The Influences of Personalized Recommendation of Video Platform on Diversity of User Information Acquisition

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Abstract. In the era of digital information, personalized recommendation technology has become the essence of information distribution in the video platform. It has the goal of enhancing the efficiency of information acquisition by matching the information with the user accurately through the user's historical behavior and preference. Under the phenomenon of reshaping the information distribution model, the technical logic promoting individuation has deeply affected the diversity of information acquisition for the users. This paper discusses the dual effect mechanism of personalized recommendation of video platform on diversity of user information acquisition. The study found that personalized recommendation has a positive effect on reducing the cost of information discovery, improving the accuracy of information acquisition and stimulating potential interest exploration. At the same time, however, its technical characteristics also have the risk of narrowing the user's field of vision, polarization of ideas and degradation of information autonomy. In view of these challenges, this paper puts forward optimization paths such as constructing "wide vision" algorithm, providing "multi-angle" content and cultivating "information autonomy" from three aspects of algorithm design, content presentation and user empowerment, so as to promote the collaborative development of personalized recommendation technology and information diversity value.

Keywords: Personalized Recommendation, Video Platform, User Information Acquisition

1 Introduction

In the digital information age, the contradiction between the explosive growth of information and the limited attention of users is increasingly prominent. In order to deal with this contradiction, personalized recommendation technology based on algorithms emerges and quickly becomes the core mechanism of information distribution on various digital platforms. This technology dynamically filters and recommends the information which can meet the individual information need by collected analysis of users' past behavior, interest preference, and social relation, to improve the efficiency of information acquisition and user experience. However, this technical logic based on "per-

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sonalization" has led to profound change in the boundaries and structure of users' information access in the framework of information distribution model, which thereafter has profoundly and in a complicated way effected the variety of information acquisition [1]. This paper aims to explore the bidirectional influence of personalized recommendation technology on diversity of user information acquisition and its internal mechanism. Personalized recommendation plays a positive role in lowering the threshold of information discovery, improving the accuracy of information matching and stimulating potential interest exploration [2]. However, at the same time, its technical characteristics and business logic may also lead to a series of risks such as narrowing of users 'personal vision, polarization of social concepts and weakening of personal information autonomy, all of which pose potential threats to the diversity and health of the information environment.

In order to cope with the above challenges, this study tries to explore feasible optimization paths on the basis of analyzing the problem mechanism, hoping to provide useful academic references for the optimization design of platform algorithms, the improvement of user media literacy and the perfection of relevant digital governance policies.

2 CONCEPT AND THEORETICAL BASIS

2.1 Personalized Recommendations

Personalized recommendation is an information filtering technology based on user data and algorithm model. Its core logic lies in constructing dynamic user portraits by collecting and analyzing historical behavior data, explicit or implicit interest preferences, social relationship networks and situations of users on digital platforms. Furthermore, collaborative filtering, content analysis, deep learning and other computing models are used to predict and filter out the content most likely to attract the attention of specific users and trigger their interaction from a large amount of information sets, so as to realize automatic and accurate matching between information and users. The technology has been widely used in news information, e-commerce, social media and audio and video streaming media, becoming a key intermediary connecting users and information content [3]. In essence, personalized recommendations represent a paradigm shift in information distribution patterns from the traditional "people looking for information" to "information looking for people". It is designed to solve the problem of information overload and optimize user experience and platform efficiency by improving the relevance of information supply.

2.2 Diversity of Access to Information

Diversity of information acquisition refers to the breadth, heterogeneity and balance of content involved in the process of users 'access to and absorption of information. This concept is a multi-dimensional complex, mainly covering Content diversity, source diversity and form diversity. Content diversity refers to the richness of the information users are exposed to in terms of topics, opinions, positions and fields, avoiding being

limited to a single or a few topics. Source diversity emphasizes the diversity of channels or sources through which users obtain information, including different types of media organizations, professional organizations and individual creators, aiming to reduce dependence on a single source. Formal diversity involves differences in the way information is presented, such as text, images, audio, video, etc [4]. For individuals, high diversity of information acquisition helps to form a more comprehensive and three-dimensional knowledge map, cultivate critical thinking and innovative ability, and prevent cognitive bias from solidifying. For society as a whole, the diversity of information environment is the cornerstone for the survival of healthy public sphere, which guarantees the presentation and exchange of different voices and opinions, and is an important prerequisite for social consensus and cultural innovation. Therefore, maintaining and promoting diversity of information acquisition has significant individual development value and social public value.

2.3 Core Theoretical Support

This study mainly relies on the following theoretical perspectives to construct an analytical framework. The first is the theory of "information cocoon room" and "echo chamber" effect. Information cocoons describe the tendency of individuals to focus on content that matches their preferences in information selection, thereby binding themselves to cocoon-like cognitive cocoons. In the age of algorithms, this process is automated, efficiently performed and enhanced by personalized recommendation technology. The echo chamber effect further describes the phenomenon that at the group level, users with similar views gather, their opinions are repeatedly amplified in closed spaces, and different external voices are isolated, resulting in increasingly polarized views. Together, these two concepts provide a critical theoretical lens for analyzing how personalized recommendations can narrow the user's field of vision and polarize perceptions [5]. The second is the theory of "selective contact", which holds that the audience will actively choose the content that is consistent with or interested in their existing position and avoid the inconsistent or irrelevant information in the process of receiving information. Personalized recommendation systems, to some extent, solidify users' unconscious selective contact into a systematic technical logic, exacerbating the risk of cognitive imbalance.

3 Influence Mechanisms of Personalized Recommendation of Video Platform on Diversity of User Information Acquisition

3.1 Positive Impact Mechanism

In the digital information environment, personalized recommendation technology has a bidirectional and complex influence on users 'information acquisition behavior. This section mainly discusses the positive influence mechanism.

Reduce information discovery costs. The primary value of personalized recommendation lies in significantly reducing the cost and threshold of information discovery. Surrounded by a large amount of information, users 'attention becomes a scarce resource, and it often takes considerable time and cognitive effort to actively search for effective information. Personalized recommendation systems model user interests through algorithmic models, pre-screening potentially relevant content from an infinite ocean of information, and pushing it directly to the user interface. This "information to find people" mode replaces part of the user's search labor, making the initial steps of accessing new information easier and more convenient. More importantly, this mechanism provides the possibility of discovery for a large number of "long tail" content that is not popular, highly specialized, or outside the user's established cognitive range. Many valuable but low-exposure resources can reach users with potential needs through algorithmic connection and recommendation, thus objectively broadening the channels for information flow and creating basic conditions for diversity acquisition [6].

Improve the accuracy of information acquisition. When recommender systems can consistently provide content that is highly aligned with users 'real needs and interests, a reliable trust relationship is established between the two. This validity-based trust is crucial because it makes users more inclined to remain open to new directions being steered by the system. Accurate recommendation does not mean simplification of content, on the contrary, high level of accuracy is often reflected in the deep understanding of user interest graph. The system can recommend relevant content from different perspectives, different sources, or different manifestations in areas surrounding the user's core interests. For example, users interested in a historical event may be systematically directed to multidimensional information about the event, such as political analysis, economic context, cultural impact, and personal narrative [7].

Stimulate potential interest exploration. The design logic of personalized recommendation system has embedded functional orientation to stimulate potential interest exploration. In order to overcome the possible hardening effect of algorithms and maintain long-term user engagement, many systems adopt a balance strategy of "exploration-exploitation". This means that the algorithm will not only use known user preferences to meet immediate needs, but will also actively allocate resources to explore unknown areas where users may be interested but have no record of behavior. Such exploratory recommendations are often generated based on crowd intelligence, trend analysis, or the multivariate nature of the content itself. Its introduction implants controllable, constructive uncertainty into the user's information flow. When such recommendations successfully attract user attention and interaction, it means that the user's interest boundary has been actively and systematically expanded.

3.2 Negative Impact Mechanism

While personalized recommendation systems perform technical functions, they also risk compressing the diversity of information and generating structural constraints on user cognition and behavior. Negative influence mechanisms are often silent in user unconscious states, and mutually influencing each other to form a seemingly comfortable information environment that has actually hardened.

Limited prediction surface. Personalized recommendation is based on the principle of continuous learning and reinforcing users explicit historical preferences, and optimization goals usually refer to increasing click-through rate and time kept on site. This results in the system keeping recommending highly homogeneous information with users past behavior, causing a positive feedback loop for continuous or unconsciously self-validation. Therefore, the range of information that users are exposed to gets tighter and tighter, and the range of information and cognition are fixed. [8] Certainly, this customized comfort zone of information gradually dilutes users internal motivation to actively seek out different information. When the external information input is smooth too much, the cost of cognition to unknown areas is relatively high, and the expansion of interest is narrowed actively, so that users will unconsciously walk into a narrower and narrower information channel.

Idea polarization. Recommendation system brings combined filtering and other technologies users with more or less the same interests and positions to the same relatively closed online community. In these communities, specific ideas and information echo, repeat and reinforce, while heterogeneous voices are rejected by algorithmic filters or community norms, ensuring robust "echo chambers". Ongoing exposure to highly homogeneous views reinforces and drives them more to the extreme [9].

Personalized recommendation systems largely shift the decision-making power of information screening and judgment to algorithms, and users change from active "searchers" to passive "receivers". In the long run, users will gradually lose their key abilities of setting information targets independently, selecting retrieval strategies, evaluating source credibility and cross-verifying information content due to lack of practice. This degradation is subtle and self-reinforcing: the more you rely on recommendations, the weaker you are; the weaker you are, the harder it is to get rid of recommendations. Ultimately, users may lose the initiative to construct diversified and personalized information recipes, and the formation and update of their knowledge systems will be excessively constrained by the logic and limitations of external algorithms, thus fundamentally weakening the independence and resilience required to cope with complex information environments.

4 Optimal Paths for Obtaining Diversity of User Information

4.1 Build a "Wide Vision" Algorithm

To solve the problem of narrowing the user's field of vision caused by personalized recommendation, the core of the optimization path lies in the fundamental modification and enrichment of the algorithm logic, that is, from the pursuit of single user stickiness and efficiency maximization to the construction of a "wide vision" algorithm oriented to expanding cognitive breadth. This requires technology designers to internalize "diversity" as a core optimization goal as important as "relevance".

Specifically, diversity metrics and exploration mechanisms can be systematically introduced into the algorithm model. An effective strategy is to adopt a dynamic balance of "exploration-exploitation" frameworks, that is, while using users 'known interests to make accurate recommendations, a certain proportion of traffic is forced to be allocated to explore users' potential interests or present irrelevant content. For example, novel, unexpected, or cross-domain content is controllably injected into the recommendation stream through techniques such as multi-arm gambling algorithms or contextual combinatorial exploration. Realizing the "wide vision" algorithm requires not only technical innovation, but also corresponding product design. The platform can set up a separate "discovery" channel, or inform users in a gentle but explicit way (such as a label prompt) about the nature of the current recommendation without disturbing the mainstream information flow. This algorithmic restructuring aims to re-embed the "wall-breaking" ability of the information environment into the system itself, transforming technology from a narrowing enabler to a broadening facilitator, guiding users to unconsciously access a broader knowledge landscape.

4.2 Provide "Multi-Angle" Content

Solving the problem of concept polarization caused or intensified by personalized recommendation is to go beyond the logic of personal interest matching and actively introduce and display the information environment of multiple perspectives at the platform level. Recommender systems should not only focus on what users will like, but also present to users what they should know, especially important public issues and undertake social responsibility for facilitating rational discourse. On the concrete road, the platform needs to develop and apply algorithmic models that can detect the controversy of issues and the diversity of opinions. When it perceives that users frequently encounter a particular social issue with obvious differences, it should trigger the "multi-angle balance" mechanism. The mechanism exert autoaggregation of the core argument and evidential basis from credible sources from different perspectives and clearly mark the source of each representative view and position location on the spectrum. Further, introducing real-time correlation cues for the fact-checking information, or presenting links to background authoritative knowledge next to the controversial content to help users form a more complete cognitive frame when receiving information.

The optimization process not only involves algorithmic but also requires clear product design. The platform should provide a user-friendly push intensity control to let users actively choose greater or smaller push intensity of such multi-angle content and thus the right to know and choose to the users. With the active content intervention and transparent interface design, the platform can break the "echo chamber" barrier, open a window for users to rationally evaluate the social complexity with open-minded attitudes, nurture the habit of independent critical thinking, and alleviate the root cause of concept polarization among groups while respecting individual preferences.

4.3 Foster “Information Autonomy”

Achieving this goal depends first and foremost on transparency and controllability of technical design. The platform should provide a clear and understandable “algorithm informed and adjusted” interface that enables users to intuitively understand the core parameters of recommendation logic, and allows them to manually adjust interest weights, temporarily close personalized recommendations, or view and manage key behavioral data used by the system to build portraits. We can design tools like “interest dashboards” that allow users to add or modify interest tags, or even create multiple different interest scene patterns. The platform can provide controllable information filtering tools that allow users to customize the visibility intensity of specific content types, sources or keywords, upgrading extensive content blocking to fine autonomous adjustment. For example, "Conservative Recommendation", "Balanced Recommendation" and "Active Exploration" are set to three options. The platform can also set a "Recommendation Reason" label below each recommended video, so that users can be informed whether the following is recommended because of your viewing history, the preference of similar users, or popular trend. While, there is also an option "Adjust this type of content" to enable users to reduce the recommendation intensity of similar videos with one click, or block specific topics completely. The platform can further develop a tool called "Information Map", which displays the type proportion of the content frequently watched by users in a graph, and the unexplored content types are marked in the graph; TThe specific functions mentioned above implemented, can really restore a part of information control to users, and transform users from passive receivers of information to active individuals who can proactively plan and manage information.

5 Conclusions

There is an interactive relationship between video site personalized recommendation technology and the diversity of user information acquisition. Studies have shown that personalized recommendation can not only provide a wider channel of information for users, but also unexpectedly govern the vision of user information. It is inherent tension in the technical design logic between the efficiency and the diversity. By building "wide vision" algorithm construct with diversity indicators, building "multi-angle" content mechanism displaying multiple aspects, and cultivating "information autonomy" of user control, the adverse impacts of personalized recommendation, such as the narrowing of information, the polarization of concepts and the degradation of abilities, can be effectively avoided. These optimization paths not only provide specific directions for the improvement of platform algorithms, but also provide practical ideas for the improvement of user media literacy. The development of personalized recommendation system in the future needs to seek a finer balance between technical efficiency and information ecological health, so that technology can truly become a tool to expand rather than limit users 'cognitive boundaries.

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