Analysis on How Algorithms Reshape People's Existence, Cognition, and Relationships

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ABSTRACT

Advances in technology are enabling algorithms to influence every aspect of our lives. This paper treats algorithms as a social force to reshape our existence, cognition and relationships rather than as a mere tool. Through exploring the use of algorithms by commercial and political forces and interpreting the new aspects of some classic theories in communication and sociology, this paper presents insights into the perils of algorithmic dominance and the significance of cultivating people's algorithmic literacy. The paper finds that being digital, which is the premise of an algorithmic society, has an impact on human behavior through the use of users' private data for commercial or political ends. Besides, algorithms are the medium between humans and the real world, and therefore shape people's cognition towards information environment. Moreover, through constructing new social relationships, algorithms can exacerbate pre-existing prejudices and inequalities in society and invisibly control the labor process for platforms.

Keywords: Algorithms; algorithmic society; being digital; algorithmic power; algorithms as a medium; algorithmic literacy

1. INTRODUCTION

For many scholars in computer science, the term algorithm "is used in computer science to describe a finite, deterministic, and effective problem-solving method suitable for implementation as a computer program" [1]. They believe that algorithms are supposed to be strictly rational concerns, marrying the certainties of mathematics with the objectivity of technology. In recent years, the development of social media, mobile terminals, big data, cloud computing, artificial intelligence, the Internet of Things and a series of other technologies have promoted the application of algorithms from different directions. However, outside of the frame of computer science, when the rigid logic of technology encountered human life, concerns about its intrinsic cultural and social logic have arisen.

Scholars in the field of culture and society have focused on the social and cultural consequences of applying algorithmic instruments to particular social problems. Some scholars have pointed to the importance of algorithms as powerful carriers of meaning. Algorithms are performative as much as symbolic, and may serve as "fundamental expressions of societies" [2]. For instance, algorithmic evaluation of plagiarism alters the definition of an "original" text and produces the skillful copier as the "original author" [3]. Furthermore, Gillespie sees algorithms as "a new knowledge logic" which are a "socially constructed and institutionally managed mechanism for assuring public acumen" [4]. He points out that the selection process of information by algorithms can always be an opportunity to curate for reasons other than relevance: for propriety, for commercial or institutional self-interest, or for political gain [4].

Beyond these carriers of meaning and knowledge logic, other scholars have pointed to the structural changes caused by algorithms. Some scholars working within a Marxist framework argue that the use of algorithmic instruments in fact does not lead to structural change, since capitalist ideology gets inscribed in algorithms [5] they are mere mechanisms in the reproduction of power [6], the "Emperor's new Codes" that serve "the enrichment of its leading participants", and are simply "rationalizing dominant distributional patterns" [7]. In terms of labor, it is believed that the great paradox of AI is that the desire to eliminate human work generates new tasks for humans, which means the classification of employment no longer functions, and project-based task-driven works, described as "ghost

work", prevail, where the value of the person is erased [8]. Algorithms are also boosting "digital labor", which has been hotly discussed. Terranova defines "digital labor" in terms of the "free labor" provided by the unpaid and voluntary online behavior of Internet users, and uses the theoretical resources of Marxism to analyze and critique "digital labor" [9]. Similarly, the British scholar Fuchs proposes a "triple alienation" model of digital labor by distinguishing between "labor" and "work" [10].

The algorithm, which was a somewhat esoteric term, is bringing us both convenience and challenges in many fields of life. This paper unpacks the influence of algorithms on human existence, cognition and relationships by exploring the use of algorithms by commercial and political forces and interpreting the new aspects of some classic theories in communication and sociology, so as to offer some insights into the risks of algorithmic power and the significance of cultivating people's algorithmic literacy. Through enriching the cultural and social research of algorithms, individuals can have the ability to effectively meet the challenges in the algorithmic society.

2. INFLUENCE ON HUMAN EXISTENCE, COGNITION AND RELATIONSHIPS BY ALGORITHMS

2.1 The End of Invisibility in the Digital Era

Although personalized recommendation algorithms have received attention because of the rise of some algorithm-based content platforms in recent years, the fact is that search engines and e-commerce platforms have long adopted recommendation algorithms. The success of these algorithmic services is only possible because every action you make on the service is tracked and logged. Consequently, the premise of the algorithmic society is the digitalization of everything, including the human body. With the development of mobile terminals and smart wearable devices, not only data triggered by the body can be traced, such as registration, posting, browsing and purchase records, but also data from the body itself, for example, faces, motions, sight, and heartbeats. The realistic needs and emotional attitudes of people can be analyzed. A dynamic "digital dossier" [11] or "algorithmic identity" [12] of users can be established based on different scenarios and goals. An individual will be seen as a cybernetic assemblage. As Balka described it, information systems produce "shadow bodies" by emphasizing some aspects of their subjects and overlooking others [13]. These shadow bodies persist and proliferate through information systems, and the slippage between the anticipated user and the user themselves that they represent can be either politically problematic or productive.

It has become a common fact of the algorithmic society that people are forced to be digitalized and

exchange personal data for convenient services or rights. If broadcasters were providing not just content to audiences but also audiences to advertisers [14], digital providers are not just providing information to users, they are also providing users to their algorithms. Controlled by certain commercial forces, these algorithms monitor user behavior, predict or even induce user needs to fuel consumerist tendencies and practice big data-enabled price discrimination against existing customers. Algorithms can also be tools for smart social governance, quantifying the results of people's enforcement of rules through scoring and labelling, such as Chinese health codes during COVID-19. But this has also resulted in the emergence of the digital divide, leaving those without access to smart devices and those without a digital identity unable to move an inch.

Being digital leads to the end of invisibility, which can have a further influence on human behavior. Sociologist Bauman proposes the concept of liquid surveillance, arguing that decentralized surveillance has emerged in the post-panopticon era, in which the watchers go out of the watchtowers, becoming invisible in the flood of information that no one can grasp, and the act of surveillance reaches all corners [15]. Due to the end of invisibility, the external discipline is actively internalized, and self-tracking technology becomes a means of self-regulation. With the help of various externalized and quantified data from the body, intrapersonal communication also becomes a dialogue between the spiritual self and the material self, bringing about the "reflexivity". Furthermore, this data-based self-observation is sometimes made public and becomes a means of self-expression, self-construction, social interaction, and part of social "performance". In Erving Goffman's dramaturgical theory [16], the boundaries between the front and the backstages of social performance are clear and controlled, and the private information on the backstage is protected. However, these boundaries in social networks are constantly dissolving, the scenarios of interactions and the behavior of the characters in the performance are becoming more complex, and people are more inclined to provide their private information, or unaware of the leakage of their private data. All these reasons make the protection of personal privacy extremely challenging, creating a "backstage dilemma" where the backstage cannot be effectively controlled by the performer.

2.2 Algorithms as the Medium of Cognition

In essence, an algorithm is an intermediary that builds a data-driven interface between people and the real world based on a computational model with specific goals. As a result, it will have an impact on human cognition [17]. In today's information explosion, the algorithm itself as a medium is to provide a filter for the user, and this filtering can reduce users' cognitive burden while

limiting their vision. This consequence is described as the "filter bubble" [18]. Filter bubbles are created by search engines and social media platforms that feed users with information that tends to confirm their opinions and political views. This tendency has been criticized for two reasons: first, these selection algorithms make it harder to gain access to outside information, creating a somewhat monological life, and second, these bubbles are created without users' consent by internet conglomerates such as Google and Facebook. Filter bubbles make it increasingly difficult to have a public argument. As we already know, Facebook's algorithms aggravated the problem by increasing polarization and ultimately harming democracy, with evidence showing that algorithms may have influenced a British referendum or the 2016 elections in the U.S.

Nevertheless, the "filter bubble" has always existed. Carl Hovland, one of the founders of communication science, has in fact articulated the "selective exposure, selective perception and selective retention" of audiences in his theory of individual differences, which proposes that individuals respond differently to the mass media according to their psychological needs, and that individuals consume the mass media to satisfy those needs [19]. The understanding of this theory has been developed over time. Under the current situation of mass information and individualized consumption, "individual differences" refer more to "choices", with each person's individual media choices varying enormously. The so-called "filter bubble" itself, which is centered on individual interests, is in fact determined by individual choice and attention. Algorithms and data technology are merely an "extension of ourselves" of the media's value selection mechanism under data conditions, not the unique cause of the "filter bubble".

The real issue is the influence of algorithms on agenda-setting. While believing that the frontstage of the news generation process has been made clear, people often miss the presence of the "deep backstage" of the algorithms. In other words, the algorithms' basic elements of seeing, determining, and selecting social facts remain hidden. Instead of professional editors as "gatekeepers", algorithms controlled by Internet giants now decide the public agenda. Internet companies with editorial control easily employ non-journalists to work with algorithms to guide public values and create a "pseudo-environment" [20] on media platforms. Michael Nunez revealed how Trending topics are selected and packaged on Facebook by a team of people, their peculiar working conditions, the lack of guidance or oversight they were provided, and the directives they received to avoid news that addressed Facebook itself [21]. It is also revealed that along the way, conservative topics were routinely ignored, meaning the trending algorithm had detected user activity around a particular topic, but the team of curators chose not to publish it as a trend [22].

Medium is the message [23]. The misuse of algorithms makes people subject to manipulation of unreliable "algorithmic" cognition, which is only partial abstraction and simplification of the world modified by a group of curators with certain purposes. Gradually, the human ability to subjectively observe, perceive and depict the world will give way to the data-based interface of algorithms, which may become a "black box" beyond human comprehension.

2.3 Algorithms as the Force of Relationships Construction

Algorithms construct relationships between things, mainly through matching and control [24]. Algorithms perform matching, that is, they filter, calculate suitable relations, make connections, and may prevent some connections from taking place. This construction of social relationships is usually repetition and reinforcement of previous social prejudices and systems. In addition to the algorithm designers bound by the original social culture and mental inertia, it is difficult to ignore the fact that algorithms usually learn biased historical data. In the labor field, an automated system for considering job candidates created by Amazon tended to reject female candidates more often, because it used more resumes from men than from women during the training process [25]. It was reported that Facebook's algorithms associated several black men with the tag "primates" and suggested users watch more primate videos below [25]. Females and Black individuals are more likely to be mislabelled, limiting their access to resources and opportunities. Such a flawed algorithmic system would be more harmful when being used in solving crimes or investigating potential crimes. Because algorithms impact judgments about people's lives in areas like justice, employment, and credit, prejudice in algorithm design and biased training data exacerbates the Matthew effect and impedes social mobility.

The control of algorithms in the field of labor is also remarkable. The food delivery platform has made the labor process of delivery men calculable, enabling a high degree of control and accurate prediction [26], and mediating the relationship between labor and consumption through algorithms in order to win the markets. On content platforms, recommendation algorithms not only influence users' access to information, but also create feedback loops between content, users and producers. Although this mechanism allows content producers to have a more direct understanding of users' needs, it invisibly controls their efforts and incentives, and even alienates the goals of their labor by reducing the assessment of content quality to a traffic evaluation. Platforms also have the potential to transform labor into what Scholz calls "play-labor" [27], unifying production and recreation and making people more willing to engage in digital labor. All these

algorithms boost user convenience while exploiting laborers and increasing platform profitability. Of course, there are some platforms that try to use algorithms to narrow the "rich-poor gap" in content traffic, promoting more high-quality content. Therefore, the algorithm itself is intrinsically neutral and, when appropriately deployed, may assist in minimizing labor strain.

3. CONCLUSION

In summary, this essay has focused on the social changes that algorithms bring to us in terms of existence, cognition and relationships. Specifically, it has argued that: (1) Being digital, which is the premise of an algorithmic society, has an impact on human behavior through the use of user's private data for commercial or political ends; (2) Algorithms are the medium between us and the real world, and therefore shape people's cognition towards information environment; (3) Algorithms as a force of relationships construction can exacerbate pre-existing prejudices and inequalities in society and control the labor process for platforms. To conclude, we need to be alert to the control that algorithms exert over us.

Technical and cultural concerns mix in algorithms. Considering algorithms are becoming a social force, it is critical to enhance rules and regulations to avoid the abuse of algorithmic power. Aside from that, it is critical for people to foster algorithmic literacy, which means knowing that algorithms have inherent biases, continually evaluating information, and understanding that sacrificing varying degrees of privacy is a norm when engaging with digital platforms. This article provides a springboard for future social science research on the development and application of algorithms, so as to mitigate potential hazards and better protect individual legitimate interests. The article does not explain the exact micro-level scenarios of algorithmic influence on persons using ethnographic approaches, which is something to focus on in the future.

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