Role of algorithms in the digital economy

Introduction

The rise of the internet brought with it digitisation, transforming our economy and society. Digitally enabled technologies have affected the daily lives of the population across the globe, which has been steadily subsumed within the existing digital infrastructures (Greenstein, 2012: 5). While the experiences of the people on the Web are mediated, this is done through specific media companies and platforms which have come to dominate the existing digital landscape (Bucher, 2018: 1). These platforms have been acting as performative intermediaries who are participating in shaping a world that they have purported to represent. Search engines like Google are not merely search engines; it serves as a medium which defines one's interaction in cyberspace (Bucher, 2018: 2). At the heart of this lies the emergence of a data revolution which has created socio-technical assemblages serving as amalgams of systems of thought, knowledge, infrastructure, practices, and institutions (Kitchin, 2014: 24). These systems provide the framework within which data gets produced, determining the ends to which it would be employed. The data revolution led to a buzz regarding data usage, symbolic of the broader rhetoric surrounding the radical transformation of the knowledge-production process. Such hype might not be inherently wrong, but it sets a precinct wherein information-related innovations may drift into domains wherein it leads to the neutralisation of the current political, ethical, and legal concerns (Kitchen, 2014: 25). In the words of Kitchin,

> "Data are commonly understood to be the raw material produced by abstracting the world into categories, measures and other representational forms - numbers, characters, symbols, images, sounds, electromagnetic waves, bits - that constitute the

> building blocks from which information and knowledge can be created" (Kitchin, 2014: 28).

The production of knowledge is done through the usage of algorithms which functions on the collected datasets. In the words of Steiner, "At its core, an algorithm is a set of instructions to be carried out perfunctorily to achieve an ideal result" (Steiner, 2012: 54). The interesting and potentially troubling issue here is how algorithms would shape everyday lives and disrupt traditional modes of cultural productions (Bucher, 2018: 2). In the words of Hayles, "Human beings are increasingly enmeshed in a 'cognisphere' shared with machines, in which many important processes take place among those machines, without direct human involvement" (as quoted in MacKenzie, 2019: 39). The enmeshing leads us to look at how our lives are networked and connected. In a world which is characterised by a changing data landscape, even the most mundane or rather uninteresting details of our lives have been rearranged to be analysed (Amoore and Piotukh, 2016: 17). The rise of algorithmic systems isolate individuals amidst the unique filter bubble with the reality of an individual being modulated by the data-driven algorithms (Joque, 2022: 13). In this vein, this allows us to look at the power that algorithms hold and look at the extent to which the digital systems have altered the existing contours of the economy. These technologies, through extensive personalisation, have sought to control the autonomy of individuals in cyberspace (Joque, 2022: 13). The ability of algorithms to cast their control over individuals exposes us to the power these algorithms hold, and the role it plays when it comes to reconfiguring the boundaries of the economy. However, it has continued reinforcing the existing inequalities, with the societal norms projected onto the Digital. This bias is brought into perspective through Noble's concept of 'algorithmic oppression', who co-opted the argument made by Peterson about the racist underpinnings of the Application Program Interface (API) on the internet (Noble, 2018: 4). The essay here seeks to look at the agency and the power algorithms hold in the Digital

Economy while delving into the racist undertones of the search results being generated on Google.

The second section here looks at the rise of algorithms in cyberspace and their increasingly pivotal role in mediating interactions in the Digital. Following this, the third section attempts to bring in Noble's conception of algorithmic oppression through a brief case study of search results on Google. The final section reinforces the argument made in the first section while looking at the reality of living a life governed by algorithms.

Power and Agency of Algorithms

We have come to consistently rely on algorithms to perform the role of decision-makers for managing and curating massive amounts of data in a meaningful manner (Bucher, 2018: 4). The notion of the 'interactive order of algorithms' as advanced by Knorr Cetina supplements the term 'interactive order', which has been coined by Erving Goffman (MacKenzie, 2019: 40). The notion advanced by Knorr Cetina allows us to look at how humans interact with interfaces on the cyberspace while reiterating the fact that algorithms ultimately function materially. It further can be pushed towards a situation wherein the algorithms interact with each other rather than an interaction mediated by humans (MacKenzie, 2019: 41). The 'computational regime' as described by Hayles is what matters to the algorithm allowing it to tap into a set of attributes, in a bid to generate an actionable output (Amoore, 2020:4). Furthermore, algorithms while tapping into multiple attributes can condense them into a single output, pushing multiple possibilities into a single output which is a testament to the predictability of the algorithms that has come to define the broader digital landscape. The increased reliance on algorithms has created a sense of 'sociality', wherein different actors

relate to each other, enabling interaction between the entities involved (Bucher, 2018: 4). This relation between the digital and social, as many commentators have claimed, is steadily becoming intimate with the blurring of boundaries between the two (Marres, 2017: 45).

The growing influence of algorithms is seen through the fact that they have expanded and weaved their logic into the existing social process. Bringing in Kowalski's classic definition of an algorithm wherein; "Algorithm = Logic + Control" (as quoted in Roberge and Seyfert, 2016: 1), allows us to understand how algorithms are both simple and complicated simultaneously. The power of an algorithm lies in solving a wide variety of problems, giving us a glimpse of the versatility it possesses, which is fundamental to its core capabilities, that extend beyond the realm of Science and Technology (Roberge and Seyfert, 2016: 1). The words of Galloway seems to have come true, as he asserted, "The point of power today resides in networks, computers, algorithms, information, and data" (as quoted in Roberge and Seyfert, 2016: 1). Thus, as we look at the power of algorithms it also gains a particular form of capability emerging from the fact that algorithm cannot be fully uncovered, it can only be unveiled only to a certain extent which is mediated by the environment it finds itself in. The algorithms would unfold in their own time, which is surmised through the words of Seaver, "There are hundreds of hands reaching into them, tweaking and tuning, swapping out parts and experiencing with new arrangements" (as quoted in Roberge and Seyfert, 2016: 2). The ways in which algorithms unfold brings in a dimension of complexity, in relation to their respective agencies and their performative function.

While we look at the algorithms, it becomes crucial to understand how actors experience differing degrees of agencies based on their location in the algorithmic assemblages (Lee,

2017: 65). Agency and power, thus, need to be looked at through the algorithmic assemblages, wherein they are dispersed over time and space owing to the fluidity of the assemblages. In the words of Lee, "Agency must be analysed as being entangled with the objects that we perform as algorithms - not as an inherent property of them" (Lee, 2017: 80). To make sense of the colossal amounts of data, the algorithmic assemblages have to be in a constant state of flux for generating new forms of knowledge. Inhabiting a world where the Digital has been mediating our experiences, new subjectivities are being produced through delving into the 'Multiplicity of Algorithms'. In a philosophical context, multiplicity is seen as "manifoldness, but not pluralism" (as quoted in Bucher, 2018: 19). The notion of multiplicity allows us to move beyond an overly simplistic understanding of algorithms, allowing us to explore the layers of the algorithm which defines our experiences in the Digital. As Bucher points out, "Algorithms can be magical and concrete, good and bad, technical and social" (Bucher, 2018: 19).

Looking at the rise of the algorithmic system brings us to the question of the global economy and its changing functionalities. While this question can have multiple answers, it does lead us to the extent to which digital systems have altered the economy. Joque introduces us to three key elements in this context. The first concerns the free labour that gets performed in the digital, forming a part of the larger capitalist system. The second related issue here concerns the 'value extraction' process and how value is produced in digital systems. Moving on to the third one involves the attempt to conceptualise Digital Capitalism as different from earlier forms of capitalism, signalling a transition into a Digital economy away from the limitations of a physical economy (Joque, 2022: 16). With machines in the digital sphere now producing knowledge by themselves, it fits into the argument that Postone makes, "The very shape of the political economy is itself plastic and changed by historical circumstances" (as

quoted in Joque, 2022: 17). This reshaping of the economy allows newer modes of production to take shape. Finally, in an age of big data, there is a transformation regarding the ordering of space, territory, and sovereignty. The exception here would be cloud computing, which serves to territorialising spaces, while devices that run on algorithms function by territorialising data storage (Amoore and Piotukh, 2016: 21).

Devices in the age of big data, which inhabit the world of the digital, are engaged in creating novel ways of perceiving the world around them (Amoore and Piotukh, 2016: 20). The digitally enabled technologies have allowed for extensive application of different forms of business strategies that for long had remained with the economists, rather than the business practitioners (Peitz and Waldfogel, 2012: 5). Search engines like Google have become a site of the creation of newer forms of knowledge as it constantly keeps on learning with each input put in by the users on the internet. This allows it to personalise results for the individual in question here and will enable it to predict future suggestions by controlling future uncertainties that might come in. However, with the growing ubiquitous usage of software's driven by algorithms, it demands a closer look at how certain forms of discrimination continue to be embedded in the computer code, which forms the basis of programming the algorithms (Noble, 2018: 1).

The Rise of Google and the Algorithm of Oppression

While we looked at the centrality and the near-ubiquitous nature of the algorithms in the digital sphere, here we will delve into how algorithms tend to mirror oppressive structures on the Web. A fascinating promise that came with the emergence of the World Wide Web (WWW) was that it would solve the mess it would create. Google, which would become a household name, would emerge as one of the first companies that would employ algorithms

allowing it to generate hierarchical results on the Web, leading to the birth of the Google search engine that we know (Birkbak and Bang-Carlsen, 2016: 38). Bruno Latour advanced the idea through the MACOSPOL (Mapping Controversies in Science for Politics), as Latour sought to turn the disorientation associated with the Web into a new opportunity concerning mapping, Latour asserts,

> "Why mapping? It is possible we think that the same tools, the same media, and the technology of the Web, which produced this sea of information, which was at first so disorienting, is also the source of a technology which allows us to do the mapping of it. It is exactly the same technology that provided the problem that should also provide the solution to the problem" (as quoted in Birkbak and Bang-Carlsen, 2016: 38).

Latour's argument about how it is the Web which provides a possible opportunity for the problem that emerges out of it is elucidated through the role Google plays. The PageRank algorithm started to become better as it began to analyse more significant quantities of data allowing it to develop the hierarchy of pages in an even more efficient manner catering to the user inputs (Mayer-Schonberger and Cukier, 2013: 75). Google has continued to carry with it the ambition of being universal, as it seeks to remain inclusive and exclusive at the same time (Birkbak and Bang-Carlsen, 2016: 42). With this utopian universalist vision, Google has sought to co-opt different racial identities, one of them being Black identities and experiences, which have become enmeshed in the discriminatory proprietary algorithms (Noble, 2018: 4). African Americans have been constrained to societal archetypes even on the Web, which was evident through numerous racialised incidents which took place on the Web. One of which created a storm was how if someone typed in the N-word (N*gga) on Google Maps, it would lead them to the White House; this was during the Presidency of Barack Obama. In each of such cases, Google's response has been to wash its hands off the

systematic problem of racist proprietary by rendering a formal apology (Noble, 2018: 7). The racist and sexist biases are sort of internalised into the digital architecture which we inhabit. While the algorithms of Google might have changed, as it doesn't show such explicit racialised results. However, the practice of digital redlining is not one of the past, with newer instances of racism and sexism popping up at points (Noble, 2018: 10). The words of Noble still resonate when we look at how search results are mediated through Google's search engine continue to reinforce the narratives of discrimination,

> "Algorithmic Oppression is not just a glitch in the system, but rather is fundamental to the operating system of the Web. It has direct impact on the users, and on our lives beyond using Internet applications" (Noble, 2018: 10).

Conclusion

The widespread dispersal of algorithms has brought with it a sense of opportunity. Still, at the same time, it remains laced with numerous concerns, too, with algorithms becoming an inseparable part of our daily lives. The essay here located algorithms in the intersection of agency and power while looking at the impact they would continue to have in widening the boundaries of the economy as we step into an increasingly digitalised world mediated through the usage of algorithms. This has been given impetus through the Big Data revolution, as data becomes the new oil for driving the economy. With such a humongous amount of data being generated, algorithms play a crucial role in making sense of this data and generate insights which allow various stakeholders to usher in the data economy. Our interactions in the digital sphere are increasingly mediated through the algorithms tasked with performing certain roles in a vast cyberspace.

Digitisation has ushered in companies that have been earning profits by churning out data and generating knowledge through algorithmic assemblages, which emerge as the source of power in the digital schema of things. These assemblages endow the algorithms with a sense of agency as it seeks to deduce human behaviour on the digital into a few predictable outcomes leaving users stuck in a filter bubble as behaviours of individuals are abstracted in cyberspace. This is done through a series of complexities, left invisible to the user as one is only exposed to the interface on the Web. Algorithms showcase changing digital cultures, and the agency attributed to algorithms can lead to a steady personalisation of the masses. At the same time, the essay delved into the role of algorithms. It also brought in a case study which exposes the inherent racist bias that lies in the proprietary algorithms of search engines like Google. The digital might seem to be a liberating space, but it is seemingly becoming a space where societal realities and archetypes are being projected, as evidenced by the search results which Google yielded. The growth of algorithms and the growing dependence on the same was inevitable, but it brings us back to a rather interesting dilemma surrounding how far we, as humans are ready to sacrifice our prized autonomies here. Adding to that, it remains to be seen the impacts it can have on a larger societal level and the fuel it would continue to add to the burgeoning state vs big tech conflict, which could well decide the fate of the data economy.

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