

Algorithm of Minds (AoM): Algorithms That Control You!

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ABSTRACT

In the modern digital age, where social interaction has undergone a significant shift towards online platforms, particularly accelerated by the global pandemic, technology has emerged as a powerful force in influencing individuals through Algorithms of Minds (AoM). AoM are computer algorithms engineered to attain the human mind's attention to influence or alter the mind consciously or subconsciously, with a specific intent. The recent surge in attention towards algorithms of minds, characterised by algorithm-heavy software applications, has become increasingly prominent. This paper explores two key playing algorithms. As such, heightened awareness, transparency, and ethical oversight are imperative to mitigate the adverse consequences of algorithmic interventions in shaping societal discourse and individual decision-making.

KEYWORDS: Algorithm, Algorithm of minds, Machine Learning, Collaborative filtering, Ranking Algorithms, Algorithm Manipulation, Impact of Algorithms

INTRODUCTION

Algorithms, simplistically described as step-by-step processes for specific tasks, are discreet lines of code guiding computers in accomplishing defined objectives. However, their significance transcends simplicity. In the contemporary technology landscape, especially within social media platforms, policy frameworks, and scientific domains, algorithms have become integral. These imperceptible algorithms permeate our daily lives through a diverse array of networked devices, such as smartphones, systems, and sensors. Recent advancements in recommendation and predictive capabilities, the modern era witnesses' algorithms assuming a transformative role. Their evolution and interconnectivity have facilitated the emergence of novel functionalities previously deemed unattainable. While a multitude of conferences, reports, and news articles broach the subject, there exists a noteworthy scarcity of comprehensive discussions and debates concerning the potential influence of these algorithms on human decisions and lives. The discourse spans a spectrum, encompassing considerations from market dynamics and business models to apprehensions regarding security, privacy, and technical interoperability. In essence, algorithms serve as the

telencephalon of modern-day technologies and social networks, driving profound impacts yet to be fully explored. A deeper exploration of these themes will unfold in subsequent discussions.

Evolution of computer algorithms

The nomenclature "algorithm" traces its roots back to the 9th-century Persian astronomer and mathematician, Abu Abdullah Muhammad ibn Musa Al-Khwarizmi (780 AD). Indeed, algorithms have had a long history of being applied diligently to solve different challenges and hence serve different purposes. Going back two millennia, Euclid's algorithm, designed to find the greatest common divisor of two numbers, exemplifies the ancient roots of algorithmic processes in mathematics. Fast forward to the present day, and the advent of generative AI algorithms signifies a transformative force in HCI development.

However, amidst the increase of computer algorithms, there are various classes presenting themselves from sorting to searching algorithms. Yet, there is one class drawing much attention towards it by leading to a new era post the internet revolution—the world of

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"machine learning algorithms," often commonly referred to as "AI algorithms".

Machine learning is essentially a process where machines learn about you—your behaviour, preferences, habits, and more. While the foundations of machine learning date back to the 1950s, it wasn't until the 2010s, with the widespread accessibility of the internet through devices like smartphones, that machine learning experienced a remarkable surge in popularity. This recent jump seems to correspond to an easier access across multiple devices to the online world where machines could easily pick up bits of information about us – like every online purchase and review etc. hence the digital data terrain experienced exponential growth.

With this explosion of data and the merger of machine learning algorithms, our decisions and habits became the objects of their learning. Corporations in particular – powerful bodies – made good use of this information in their businesses or on-the-quiet gains. The algorithms have been designed for the sole purpose of quality, pertinent recommendations that are tailor-made to improve our decision-making processes. Apparently, most users may attest that personalised recommendations offered by either of these algorithms usually contain an insidious current within them. The speed and magnitude where this reach us through the contemporary platforms, and the mainstream channels like social media, entertainment, information dispensation, as well as video applications has indeed raised meaningful concerns. This intricate interplay will be explored further in subsequent discussions.

Algorithm of Minds

The term "Algorithms of Minds" is introduced for the first time in this paper. Algorithms of mind are computer algorithms engineered to attain the human mind's attention to influence or alter the mind consciously or subconsciously, with a specific intent. Abbreviated as AoM, the term is derived from the combination of "Algorithm" and "Minds." In this context, "Algorithm" refers to algorithms that are meticulously designed and trained to deal with the human mind, while "Minds" pertains to the mind of the humans or the user who comes into contact with the algorithm, aiming to capture attention or effect alterations as needed.

The recent surge in attention towards algorithms of minds, characterised by algorithm-heavy software applications, has become increasingly prominent. The transformation in our interaction with the internet emerged distinctly following the Web 2.0 revolution, wherein social networks adopted machine learning algorithms to influence our actions based on learned

behaviours. However, the spotlight on Mind Dealing Algorithms, denoted as (AoM) entered a new phase during the global pandemic and yet continuing after posting pandemic new normal 4IR, wherein individuals were primarily left with data-generating devices and applications, particularly smartphones, AoM-heavy applications became ubiquitous.

These applications heavily rely on recommendation systems tailored to our preferences. As machine learning algorithms progressively monitor our decisions and actions, they attain a level of potency that allows them to predict our next moves. In some instances, they even take on the role of decision-makers, illustrating a scenario where a dependent entity controls an independent one – our minds.

The exponential growth of social media platform usage time over recent years can be predominantly attributed to the pervasive influence of algorithms of minds (AoM). These algorithms are designed to be as addictive and influential as possible, marking a significant chapter in the contemporary internet era (4IR). For the purposes of this paper, the terms "Algorithm of Minds" and "AoM" encompass a broad spectrum of algorithms designed to interact with the human mind for diverse purposes.

Algorithm that shaped the internet era

Undeniably, numerous factors contributed to the significant paradigm shift observed during the Web 2.0 revolution, the central and indisputable role of machine learning algorithms cannot be overstated. The landscape of artificial intelligence (AI) had experienced a downturn during the AI winter, spanning the late 1970s to the 1990s, characterised by a lack of enthusiasm due to limited experimentation and applications. This dearth of opportunities led to a constrained scope within the field.

However, the dynamics underwent a complete overhaul with the advent of the internet era, particularly during the Web 2.0 phase, where data emerged as the lifeblood for machine learning algorithms. The ascendancy of machine learning in the 21st century can be attributed to the principles of Moore's Law (in data) and its exponential growth. As computing power became more cost-effective, the training of AI algorithms with extensive datasets became a reality, fostering tremendous growth.

In the contemporary landscape, machine learning has permeated social network applications and personalised content feeds, leveraging user interactions, preferences, and sharing patterns. This profound engagement has evolved beyond mere content consumption, extending to influence various aspects of our lives – from the media we choose to

consume to the individuals we opt to connect with romantically. Machine learning algorithms, embedded in platforms such as YouTube or Amazon, are not only instrumental in garnering vast audiences but are also significant contributors to corporations' multibillion-dollar earnings. The rise of ML algorithms during the Web 2.0 era marks a transformative chapter in the evolution of the internet. Their ability to harness data and personalise experiences has fundamentally reshaped our online interactions, blurring the lines between consumer and data point.

This transformative influence of machine learning algorithms serves as a precursor to the envisioned future of Web 3.0, characterised by the integration of artificial intelligence, suggesting a continued and evolving role for these algorithms in shaping the digital landscape.

Are computer algorithms controlling us?

The ubiquitous presence of computer algorithms in our daily lives raises a provocative question: Is the omnipresence of computer algorithms tantamount to control over our lives? The query is inherently subjective, especially among those navigating these algorithms in their daily routines. However, when examined from a broader perspective and viewed through a statistical lens, a compelling narrative emerges. According to statistical data, there has been a 13% surge in daily screen time since 2013, equating to an additional 49 minutes. In 2024, this screen time incrementally rose by 1%, accounting for an extra 4 minutes compared to 2021 [1]. This substantial increase is attributed to people predominantly immersing themselves in a landscape dominated by short-form videos, curated social media feeds, and personalised recommendations – spaces where content suggestion algorithms reign supreme.

Returning to the central question—do computer algorithms exert control over us? Algorithms, essentially intricate sets of codes crafted by computer engineers, inherently reflect the intentions of their creators or the organisation. In the context of social media, these algorithms wield a transformative power, capable of shaping social norms and behaviours, potentially encroaching upon individual agency and autonomy [2]. Thus, the question elicits a dual response: subjectively, the answer may vary from person to person, oscillating between yes and no; however, statistically, the affirmative prevails, affirming the substantial impact these algorithms wield over our cognitive landscapes.

How algorithms subliminally impact our daily life?

As the 21st century unfolds, the boundaries between online and offline blur, rendering social media and digital interactions an integral part of the human experience. Within this landscape, we encounter mind-targeting algorithms, ubiquitous and often opaque digital operatives that learn from our every click, scroll, and like. Their reach extends far beyond mere convenience, subtly influencing our actions, thoughts, and motivations through the very tools we embrace daily. Drawing parallels to traditional nudges in behavioural economics, algorithms employ sophisticated techniques to steer our online choices. These "choice architects," as Thaler and Sunstein aptly termed them, subtly influence our decision-making by framing options, highlighting desirable features, and leveraging cognitive biases [3]. Similarly, social media algorithms personalise content, prioritise engaging posts, and recommend individuals to follow, subtly shaping our social spheres and influencing our perceptions. This tailored environment can, albeit unintentionally, nudge us towards confirmation bias, favouring information that reinforces our existing beliefs and limiting exposure to diverse viewpoints.

A growing body of research underscores this profound impact, highlighting how these algorithms nudge us towards specific behaviours, reinforce existing social norms, and even construct echo chambers that filter our realities. While the extent of their influence remains open to debate, Nevertheless, the undeniable truth remains — these algorithms undeniably wield a profound impact on the psyche, and the discernible shifts in contemporary human behaviours align with it.

Algorithms that are controlling us

The internet as we know it today is a bustling marketplace of information and experiences, it is being controlled by invisible hands that is manipulated through numerous mind-intensive algorithms. There are numerous algorithms that contribute to this dynamic landscape, but some play a particularly salient role in directing our attention and affecting our online interactions in ways that have veritably reshaped the fabric of the web world. The reality of this impact is quite objective, of course, but also very subjective. This paper explores into two such key players: ranking algorithms and collaborative filtering algorithms.

1.1 Ranking algorithms

In this context, "ranking" denotes the process of arranging online content sequentially, based on relevance, and facilitating real-time matching. While seemingly straightforward, this function serves as the cornerstone of contemporary online experiences. Initially, ranking algorithms were introduced in Google's search engine, aiming to priorities web pages to display the most pertinent results prominently. However, with the advent of the web 2.0 transition, characterised by the vast online content, these algorithms gained a newfound significance. Their role expanded to retaining user engagement by adeptly curating content to prolong user interaction.

Algorithms have morphed into sophisticated "Learning to Rank" (LTR) systems, wielding immense power to keep users engaged. Their primary objective is to optimise user retention by tailoring content recommendations based on various user parameters, such as preferences and beliefs. The personalised nature of these recommendations ensures that users are presented with content tailored to their interests, thus prolonging their engagement. Behind the scenes, machine learning (ML) and deep learning (DL) algorithms power these recommendation systems.

Though their inner workings remain shrouded in secrecy by platforms such as YouTube, Instagram, TikTok, and X (formerly Twitter), Twitter/X recently shed some light, in particular, has gained notoriety for its addictive nature, attributed in part to its sophisticated ranking algorithm, revealing a massive neural network with approximately 48 million parameters trained on user interactions (likes, retweets, replies) to predict engagement potential [4]. This "engagement score" dictates individual tweet visibility, essentially creating a loop that compels users to spend more time glued to their screens.

The addictive nature of these platforms highlights the undeniable hold algorithms have on our daily lives. They subtly manipulate our attention spans, shaping what we see, how we interact, and potentially even influencing our opinions. This raises the crucial question: are these algorithms, the "Algorithm of Minds" (AoM), truly in control?

The answer, like the algorithms themselves, is complex. It is undeniable that these algorithms wield significant influence over user behaviour and daily routines, underscoring their pervasive control over user engagement.

1.2 Collaborative recommendation algorithms

Collaborative recommendation algorithms, in their entirety, are a strong tool within the power set of strong recommender systems, which have had a strong impact on the ascent of web services and content platforms such as Amazon, Netflix, YouTube, or Instagram. Understanding what a customer would prefer before the customer even knows it is a superpower in this information-abundant era. Both the collaborative as well as the content-based filtering algorithms are important because they help provide to the consumer the relevant content or the products which conform to the taste or the previous choice which user had taken.

Content-based filtering is a recommendation method that is put into use to predict and recommend new items which are similar in nature to those items that a user has liked before. Clustering of items based on item features will definitely make sure that the preference of users is detailed up to a very good level effectively. Collaborative filtering, on the other hand, uses only the past interactions of users and products to make recommendations on new items. Features of items are not so crucial in this sense, since recommendations are based on the information about user-item interactions contained in the user-item interaction matrix.

These algorithms are a very great asset for any organisation that wishes their users to be updated with the trends in emergence. In a diverse category, from the model-based to memory-based methods, the tools act as an indispensable encouragement to users for the exploration or influence with new interests in the face of actual search inputs. Smart gadgets, for instance, suggest similar items according to a consumer's preferences, which have turned out to be very natural in daily lives to nudge behaviour through the subtle influence of sophisticated AoM algorithms.

Emerging trends in the world of algorithms

2.1 Algorithm manipulation

Algorithm manipulation refers to the deliberate alteration or modification of the rules and structures governing algorithms for specific purposes. In the realm of social media, algorithms serve as the backbone, dictating how content is filtered, ranked, selected, and recommended to users. These algorithms wield significant influence over users' choices and the content they encounter on social media platforms.

However, algorithm manipulation entails the intentional distortion of these algorithms to serve ulterior motives. Common objectives include suppressing certain online content, promoting specific

content to users' attention, or manipulating the perception of individuals by inundating them with either positive or negative reviews and comments. This manipulation can subtly shape users' thoughts and behaviours regarding particular subjects or entities.

The ramifications of algorithm manipulation extend beyond mere content curation, potentially exacerbating discrimination, and inequality by inadvertently favouring certain groups or viewpoints over others. This phenomenon aligns with the adage, "the person who controls the media controls the mind."

Numerous allegations have surfaced regarding algorithm manipulation on platforms like Twitter/X, with accusations of amplifying certain voices while silencing others. Even the current owner of Twitter/X, Elon Musk tweeted "I'm not suggesting malice in the algorithm, but rather that it's trying to guess what you might want to read and, in doing so, inadvertently manipulate/amplify your viewpoints without you realising this is happening" [5].

Furthermore, TikTok, one of the largest entertainment platforms, has allegedly admitted that its employees have the ability to manipulate which content goes viral and which does not [6]. This admission underscores the reality of algorithm manipulation, wherein the manipulation of content dissemination directly impacts individuals' cognitive processes and perceptions.

2.2 Consequences of algorithm manipulation

Manipulation of algorithms brings with it huge serious effects in a modern human civilization where people are inclined to and rely immensely on social media as suggested from a variety of user statistics to have increased engagement. This wider dependence on platforms for social media has just made it an environment of opportunity for us to manipulate the masses algorithmically.

But how does algorithm manipulation unfold within the realm of social media? Consider a scenario where Entity X seeks to achieve a particular objective and influence individuals. In such cases, X may collaborate with Organization Y to request alterations to the platform's algorithms, strategically designed to impact users' minds. However, this practice raises ethical concerns, as it entails the pervasive manipulation of human cognition.

By surreptitiously altering algorithms, entities wield the power to shape individuals' perceptions, preferences, and behaviours, often without their awareness. This clandestine influence not only undermines the autonomy of users but also poses

risks to societal well-being by fostering misinformation, polarisation, and manipulation on a large scale.

In essence, algorithm manipulation within social media platforms represents a breach of trust, where the manipulation of digital systems translates into the manipulation of human minds. As such, heightened awareness, transparency, and ethical oversight are imperative to mitigate the adverse consequences of algorithmic interventions in shaping societal discourse and individual decision-making.

Conclusion and the future with industry oriented AoM

In conclusion, in this contemporary internet age, where social interaction has undergone a significant shift towards online platforms, particularly accelerated by the global pandemic, technology has emerged as a powerful force in influencing individuals through Algorithm of Minds (AoM). These algorithms wield an undeniable influence over us, facilitated by their addictive nature and pervasive presence in our digital lives.

While numerous theories abound regarding the implications of AoM, the future holds tangible possibilities where these algorithms may exert even greater dominance. It is conceivable that AoM could progressively shape various facets of our world, including industry 4.0 and individual cognition. Consequently, there arises a pressing need for the formulation of new information technology acts within the legal framework to monitor these AoMs

As we navigate this evolving digital landscape, it becomes imperative to remain vigilant and discerning, recognizing the profound impact of AoM while striving to ensure ethical deployment and regulation. Only through informed awareness and proactive measures can we navigate the complexities of the future with AoM, safeguarding individual autonomy and societal well-being in the face of unprecedented technological influence.

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