**Social media "algorithm cognitive warfare" and new features of public diplomacy**

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    【Abstract】With the booming development of social media platforms and the increasingly widespread application of algorithms, "algorithmic cognitive warfare" has been widely used in public diplomacy, and "digital public diplomacy" has gradually transformed into "smart public diplomacy". The process of algorithms playing a role in public diplomacy can be roughly divided into three steps: group analysis, customized information, and shaping cognition. Public diplomacy under the support of algorithmic technology has significant new characteristics, namely, accuracy, cognitive solidification tendency of the recipient, anonymity, and technical dependence of capabilities. In the face of the public diplomacy challenges brought about by "algorithmic cognitive warfare", we should respond from multiple angles, including domestic public opinion field, international public diplomacy capabilities, and algorithmic governance.

    【Key words】social media, “algorithm cognitive warfare”, public diplomacy 【Chinese Library Classification Number】G206 【Document Identification Code】A

    As algorithms are increasingly used in the public and private sectors, algorithmic systems have gradually been seen as part of the decision-making process, with potentially significant impacts on individuals, organizations, and society as a whole. Especially in social media platforms and search engines, the use of algorithms to guide, prioritize, and filter information has unpredictably affected citizens' right to information freedom, freedom of expression, diversity of social opinion, and even political discourse. In addition, the irrational mobilization capabilities generated by algorithms also have a huge impact on domestic political agendas, which has been verified in the "Cambridge Analytica" incident. In the field of international politics, algorithm-based technologies have not only made social media platforms an important tool for contemporary public diplomacy, but also made them a platform and even a participant in the "algorithmic cognitive war" between international actors. In the traffic statistics of relevant platforms, it can be found that Facebook's global monthly active users reached 2.91 billion in the fourth quarter of 2021, and Instagram and YouTube are on par with it. With such a large transnational audience group, social media platforms have become an important field that contemporary public diplomacy cannot avoid. The powerful influence of algorithmic technology on social media platforms and the global public opinion field has given public diplomacy new characteristics in the algorithmic era, and also posed new challenges to algorithmic governance.

    The process by which algorithms influence public diplomacy through cognitive shaping

    The birth of social media platforms has provided the global public with unprecedented broad channels for expression, but the inequality of the online society is conducive to the political and social elites to achieve discourse monopoly and social mobilization. At the same time, the "information cocoon" and "echo chamber effect" caused by algorithm technology have led to the gradual polarization and singularization of people's cognition. In this context, algorithm-based artificial intelligence, deep learning, and machine learning technologies have become powerful tools for various political forces to shape cognition and social mobilization. It is necessary to recognize that the essence of this cognitive shaping and influencing behavior is that the algorithm screens and even processes the information obtained by people through different human-computer interaction modes, and then shapes and influences the cognitive behavior of the target audience. In summary, the process of algorithms playing a role in public diplomacy through the cognitive shaping process can be roughly divided into three steps, namely "group analysis-customized information-shaping cognition".

    First, individualized behavior analysis based on user data. Relying on the massive data generated by users, algorithms can analyze user behavior and classify users accordingly. Generally speaking, user data is divided into two categories: input and output. Input data refers to data generated by users' activities in cyberspace that can be used for analysis; output data refers to information data obtained based on the analysis of users' activities in cyberspace. In general, both input and output data can reflect the user's living environment and behavioral preferences. For example, input data mainly includes web browsing preferences, the speed of browsing social media information, and activity data that is highly correlated with personal behavior patterns, such as restaurant dining information, travel methods and financial transaction information, and even employment status. Output data mainly includes shopping and travel preferences, as well as information about the user's health, economic status, and social relationships. Therefore, behavioral analysis of users can locate the individual's social class, political and cultural preferences, and issues of concern, and form different user classifications accordingly. In short, algorithm-based machine learning technology has two roles in behavioral analysis, namely grouping and correlation. Grouping means that the algorithm groups individuals according to the data they input. When individuals show similar data characteristics, they are classified into the same group. In this case, each individual is part of a different group because each data point brings the user together with other individuals with similar characteristics. Correlation means first training the algorithm on big data to find the statistical correlation between the input data and the analysis results, and then matching the individual's relevant data with the input data that the algorithm analysis will lead to certain results, and the result is the possible correlation between the individual and a certain specific result. In other words, seemingly meaningless input data can be used with the help of the algorithm's machine learning technology to derive output information with economic and social significance, which can be used to predict individual behavior.

    Secondly, customized information push leads to "information cocoon" and "echo chamber effect". After the algorithm groups and analyzes the correlation of user data, social media platforms and search engines will push and display precise information to specific users. In this process, the algorithm changes the way information content is produced, bringing about problems such as "filter bubbles" based on user portraits, which makes it easier to cause the "information cocoon" effect. Conceptually, "information cocoon" and "echo chamber" both refer to Internet users who choose the information to browse based on their own preferences. In the long run, they will bind themselves in a "cocoon" like a silkworm cocoon. This phenomenon will also occur in the corresponding political, scientific and cultural fields, making it difficult for people to obtain different or even opposite views. In other words, this is a special phenomenon formed between individuals by the "circle culture" formed by users' private social relationships through mobile phones. It is a phenomenon that individuals are surrounded by a huge amount of information "circles" driven by new media technology when obtaining information and exchanging views, forming a convergence psychology and information narrowing phenomenon under group pressure. With the advancement of artificial intelligence technology, algorithm-based social robots can even customize the required content for users and create or reinforce users' "information cocoons". Especially in the context of the widespread use of social media platforms, social robots are also playing an increasingly important role in global political communication. For example, on social media platforms such as Twitter and Facebook, social robots generate and disseminate information flows in various ways, interact with users, and use carefully planned narratives to spread false information, influence the information environment perceived by users, and create a false public opinion atmosphere and public opinion ecology in major international events and national democratic politics. Therefore, various political and economic forces, including state actors, the international community, and the private sector, have tried to use this function of the algorithm to create a public opinion environment that is beneficial to themselves, or to create a negative public opinion environment that is unfavorable to their competitors.

    Finally, after forming a specific cognition, it reacts to real politics. The impact of algorithms on real politics is reflected through people's positions and value orientations on political, economic and social issues. For example, in the 2016 US presidential election, Cambridge Analytica's important way of influencing voters was customized information push. Based on the data portraits formed by analyzing massive amounts of data, Cambridge Analytica was able to achieve personalized targeted push according to the psychology of different groups of people, change or even manipulate the information environment of the target group, that is, to build an "information cocoon" for the target object, thereby affecting the target object's cognition and attitude. ① In this process, the intelligent algorithms of network content service providers such as social media platforms have become the dominant force influencing voters' voting tendencies, and thus affecting the US political process. With the widespread application of technologies such as algorithms and artificial intelligence, communication media such as social media platforms have built a new communication structure and political ecological landscape, which has brought about a significant impact of specific cognition on real politics. This impact includes two levels. On the one hand, people's political awareness and rights awareness have been strengthened. The political awareness of the grassroots people on the Internet has been enhanced under the empowerment of social media, but the identity of the grassroots people is complex and changeable. Their political participation is often entangled with many factors and interests, and with the "information cocoon" effect, it is very easy to lead to political polarization. On the other hand, the status of large technology companies in political communication has been greatly improved. Super-large social media platforms such as YouTube, Facebook, and Twitter have become super content dissemination platforms that integrate traditional media such as newspapers, radio, and television. They have huge economic, social, and political influence. While empowering the grassroots and grassroots, they have also become a tool for national competition. There is no doubt that social media platforms have amplified the voices of the public and civil society. At the same time, the importance of platforms such as Facebook in the field of diplomacy is becoming increasingly prominent. If good public diplomacy begins with listening, then practitioners must pay attention to these platforms.

    Considering the unique role that algorithms play in the process of shaping cognition, various political forces have tried to accurately deliver their own positions, values, and political goals to designated users through algorithms. In this way, they achieve propaganda and mobilization effects that mass media cannot achieve, shape public cognition, and strive to gain more support and recognition on a certain issue.

    Public diplomacy powered by algorithmic technology has significant new features

    With the booming development of social media platforms and the increasingly widespread application of algorithms, "digital public diplomacy" has gradually transformed into "smart public diplomacy". Generally speaking, digital public diplomacy refers to diplomatic activities carried out and participated in by governments, private sectors, non-governmental organizations, etc. with the help of the Internet and social media platforms and digital technology. Its main contents include obtaining feedback from netizens in the target country on the country's foreign policy, promoting the country's ideas, positions, policies and cultural achievements, and disseminating and promoting the activities and views on current affairs released by the country's government diplomatic department on social media. ② With the increasing participation and penetration of intelligent technologies such as algorithms in global political and economic life, "smart public diplomacy" based on data and its algorithms has become a new trend. Because of the way algorithm technology works and the path it affects user cognition, public diplomacy under the blessing of algorithm technology has significant new characteristics.

    Precision public diplomacy under the algorithm recommendation mechanism. Public diplomacy driven by digital technologies such as algorithms and big data has evolved from "targeted" to "customized". Policymakers pay more attention to whether the purpose of public diplomacy is truly achieved rather than simply focusing on the efficiency of "communication power". In the future, with the support of algorithms, "personalized communication" based on the personal characteristics, interests and habits of the communication objects will become the main means of precision public diplomacy. ③ Since the 21st century, global political communication practices have undergone subversive changes. New political communication models and their characteristics have gradually emerged. The communication model represented by "political brand" has gradually replaced the "political marketing" of the 1990s and become the current mainstream political communication model. Among them, precision political marketing based on algorithms and big data technology, as well as global social media platforms, has become one of the most important means of public diplomacy. It has two modes of action: one is to collect audience preferences and symbolic resources based on big data, and to conduct precision marketing with the audience's psychology and behavior as the target; the other is to achieve direct communication and interaction with the public through social media platforms and maintain daily political communication efforts. ④ The algorithm-based public diplomacy strategy also adopts a strategy similar to brand marketing, that is, by capturing data traces and cluster analysis, accurately defining the event region, event population and population attribute characteristics, customizing the push of political marketing advertisements and implementing precise public diplomacy. It is true that algorithms may have a non-neutral impact on users in the process of information production, distribution and verification, leading to the spread of one-sided and false information concepts, that is, algorithm bias. In fact, the so-called "technological neutrality" and "value neutrality" algorithms are not so "objective" and "neutral". Algorithms will create, strengthen and amplify social biases such as racial discrimination, gender discrimination, regional discrimination and religious discrimination. It is worth noting that large technology companies controlled by Western developed countries inevitably have value biases in algorithm design, which invisibly promotes the pro-Western trend of the international public opinion environment, causing setbacks to the public diplomacy of other countries while increasing the offensiveness of Western countries' public diplomacy.

    The "information cocoon" caused by algorithms and the cognitive solidification tendency of public diplomacy recipients. Unlike traditional public diplomacy, the current public diplomacy supported by algorithms has broken away from the dependence on mass media technology, but is limited by the algorithmic constraints of social media platforms, which makes it impossible to convey information to the target audience in a comprehensive and uniform manner. Under the behavioral analysis and precise delivery of algorithms, the audience will be more inclined to choose to browse online content that suits their preferences and political views, resulting in the continuous strengthening of the "information cocoon" effect, thereby invisibly strengthening the user's inherent cognition and reducing the desire for heterogeneous information. The impact of this on contemporary public diplomacy can be attributed to two aspects: on the one hand, the public will easily obtain information about a country's politics, military, economy, diplomacy and culture. Although this information is limited, most of it is irrelevant to the position; on the other hand, the information obtained by the public will be dominated by algorithms and even controlled by robots, and then a specific cognition will be established invisibly. For example, some scholars have studied the primary and secondary dissemination of the New York Times' series of reports on China's Xinjiang on social media Twitter. Based on the analysis of the robot's publishing frequency, influence and forwarding relationship, it was found that a large number of algorithm-based social robots have extremely high participation in primary and secondary dissemination, and play different roles in primary and secondary dissemination: in the first step of dissemination, social robots generated up to 22.5% of the content, playing the role of information carrier and disseminator of original media reports, and did not show obvious interest preferences; in the second step of dissemination, social robots contributed 13.6% of the content, but in the secondary forwarding, social robots are more inclined to forward negative stories and become manipulators of public opinion on specific issues. ⑤ After algorithmic processing, social media platforms and even the global public opinion field have formed a specific cognition about China's Xinjiang, which in turn provided the so-called "public opinion basis" for a series of sanctions measures taken by the United States and other Western countries.

    The hidden nature of public diplomacy under the algorithm black box. Algorithm-based technology allows the development of public diplomacy to be hidden in the daily online life of citizens. Algorithm-based technologies such as artificial intelligence continue to improve the knowledge boundaries of individuals and the well-being of economic and social life, but also bring ethical and legal challenges in technology governance. In particular, the algorithm "black box" problem caused by the professionalism, abstractness and invisibility of algorithms, specifically: first, algorithms written in abstract and highly specialized code languages ​​are in the knowledge blind spot of the vast majority of the public and are not easy to detect and crack; second, in order to safeguard national interests and market competition, governments and large technology companies set algorithms on specific issues as confidential information; third, political operations in algorithm operation have become an irrefutable fact in the process of technology governance in Western countries, but the power operation process and public power use responsibility issues involved are not detectable to the public. ⑥ This hidden nature of the algorithm makes it difficult to detect its widespread use on global social media platforms, and it is even more difficult to regulate it through governance means. The most prominent example is the spread of the epidemic on social media platforms during the outbreak of the new crown pneumonia epidemic. A series of false information and customized content, powered by algorithms and social media, were accurately delivered to users. Some extreme content even became popular due to the amplification effect of social media platforms on opinions and viewpoints, causing stigmatization of China on issues such as the origin of the epidemic and anti-epidemic policies. Although this series of operations has obvious racist and ideological overtones, Western people rarely resist or question the above unverified information, which is closely related to the "information cocoon" that has been subtly created by algorithms for a long time.

    The technological dependence of public diplomacy capabilities under the widespread application of algorithms. Currently, large technology companies are becoming increasingly active and involved in the diplomatic circle, and have become important actors that can be compared with national actors. At the same time, countries that master algorithms and related technical capabilities have not only formed a technological advantage over other countries, but also created a huge public opinion advantage. From a technical perspective, algorithmic logic has commonalities, but at the same time, because the social media platforms that master algorithms and the technology companies behind them have their own market positioning and goals, as well as corporate culture and values, this leads to platform differences in user and content supply characteristics and specific algorithmic strategies. However, it should be noted that under the algorithmic logic of the intelligent era, the information obtained by users through different platforms may be very different. This is not only related to platform differences, but also to the countries and regions where technology companies are located, because this determines the political, legal and market environment faced by companies. For example, Western countries such as the United States have an advantage in discourse power on social media platforms such as Twitter and Facebook. On the surface, these social media platforms claim to "freedom of speech" and "provide diverse views", but whether it is the rules, user group characteristics or algorithms, they are more favorable to the mainstream Western elites. In cases like the Russia-Ukraine conflict, these social media can eliminate anti-Western voices through algorithms. The algorithm-based soft power of the United States and the West in the field of science and technology has become a de facto weapon of war. In fact, as early as 2016, Harvard University proposed the concept of "war algorithms" and regarded "analyzing massive data including social media and making rapid strategic choices" as a kind of algorithmic ability. In 2017, the US Department of Defense announced the launch of the "Marvin Plan", which is to form an "algorithm warfare cross-functional team" to truly deploy algorithms in war, and invited many large technology companies to join. The field where algorithms play the greatest role is the international public opinion field, and the United States and the West, which control the vast majority of international social media platforms and the technology companies behind them, have absolute discourse power, forming an imbalance in the discourse of the international public opinion field.

    Challenges and countermeasures brought by "algorithmic cognitive warfare" in public diplomacy

    In the era of mass communication, the "information warfare" model of international public opinion is to build a media communication matrix with an organized and systematic communication strategy, and to spread high-quality graphic reports and comments with the help of the voice of international mainstream media organizations, in an effort to compete for the discourse dominance of relevant issues in the "opinion market" with the most objective and balanced attitude; in contrast, the fragmented communication context, multimodal presentation method and effect orientation of digital media dominated by algorithm push to seize the initiative in the "emotional market" have shifted the focus of public opinion war from the "information dissemination" and "viewpoint dissemination" models to the "cognitive construction" and "emotional guidance" models. ⑦ This trend of change means that the current struggle for discourse power in the global public opinion field has entered the era of "algorithm cognitive warfare", which brings new challenges to the development of my country's foreign public diplomacy and the stability of the domestic public opinion environment as the recipient of public diplomacy.

    On the one hand, the speed and pertinence of information dissemination in the algorithmic era have increased dramatically, and the uneasy situation in the domestic public opinion field is intensifying. Social media platforms in the algorithmic era regard traffic as a source of profit, so it is inevitable that they will cater to the preferences of the public through algorithms to gain approval and spread and thus make profits. While algorithms bring traffic, they also cause the "information cocoon" effect, thus forming public opinion trends such as political polarization and populism. To a certain extent, this situation will aggravate the rift between social elites and the general public, and the international dissemination of domestic agendas may continue to amplify this rift effect, thereby affecting my country's public diplomacy. For the long-term development of society and economy, this rift in the domestic public opinion environment will cause great negative effects. At the same time, other countries, in the name of public diplomacy, use social media platforms supported by algorithms to conduct offensive ideological and value output, which is very likely to cause turbulence and rifts in the domestic public opinion environment, and have an adverse impact on China's political and social stability.

    On the other hand, international algorithm governance is in its infancy, and it is difficult to eradicate the use of algorithms by discourse-leading countries to manipulate public opinion or spread malicious information. Technology companies that master algorithm technology may take advantage of users' superstition about data and manipulate public opinion and control the audience under the guise of algorithm neutrality. At the same time, the competition among countries in real politics is also carried out in cyberspace through social media, algorithms and traffic. As shown at the beginning of the outbreak of the Russian-Ukrainian conflict, in the fierce public opinion confrontation, the parties to the conflict seemed to have no time to think about the root causes of the conflict, and it was difficult to maintain the rationality that should be used to resolve the conflict. This is closely related to the global coverage of American and Western social media companies, and their anti-Russian propaganda and pro-Western political mobilization under the blessing of algorithms. Even in the customized push of algorithms such as social robots, false information is also rampant in the global cyberspace, which has profoundly affected the people of the relevant countries' cognition of this conflict, and has created invisible pressure on the government's diplomatic decision-making. More importantly, there is no effective mechanism and means to regulate this field in the current international governance process, resulting in the erosion of the neutrality of algorithms in the international community.

    Algorithms are both uncontrollable factors in contemporary public diplomacy and an important means to break the algorithm governance dilemma. In the face of the public diplomacy challenges brought about by the "algorithm cognitive war", first of all, we should strengthen the guidance and regulation of the domestic public opinion field and build the ethics and rules system of social media platforms through algorithm regulation. From the perspective of political game, the political space constructed by social media is a display platform for multiple political subjects. Those extreme nationalists, extreme populists, extreme leftists, extreme rightists and other political actors who are easily instigated and instigated by foreign forces play games in social space. The algorithm regulation of multiple political actors on social media platforms is to govern the information dissemination behaviors that threaten political stability in order to achieve stability in the social space order.

    Secondly, we should strengthen algorithm research and related public diplomacy applications, increase the participation of the domestic public in public diplomacy, and enhance the circulation and linkage of domestic and international communication. Faced with the strong offensive public diplomacy conducted by the United States and the West using the advantages of "algorithm cognitive warfare", my country should study the corresponding algorithm technology applications, strengthen inter-governmental cross-departmental coordination and linkage, mobilize participants from the private sector, and take effective measures to encourage and "empower" ordinary citizens and grassroots organizations to participate in the practice of international communication and public diplomacy.

    Finally, we should actively participate in international algorithm governance and strive for more international voice and participation in rule-making. We should advocate the concept of "acceptable fairness" and seek a minimum and acceptable global consensus on algorithm governance. On December 4, 2021, Chen Ling, an associate professor at Tsinghua University, delivered a keynote speech at the 2021 International Forum on Cooperation and Governance of Artificial Intelligence, pointing out that algorithm procedures should be transparent, traceable and accountable: transparency provides an opportunity for verification; traceability requires that some checkpoints be inserted into the algorithm procedure, which can make the process traceable; accountability means that each process of data generation, calculation and application has a specific responsible subject, that is, a responsible subject who can be held accountable. Only in this way can we ensure that technology companies that have algorithm advantages and the governments of relevant countries use algorithms in accordance with ethical and legal norms, and avoid using algorithms in areas that are detrimental to the peaceful development of human society.

    (The author is a professor and doctoral supervisor at the Center for American Studies at Fudan University; Wang Tianchan, a doctoral student at the School of International Relations and Public Affairs at Fudan University, also contributed to this article)

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