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How Algorithm Improves Mindreading Capacity?

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Abstract

The digital era has brought humans to a change in life culture that demands to always adapt. Changes in lifestyle and life needs are closely related to business development efforts. Algortima is used as one of the tools used to make it easier for entrepreneurs to understand consumer desires and market opportunities to be achieved. Algorithms are able to provide an overview of the expression or psychological reality as well as the habits of the market or product users. Therefore, entrepreneurs use algorithms as a tool to predict and read the thinking of the market. This is in line with human abilities in the cognitive realm, so it is closely associated with mindreading or the ability of humans to understand the thoughts and perspectives of others. This is considered to be able to make it easier for entrepreneurs to develop creativity in their products. The author hypothesizes that algorithms can be a human tool in expanding cognitive abilities through algorithms to increase creativity. The method used in this article is a literature review to answer philosophical questions, including: (1) The impact of mindreading on creativity, (2) Algorithms as prototypes of mindreading, (3) Mindreading capacity which is sometimes considered less qualified. Algorithms as a mindreading simulation process play an important role in helping humans sexually read minds better and increase creativity. The abundance of data allows us to carry out a more comprehensive and simultaneous mind-reading process. This synergy between human cognition and

algorithmic support opens up new avenues for innovation and problem-solving, leading to more creative and successful endeavors in entrepreneurship, marketing, and beyond.

Keywords: *Algorithm, Mindreading, Creativity, Entrepreneurship*

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INTRODUCTION

In today's digital world, using the internet and interacting with diverse people helps us learn more about ourselves and others. It makes us better at understanding emotions and how people think. The online experience also boosts our creativity because we encounter new ideas and information all the time. This way of thinking helps everyone become better individuals and entrepreneurs, as we learn to adapt and come up with new ideas in the fast-paced digital environment (Racovolis, 2023).

Impact of technology on creativity can be more holistic and pervasive. In particular, recent technological developments dramatically extend the feasibility frontier through advanced automation and digital-physical integration. Thus, they change the rules of the game by alter-ing the domain where the creative activity takes place, enriching it with new symbols, techniques, procedures and understandings. By doing so, they provide employees with new building blocks to form creative solutions, thus complementing their creative capabilities. The higher the creativity of employees, the higher the benefit of domain-extending technologies on creative tasks; the higher the domain-extending potential of a new technology, the higher the value of having creative individuals ready to embrace it. Accordingly, we aim to develop a new domain-centred perspective on technology-driven creativity enhancement (Pedota & Piscitello, 2022). Creativity is commonly considered to be a mental process involving the expression of new ideas or the ability to combine unrelated ideas in different ways while avoiding

common paths (Benedek et al., 2012; Simonton, 2000; Paz-Baruch, 2023).

Algorithms is a step-by-step set of instructions or rules designed to solve a specific problem or perform a particular task. In our daily lives, algorithms observe and analyze the patterns in our online activities, such as the websites we visit, the links we click, and the keywords we search for. By doing so, it can deduce what topics and products we are interested in, what kind of content we prefer, and even what goals we might have, such as finding information or making a purchase. This information is then used to arrange personalized recommendations, advertisements, and content to better suit our individual tastes and needs.

The power of algorithms plays a crucial role in enhancing our ability to mindread people and the world better. Algorithms, like the ones used in social media platforms and recommendation systems, are designed to understand our preferences, interests, and behaviors based on our online activities. By analyzing our interactions and engagements, these algorithms personalize the content we see, exposing us to a diverse range of information and perspectives. This personalized content helps us gain a deeper understanding of different cultures, ideas, and viewpoints, effectively broadening our horizons and making us more open-minded individuals (Dourish, 2016).

This research adopts a literature review approach to examine the concept of algorithmic tracking in the context of mindreading. Previous research (Peters, 2022) has presented arguments claiming that algorithmic tracking can be seen as extended mindreading, blurring the line between human cognition and external computational processes. However, the controversy surrounding AI's ability to truly mindread, akin to human thinking, remains a subject of debate. In this study, we take a neutral stance on the nature of algorithms, neither fully endorsing nor dismissing the idea of extended mindreading. Instead, we focus on exploring the notion that algorithmic tracking serves as a model or simulation of mindreading. By analyzing existing literature and research, our aim

is to understand how algorithms mimic aspects of human mindreading capacity, potentially leading to improve creativity in various applications and domains.

By taking this approach, we can better understand the practical implications of algorithmic tracking for mindreading without delving into broader philosophical discussions about the nature of extended cognition. The goal is to explore how algorithms act as mindreading simulations and how they can enhance various aspects of human interaction, decision-making, and personalization, which can open up opportunities for creativity. This is according to Frith & Frith (2012) who argue that successful social interactions and cooperation rely on the advancement of social cognition, which involves various abilities such as recognizing emotions, empathizing with others, understanding facial expressions, imitating behaviors, and attributing mental states (Frith & Frith, 2012). Another study from Markiewicz et al (2022) showed that individuals with strong theory of mind skills were better at cooperating with others, especially when paired with people who also had similar abilities (Markiewicz et al., 2023). This research highlights the possibility of promoting improved cooperation in different environments, such as schools, workplaces, or colleges, by enhancing these cognitive abilities.

1. Defining Mindreading

Mindreading is the ability to see the world from one's point of view, to imagine what the world looks like from their perspective, to recognise what strikes them as salient or valuable or important, and so on (Currie & Ravenscroft, 2002). In the simpler term, mindreading can be undestood as “putting ourselves in someone else's shoes" to help us better grasp other thoughts and intentions” (Barlassina, 2013). Thus, mindreading means as a way to predict other entity's mental states (Dindo et al., 2015).

Besides empathy being a result of the mindreading process, it's essential to have both empirical evidence and a clear purpose in

understanding the actions and beliefs of others(Dindo et al., 2015). Therefore, mindreading is often implicitly and explicitly differentiated. Implicit mindreading usually has higher cognitive efficiency but is less flexible. On the other hand, explicit types are characterized as more flexible and often require cognitive development. These abilities are closely related to the purpose of mindreading, which is used to explain and predict the behavior of other entities (Woensdregt et al., 2021).

2. Understanding Algorithms as Simulated Mindreading Process

Philosophically, the true nature of algorithmic tracking is not fully understood. According to Peters (2022), algorithmic tracking might involve a concept called 'mindreading,' specifically extended mindreading (Peters, 2022). In philosophy of mind and cognitive science, mindreading is understood as the ability to understand and predict others' thoughts and actions, while extended mindreading suggests that this ability can extend beyond our minds into computers. This idea arises because humans are closely connected to the process of algorithmic tracking.

Arguing that algorithmic tracking does involve mindreading relates to Clark and Chalmers' (1998) 'hypothesis of extended cognition' (HEC). HEC states that cognition might sometimes be partly realized by objects outside of one's body (Clark & Chalmers, 1998). The reason is that computer systems that perform algorithmic tracking are often not only epistemic tools that people use for mindreading. Rather, they literally extend or partly realize the human mindreading by website operators and website users. On the other hand, it is commonly assumed that for inferring and predicting mental states like mindreading, one needs to have at least intentional stance (Dennett, 1989). Yet, the AI currently used for website personalization clearly unable to do that. Moreover, it is commonly assumed that mindreading is situated only within an individual's head (Spaulding, 2020).

In contrast to the previous research, we maintain a neutral stance regarding the 'hypothesis of extended cognition' (HEC) in the context of algorithmic tracking. Instead of endorsing HEC, our research will explore an alternative perspective, arguing that algorithmic tracking can be viewed as a form of simulation for mindreading. In this approach, we consider algorithms as powerful tools that simulate or model human mindreading capabilities. These algorithms observe and analyze user data, such as browsing behavior, clicks, and searches, to infer preferences and interests. Thus, the central argument will not delve further into the nature of HEC or extend the concept to website operators and users. The research will focus on the idea that algorithmic tracking allows human agents to perform mindreading in a simulated manner. It emphasizes the causal coupling between human users and the algorithms, wherein the algorithms facilitate the mindreading process by providing insights and predictions based on observed patterns, without necessarily being extensions of the users' cognition.

3. The Role of Mindreading for Creativity

Mindreading is a cognitive social activity or ability to gain knowledge about the mental states of others (Schlicht, 2023). It involves understanding intentions, desires, and beliefs related to the cause-and-effect relationship between observable actions and hidden motives. There are two main concepts of mind-reading: teleological and action-based. Teleological emphasizes understanding actions through logical interpretation to determine goals and appropriate actions given specific environmental constraints. Action-based explains the extensive activation of motor skills during perception and prediction of actions and the systematic relationship between our abilities to predict, understand, create, plan, imagine, and communicate actions (Dindo et al., 2015).

Conceptually, mindreading can be linked to the process of creativity. Creativity involves generating one or more ideas and

possesses the flexibility to replace existing ideas, approach problems in various ways, and offer unique solutions (Paz-Baruch & Maor, 2023). Creativity is also seen both as a capability and a process (Hemonnet-Goujot et al., 2022), which exists between habit and the mental process of generating new ideas (Glăveanu, 2020). In other words, creativity involves cognitive activities in the process of creation, positioning itself as a human activity that bridges doing and being in the world. It focuses on individual activities in the material world, interacting with others to create new products, adopt, and innovate within specific cultural contexts(Glăveanu, 2020). This aligns with mindreading, which seeks to simplify the perspective of others, considering the probabilities of other entities in a specific context (Woensdregt et al., 2021). This implies that mindreading is part of the creative process, forming the cognitive basis for idea generation. Next, we will explore the four proportions of the Perspective-Affordance Sociocultural theory to further explain the role of mindreading in creativity.

DISCUSSION: IMPROVISATION ON THE RANGE OF MINDREADING TOWARDS CREATIVITY

1. Algorithms Impact on Wide-Ranged Mindreading Capacity and Improved Creativity

The mindreading faculty as the capacity to determine pre-existing propositional attitudes and to explain and/or predict behaviour, is precisely such a mechanism. Its processing may not always only be sensitive to evidence relevant to an accurate representation of people's mind. It might often also be influenced by the ascriber's or ascribee's motivational states (Shepherd 2012), values, or normative considerations, and the result might frequently be confabulations (Carruthers, 2011) (Peters, 2019). Furthermore, mindreading is also a result of the intentional stance and generative model. The intentional stance is generative in nature, continually updated based on the ongoing intentional approach, resulting in updated mindreading interpretations (Dindo et al., 2015).

To establish the relationship between mindreading and algorithms, it's important to understand that algorithms go beyond the realm of computer science and also apply to the understanding of cultural contexts. Dourish (2016) explains that algorithms in computer science have an abstract domain and formulate descriptions of procedures specific to computers. Therefore, algorithms can come in various types depending on their properties. In the realm of social relationships related to understanding a culture, algorithms are a technical art of presenting data precisely within specific boundaries of space, referred to as alternative spaces by Dourish (Dourish, 2016).

Based on the above explanation, mindreading in the concept of social algorithms closely correlates with two possibilities. The first possibility is humans' effort to understand the data displayed in algorithms, and the second is the function of algorithms as tools for humans to depict reality, facilitating explanations and cultural predictions. The first function involves the potential of cognitive mindreading to comprehend realities beyond an individual's perspective. It can be seen as an intentional and generative approach since it's continually repeated, generating new predictions about reality. However, this function heavily depends on the individual's experiences (knowledge resources) and the data presented by the algorithm. In this case, algorithms have their own cognitive capacity. The second function is the main hypothesis of this article. It suggests that algorithms serve as tools for humans to facilitate understanding the thoughts of others through the data they display. In this function, the cognitive abilities of the algorithms are reduced, and its full control lies with the human users.

Focusing on the second function, it has roles in creating products or applications particularly in business contexts. Algorithms act as a computational trait for systems to understand user preferences, similar to how mindreading serves as a cognitive trait for humans to understand and empathize with others. Just as mindreading enables humans to perceive and connect with the feelings and intentions of others, algorithms empower systems to

analyze user data and interactions, gaining insights into their interests and needs, ultimately providing personalized experiences for users. Algorithms can play a significant role in helping us improve our mindreading abilities, and this enhanced understanding of others can open up opportunities for, but not limited to, entrepreneurship.

2. The prospect of Creativity In Light of Mindreading Capacity and Algorithms

In this section, the relationship between mindreading and social algorithms is explored, focusing on creativity. The development of current creativity theories encompasses material, social, and psychological aspects from the beginning. Particularly in individual creativity, sociocultural factors and interactions play significant roles (Glăveanu, 2020). Glăveanu's Sociocultural Creativity theory serves as the basis for this discussion.

There are four propositions proposed by Glăveanu (2020): (1) disagreement enhances creative potential, (2) changing positions can develop creative potential, (3) exchanging positions can reveal previously unknown abilities, and (4) unique abilities of each object combine to offer new perspectives in creative work. These propositions place creativity as a human quality within the realm of pragmatic culture. This means that creativity goes beyond cognitive and intrapsychological domains, manifesting as a socio-cultural form of behavior and creation in the world (Glăveanu, 2020). In each proposition, mindreading is linked to both teleological and action-based perspectives (Dindo et al., 2015) and its role in algorithmic functions, as previously discussed, becomes evident.

The first proposition assumes that every creative process within a group seeks new ideas. Each individual contributes diverse cognitive aspects based on their knowledge, background, perspectives, and worldviews, fueling creativity. Glaveanu (2020) explains that increased creativity not only positively impacts the group's challenges but also enhances individual creative potential.

This is because new perspectives can connect with personal viewpoints, becoming fuel for creative expression. Here, mindreading is clearly evident as individuals exchange thoughts, seeking to understand each other's cognitive aspects in light of the shared constraints they face. Algorithmic data represents each member's perspective within the discussion space, and mindreading types used include teleology to determine problem-solving directions and action-based to continuously consider various perspectives in the pursuit of creativity.

The second proposition involves cognitive efforts to position oneself in the perspectives of others. In this proposition, mindreading is prominent, involving empathy and intensified action-based understanding. This heightened effort leads to teleological mindreading, aligning with the goal of providing greater empathy toward cultural backgrounds, internal logic, and a richer understanding of consequences. This lowers the risk of mental blocks, which can often hinder creativity (Glăveanu, 2020).

The third proposition extends from the second and aims to exchange positions. In this proposition, personal contradictory abilities become creative actions, involving exploration and the utilization of artifacts, materials, and symbols in new ways to uncover hidden potentials. The perspective an individual adopts in approaching problems is influenced by their connection to the world. Creative action depends on the development of perspectives, moving from the familiar to potential new approaches. Teleological and action-based mindreading work linearly here, providing accurate insights and predictions in the creative process.

The fourth proposition explains the dynamic nature of creative action, which may not align with the individual's initial vision, resulting in outputs that resemble the original aspirations. Creative action involves dynamic interplay between subjects and objects, involving intentions, mistakes, new perspectives, and the ability to guide creativity to newer perspectives. In this case, teleological mindreading remains continuous, occurring repeatedly and not just as a single planned intention. This is due to the dynamics of the

creative process, which offers numerous new opportunities. Glaveanu (2020) explains that among abilities and perspectives, there are prepared thoughts, opportunities, accidents, and encounters between the social and material worlds. The dynamics of creative action also implicate action-based mindreading, expanding and preparing motoric readiness for anticipation and tactics in predicting occurrences during the creative process (Glăveanu, 2020).

The process of creativity allows us to see the world from new perspectives and come up with both familiar and new ways of doing things. It lets us explore and interpret the world in unique ways, leading to fresh ideas and innovative solutions. Creativity breaks away from the usual and traditional, helping us discover new ways of understanding and interacting with the world. It opens up opportunities to think creatively to tackle challenges and express ourselves in different ways (Glăveanu, 2020). Therefore, the reading of algorithmic data from a sociocultural perspective must continuously be attended to, considering that technological systems today are not solely computer-based and algorithm-centric but are also connected through digital computing networks (Vial, 2019).

The dynamics of the creative process offer opportunities to see the world from new angles, creating both familiar and unfamiliar approaches (Peters, 2022). Entrepreneurs use data from algorithms to gain insights into customer behavior, preferences, and interests. By understanding their target audience better, entrepreneurs can tailor their products, services, and marketing strategies to meet specific customer needs and preferences. For instance, this simple algorithmic tracking is used at least by Netflix and Amazon in promoting their innovations (Peters, 2022). Thus, in practical manner, entrepreneurs can use algorithms to better understand their customers and the market. This understanding allows them to create products, services, and marketing that really match what customers want. By using data from algorithms, entrepreneurs can make smart decisions and come up with creative solutions to

problems. This can boost their chances of succeeding in their business ventures.

CONCLUSION

Mindreading, or the ability to attribute mental states to others, involves the capacity to empathize and understand the emotions of others. Understanding the thoughts, emotions, and intentions of other people allows individuals to gain valuable insights and perspectives. These insights can serve as a rich source of inspiration for creative endeavors (Galveanu, 2020). However, mindreading process can be prone to errors and inaccuracies. As humans, we rely on our cognitive abilities and past experiences to interpret the intentions and feelings of those around us. Some understandings may be influenced by biases, limited information, or misinterpretation of cues (Spaulding, 2019). To address these limitations and enhance the mindreading process, data and algorithmic tracking can be valuable tools. Algorithmic tracking involves analyzing vast amounts of data from various sources, such as online behaviors, preferences, and interactions. By processing this data, algorithms can identify patterns and trends, providing valuable insights into individuals' interests, preferences, and needs (Dourish, 2016). In addition, algorithms can also be interpreted as simulated mindreading process or mindreading prototype (Peters, 2020).

In summary, algorithms as mindreading simulation process play a crucial role in helping humans generatively mindread better and boost creativity. Through algorithms, we gain access to a wealth of data from various sources, such as online activities, preferences, and behaviors of individuals. This abundance of data allows us to perform a more comprehensive and simultaneous mindreading process. This synergy between human cognition and algorithmic support opens up new avenues for innovation and problem-solving, leading to more creative and successful endeavors in entrepreneurship, marketing, and beyond.

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