pay more attention to secondary factors, such as other people's consent or the source of information [2].

However, it should be noted that not all users blindly or without critical consideration follow the recommendations of the system. Research has shown that the importance of a topic, personal interest, confidence and conviction of the user, that is, the level of engagement in the topic, can greatly contribute to access to information that challenges attitudes [2]. In other words, this indicates that as people's interest and awareness of a topic increases, they may become more motivated to explore different opinions in order to form a more reliable and comprehensive understanding of reality. But this does not necessarily mean that it is easier for such users to recognize competing points of view objectively. On the contrary, people involved in a particular topic tend to analyze information more carefully and change their attitude only when they consider the arguments to be extremely and logically sound.

Although this perception of diverse information does help reduce polarization among people, high engagement makes their attitudes more stable. With information representing different points of view, people can more carefully argue their point of view, which makes it more stable and resistant to change. This is also supported by research that proves that although algorithms can introduce some diverse content, they preferentially reinforce pre-existing preferences, acting more as an amplifier than a neutral filter [4]. However, many researchers note that recommendation algorithms do not always harm users and can actually be beneficial in many contexts. For example, there are studies that have shown that recommendation algorithms introduce consumers to more diverse news than they could find on their own, through traditional browsing habits [4]. By breaking the usual search patterns, algorithms can sometimes offer unexpected information. Recommendation systems can also help users learn something new.

Conclusion. Thus, the «filter bubble» effect is not an exclusively negative phenomenon, but a complex interaction between technology and psychology. Information bubbles arise not so much because of recommendation systems, but due to the human psyche, which avoids contradictory information out of a natural desire for cognitive comfort. The filter bubble effect is not an independent cause of information isolation, but a reinforcing factor that accelerates existing tendencies. Recommendations can isolate users from alternative information and strengthen the bubble, especially when the user is passive. But with higher engagement, they provide access to new information and can serve as a tool for discovery. However, the issue remains controversial and requires further discussion both in the scientific community and among ordinary Internet users who interact with these systems daily.

References

1. Nguyen, T.T. Exploring the filter bubble: the effect of using recommender systems on content diversity / T.T. Nguyen [et al.] // *Proceedings of the 23rd international conference on World wide web*, Apr. 7–11, 2014. / Association for Computing Machinery ; ed. C.-W. Chung – New York, 2014. – P. 677–686.
2. Liao, Q.V. Beyond the filter bubble: interactive effects of perceived threat and topic involvement on selective exposure to information / Q.V. Liao, W.-T. Fu. // *CHI '13: Proceedings of the SIGCHI Conference on Human Factors in Computing Systems*, 27 Apr.–2 May, 2013 – Association for Computing Machinery ; ed. W.E. Mackay – New York, 2013. – P. 2359 – 2368.
3. Breaking the filter bubble: democracy and design [Electronic resource]. // Springer Nature Link. – Mode of access: <https://link.springer.com/article/10.1007/s10676-015-9380-y#Abs1>. – Date of access: 18.12.2015.
4. Anwar, M.S. Filter Bubble or Homogenization? Disentangling the Long-Term Effects of Recommendations on User Consumption Patterns / M.S. Anwar, G. Schoenebeck, P.S. Dhillon. // *WWW '24: Proceedings of the ACM Web Conference 2024*, May 13–17, 2024 / Association for Computing Machinery ; ed. T.-S. Chua – New York, 2024. – P. 123 – 134.