Toward Datafied Human Enhancement: Concept, Functional Classifications and Ethical Issues

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This article presents a robust defense of the concept of 'datafied enhancement' as a subset of human enhancement. Firstly, the author notes that the widespread development of ICT and AI technologies has made it possible to collect and analyse human biometric data, thus integrating data into the concept of embodiment. Secondly, the author explores the cultural and intellectual history of datafied enhancement, highlighting the significant role that data has played in human evolution. Thirdly, the author examines the functional classifications of datafied enhancement, arguing that conversational, wearable, ingestible and embeddable technological devices can enhance physical, cognitive, emotional and moral capacities of individuals by collecting body data. Fourthly, the author underscores the importance of distinguishing datafied enhancement from dataism to avoid misconceptions. Finally, the author addresses potential ethical issues, such as data exclusivity, the uncontrollable data self, and privacy invasion. By acknowledging these risks, datafied enhancement can be guided to become a technology that respects human dignity and promotes the common good.

Keywords: human enhancement, datafied enhancement, dataism, ethical issues

INTRODUCTION

In the recent decade and a half, the theme of human enhancement has evolved into a distinct subject of dialogue. Human enhancement, in a broad sense, refers to the augmentation of our physical, moral, emotional and cognitive faculties through technological methodologies. Persson and Savulescu (2008) introduced the concept of invigorating the moral motivation of individuals via biomedical approaches, consequently advancing moral capabilities of individuals. This initiative has since triggered an influx of intellectual deliberations and related literature scrutinising the ethical implications concerning the application of biomedical interventions for human enhancement.

The advent of biomedical technology, encompassing spheres such as pharmacology and gene editing, has incited an expansive discourse pertaining to biomedical improvement of human capacities. A notable fraction of these interactions is centred around the rapport between enhancement and inherent human characteristics, the distinction between enhancement and therapy, and the ethical implications steered by biomedical enhancement.

Since 1990s, as Agar (2024: 11) argues that, a number of scholars have used thought experiments to explore the possible enhancement effects of future biotechnology. This causes today's discussion that biomedical enhancement is closely related to transhumanism, which manifests a future aspect of human enhancement (Coenen 2014). It is no doubt that the discussion tends to focus on future prospective effects of enhancement, because technologies such as gene editing have not yet been marketed on a large scale. Consequently, in sync with the transhumanist narrative, several deliberations questioning the desirability of biomedical enhancement have ensued. However, a consensus in this regard remains elusive.

Confining the scope of human enhancement within the biomedical ambit runs the hazard of fostering an interpretive false impression that positions biomedical means as an overriding technology for human enhancement. Biomedical technology indeed forms an integral part of the human enhancement, but it is not the only dominant one – pivotal roles are also played by the spheres of information and communication technology (ICT) and artificial intelligence (AI). For example, computers, smartphones, the Internet, and other technologies that we see everywhere and use all the time can be seen as human enhancement technologies because they enhance and augment our memory and cognition (Coeckelbergh 2017: 143).

Compared with biomedical approaches, ICT and AI technologies present a more ubiquitous and practical bent. The majority of discourse about biomedical enhancement is largely presaged on hypothetical future prospects, and the likelihood of its large-scale commercial deployment is still a distant reality. ICT and AI, on the contrary, are currently commercialised and being applied on a large scale, and ubiquitously influencing and enhancing our physical, emotional, moral and cognitive conditions. For instance, wearable devices like the Fitbit are capable of monitoring and encoding users' biometrics into data, real-time physical conditions including heartbeat rate and blood pressure can be converted into data visualisation. Fitness and dietary recommendations are then automatically devised by algorithms, persuading users to adhere to such advice with the aim of enhancing their health status.

In the same vein, a myriad of other ICT and AI technologies, including the Internet, robots, and cyborg technologies, possess the potential to modulate and enhance individuals' capabilities via data-centric methods (Klincewicz 2018; Lara, Deckers 2020; Voinea et al. 2020).

Hence, it seems accurate to not only to perceive ourselves as 'human–machine hybrids' but also as 'human–data assemblages' (Lupton 2020: 12). The data collected from our bodies through Internet-connected devices can greatly influence, constitute and mediate the relationships we share with ourselves, others and the world (Liu 2023). So in a way, we are not just biological entities but complex combinations of biological, mechanical and data components, intricately interwoven within the broader fabric of society and the digital realm.

In line with the notion of biomedical enhancement, the author posits that the concept of 'datafied enhancement' can be duly introduced. The author argues that contemporary technologies relevant to our physical bodies and significantly interconnected with the internet – such as wearable, ingestible and embeddable devices – can digitise and datafy our fitness, morality, emotion and cognition, thereby enhancing our capacities. Digital data has seamlessly integrated into our lives, becoming a new form of our embodiment (Lupton et al. 2022). As Lupton (2020: 7) demonstrates, people utilise digital data collected from self-tracking devices 'to improve their lives, contribute to their memories or achieve self-knowledge'. It signifies that datafied enhancement is not a mere figment of the future, but a reality that we actively partake in and experience.

Accordingly, the aim of this paper is to underline the necessity of datafied enhancement, and to explore its functional aspects of enhancement, as well as the philosophical dilemmas and ethical implications that it could potentially pose.

DATAFIED ENHANCEMENT: FROM PAST TO PRESENT

As it stands, digitisation, datafication and quantification are pivotal characteristics of contemporary society (Cukier, Mayer-Schoenberger 2013). Though it seems that digitisation and datafication as enhancing methods have arisen due to advancements in ICT and AI, it is crucial to recognise that datafied enhancement did not emerge in a vacuum.

In the context of human enhancement history, datafied enhancement is not a novel concept. Buchanan (2011: 38–39) indicates that literacy, which emancipates us from the shackles of nature, enabling a comprehensive understanding and transformation of nature to create cultures, extend memories, and pursue scientific research, represents a significant cognitive enhancement in human evolution.

Similarly, datafication, as an advanced form of this literacy, is intimately connected with human development. Tracing back to early human civilisations, the practice of knot-tying for record-keeping began to symbolise the world through quantification, serving to improve and enhance human memory and cognition. In the history of science, Pythagoras' idea that 'all is number' marked the beginning of the ideological history of datafied enhancement. Subsequently, the mathematical (geometrical) cosmology that Plato formulated in *Timaeus* solidified the foundations of natural philosophy, then mathematics was again confirmed as the universal language of nature during the Scientific Revolution. In essence, humans enhance their cognitive and mnemonic abilities through numbers, digits and data, building lives around mathematical models. So, numbers and data possess a unique literary that imbues them with dramatic, affective and narrative powers (Lee 2022: 25). This demonstrates a clear trajectory where our understanding of the world deepens alongside our understanding of numbers, digits and data.

Nowadays, the advancement of ICT and AI has substantially altered our daily lives. Digitisation and datafication have become the 'new normal' for our lifeworld. Essentially, almost every aspect of our existence can be digitally and datafied enhanced, leaving no stone unturned.

Unlike biomedical enhancement, which is a topic of ongoing debate regarding permissibility, datafied enhancement has historically existed and continues to occur in the present era. Because of this, we might overlook its profound enhancing effects. To clarify the specific effects of datafied enhancement in the current era, the author will elaborate on the functional classifications of datafied enhancement to clarify which aspects of humanity can be enhanced by datafication.

DATAFIED ENHANCEMENT: FUNCTIONAL CLASSIFICATIONS

How does the datafied enhancement improve our capacities? Similar to biomedical enhancement, the author argues that datafied enhancement can improve our physical, cognitive, emotional and moral capacities through conversational, wearable, ingestible and embeddable devices that collect our body data incessantly.

Datafied physical enhancement refers to the technologies that enhance human bodily functions and performances either indirectly or directly. For instance, by making use of

wearable health bracelets, individuals can capture physiological data generated by their bodies. Subsequently, they can modify their dietary practices, transform their lifestyle behaviours, and adhere to prescribed medication based on specific data benchmarks and medical suggestions. This represents an indirect model, which fosters the dialogical interaction between humans and technologies. Conversely, a direct model involves interventions that affect bodily functions and abilities. Take, for example, the installation of ingestible smart stents in a patient's relevant blood vessel not only permits the illustration of the patient's vascular condition through data visualisation but also enables a prompt thrombosis removal, improves vascular fluidity and maintains blood circulation, thereby enhancing bodily functionalities and augmenting the performance of the patient.

Datafied cognitive enhancement has been present throughout the history of human civilisations and in our daily life. For instance, the invention of numbers greatly boosted human cognition and our understanding of the world. Today, the broad use of the Internet, which operates on a binary number system, has significantly enhanced information exchange efficiency among individuals, and expanded their cognitive scope and capabilities (Voinea et al. 2020). Notably, the prevalent use of ICT, accompanied by portable and wearable devices, has established an omnipresent environment of cognitive enhancement. This setting enables data-driven algorithms to track and forecast individuals' locations, behaviours, emotions and thoughts, thus offering a deeper self-understanding and awareness for individuals.

Additionally, conversational agents such as ChatGPT serve as powerful tools to assist individuals in performing intricate tasks and answering intricate questions, and in easing cognitive stress (Bai et al. 2023). Their applications span across a spectrum of tasks, which include composing emails, authoring articles, crafting poetry and generating codes. The primary objective of these conversational agents is to lessen the mental load experienced by human users, and this allows them to channel more attention towards creative and significant tasks. Consequently, this amplifies their cognitive perspectives, enhances their cognitive understanding, accelerates the cognitive processing speed, and elevates the complexity of cognitive tasks.

Datafied emotional enhancement refers to the technologies that aim to alleviate negative emotions and promote positive ones in individuals, using conversational, wearable and embeddable (invasive) devices. For instance, conversational AI robots use emotional recognition technology to identify users' emotions and mitigate negative feelings via real-time intelligent conversations. Similarly, wearable devices like bracelets can collect bio-data related to emotions and provide reminders for emotional self-regulation.

Furthermore, non-invasive brain-computer interfaces employing technologies like electroencephalography (EEG) are capable of detecting changes in emotional states within the human brain. This enables automatic alterations in the content of computer applications or video games to match or influence emotional dispositions of users (Steinert, Friedrich 2020). Hence, these technologies not only serve as tools to understand and evaluate emotions but also hold potential in significantly enhancing emotional experiences. In contrast, invasive brain–computer interfaces have the potential to either stimulate or suppress specific emotional states by directly interacting with different regions of the brain. By doing so, they have the ability to reduce negative emotions and enhance positive ones for individuals. This direct interaction with the brain allows for a more focused and potential immediate influence on emotional states of individuals.

Datafied moral enhancement is often used to curb immoral behaviours of individuals and enhance moral ones by using conversational agents. As noted by Klincewicz (2016) and

Lara and Deckers (2020), AI robots can provide timely moral decision-making suggestions for individuals in different situations, thereby improving their moral judgment capabilities. Additionally, data-based intelligent transportation systems can provide real-time feedback on driving behaviours, enabling drivers to be aware of potential safety issues timely.

In an example provided by Savulescu and Persson (2012: 412–413), they foresee the invention of a bioquantum computer known as 'the God Machine' by 2050. This machine could theoretically connect with and even be integrated into our brains, decoding neuronal activities into data. This, in turn, allows for the monitoring and supervising of our thoughts, desires and intentions, which can help in preventing immoral actions and promoting moral intentions and actions.

In brief, the functional classifications of datafied enhancement not only align with the growing trend of increasingly integrating individuals and technologies, but also continuously impact and shape physical, cognitive, emotional and moral capacities of an individual. Consequently, the existence of individuals is constantly penetrated and shaped by datafication and quantification from the outside in, and from the inside out.

IS DATAFIED ENHANCEMENT A REPLICA OF DATAISM?

As the author mentioned above, if datafication can significantly enhance individuals' capacities, then some may criticise that datafied enhancement is merely a replica of dataism. Dataism is a term that underscores 'the prevalent belief in the objective quantification and potential monitoring of all sorts of human behaviour and societal interaction through the use of online media technologies' (van Dijck 2014). Critics might say that like dataism, datafied enhancement holds an overly optimistic attitude towards data, believing that through complete datafication, humanity will achieve continuous improvement.

However, discussing how data can enhance human capabilities does not necessarily mean falling into the trap of dataism, nor does talking about datafied enhancement imply that we hold a blindly optimistic attitude toward data. Data always exists within specific social conditions; hence, datafied enhancement inevitably carries ethical implications. This is because enhancement is a relative concept; while technology may enhance one aspect of human capability, it may simultaneously weaken another. For instance, coffee boosts human energy but diminishes sleep. Moreover, discussing the permissibility of datafied enhancement does not necessarily mean that it will be free from ethical concerns. For example, if human lifespan could be significantly extended, it would generally be considered a good thing. However, if life were prolonged to a certain extent, it might become excessively long and monotonous, thereby raising ethical implications and concerns.

For these reasons, we must consider a series of ethical implications of datafied enhancement. While data allows us to better understand and enhance ourselves, it also exposes us to the danger of data misuse, leading to exploit, discriminate and persecute (Kitchin 2021: 6). Indeed, our everyday lives are saturated with voluminous amounts of irrelevant data that, instead of enhancing our capacities, debilitate and numb us, thereby reducing our responsiveness. Examples include fake news, tabloid gossip, rumors, and fabricated data.

In this regard, it is of utmost importance for us to fully recognise the ethical implications and concerns that may emerge due to datafied enhancement. By unconditionally embracing dataism as our preferred ideology, we risk reducing the meaning of life to mere data. Regrettably, we already observe this phenomenon to some extent. As a result, it is crucial for us to explore methods to limit the influence of data on certain aspects of our lives, utilising it to

assist us in specific tasks and deepen our understanding of ourselves and the world. Blindly allowing data to control every aspect of our existence should be avoided.

ETHICAL ISSUE 1: DATA EXCLUSIVITY

From the author's point of view, the most prominent ethical issue with datafied enhancement is data exclusivity. This issue pertains to the tendency of data-driven digital information systems to disregard individual and specific circumstances, thereby deeming them less valuable and ultimately contributing to the narrowness of perspectives and monotonous values. If data is derived from a particular context, its representation should also be contextual. However, when we employ a specific data model to encapsulate all social situations, the problem of data exclusivity emerges.

Essentially, this implies that when we describe and analyse social situations by using a particular data model, it may not fully encompass all individuals and specific circumstances. As big data systems rely on datasets that may not account for nuanced distinctions in every context, there is a risk of omitting certain individuals and specific situations. Consequently, this can limit our thinking and foster a one-dimensional perspective on values.

For example, during the COVID-19 pandemic in Shanghai in 2022, a phenomenon emerged where many elderly people experienced marginalisation. Due to their lack of familiarity with smartphone usages, they were unable to present valid health codes or scan venue codes, resulting in being denied access to public places. According to a report, there was a 90-year-old woman who needed to buy noodles for her birthday, but the shop refused to serve her because she did not have a smartphone to scan the venue code (Gu, Fan 2022). According to the regulations at that time, the shop was unable to provide service to her.

Accordingly, the issue of data exclusivity can lead to social inequality, where some individuals are deprived of the right to choose whether to represent their identity and make payments by datafication, thereby depriving them of an equal access to social public services. This group of people will eventually become 'data refugees', excluded from the realm of datafication. In other words, their voices and demands will be excluded and suppressed by data-driven approaches. This will give rise to a 'data divide', a significant barrier of data between those who benefit from data-driven advantages and those who are excluded from the data realm, making it difficult to bridge the gap (Lutz 2019).

ETHICAL ISSUE 2: UNCONTROLLABLE DATA SELVES

A data self is a new form of self generated by algorithms based on an individual's images, voices and biometric data stored in the database, thereby giving rise to the issue of the disconnection between the data self in the virtual world and the real self in the physical world. Ultimately, the data self will detach from the real self and become an independent, uncontrollable form of self.

The correlation between the data self and the real one can be delineated via three progressive stages. Initially, individuals can formulate their data selves within the digital domains via the transmission and receipt of textual contents, voices, imagery and numerical information. At this juncture, data selves merely serve as conduits for expressing the real ones (as seen in profile images, textual contents and vocal information on social platforms like Facebook or Twitter, for instance). Subsequently, individuals' texts, vocal and visual data, coupled with biometric information, can be seamlessly harvested, generated and scrutinised, thereby birthing the data selves

that elude administration of users (akin to an automated virtual user profile fashioned by social media platforms through the assimilation of relevant personal data). At this stage, data selves and the real ones act as mutual substitutes and auxiliaries. Ultimately, according to Pauwels and Denton (2018), data selves evolve to become 'algorithmic avatars', supplanting the real selves, which consequently precipitates a schism between data selves and the real ones.

As highlighted by Pierlejewski (2020), the concept of the data self can be understood as a mirrored representation of one's real identity, namely 'data-doppelganger'. On the one hand, the data-doppelganger accurately portrays the behaviours, emotions, and learning patterns of the individual. Simultaneously, however, it also shapes and alters the subjectivity of the real self, ultimately becoming more significant and potentially leading to a dehumanised state. For example, when people apply for a mortgage loan at a bank, the system automatically generates a credit profile based on their credit history. In this scenario, the credit profile, or data self, is often seen as more reliable and credible than the real self. This indicates that the data self and the real self are not only separable, but the data self can also replace the real self, becoming an independent and uncontrollable hyper-real form.

Consequently, the emergence of the data self and its influence on personal subjectivity will lead to a new form of data epistemology. When every aspect of actions, expressions, voices, thoughts, emotions and attitudes of individuals can be converted into data, the algorithmic avatar of the real self will persist in cyberspace. Meanwhile, the data self will autonomously exist and develop within that realm. As a result, the data self and the real self will coexist separately and become disconnected, leading to personal identity confusions.

ETHICAL ISSUE 3: SUBVERSION OF PRIVACY

As a form of capital, data can wield a significant influence in determining key decisions related to business models, political governance and technological advancements (Sadowski 2019).

Consequently, the operation of data is essentially driven by the logic of capital, with its primary purpose being the accumulation of capital. On the one hand, fuelled by the capital logic, knowledge boundaries between various disciplines are blurred, and knowledge becomes a shared intellectual asset for humanity through the global flow of data.

On the other hand, when physiological and psychological aspects of an individual can be represented through data, personal sensations, experiences, thoughts and emotions can be transmitted across individuals, leading to the ever-narrowing boundaries of personal privacy and even the potential replacement of the notion of privacy with the concept of sharing.

According to Floridi (2014: 77), the complete datafication of the body will give rise to a 'shared body', resulting in reduced loneliness, increased hope, easier dissemination of best practices, enhanced prevention and improved planning. However, the 'shared body' undoubtedly shapes new social values. When both the external and internal aspects of the body can be 'shared' with others through datafication, we become 'transparent persons' from outside in. In other words, the inevitable consequence of data sharing is the complete datafication of individuals. Under the control of capital and algorithms, individuals will lose any personal 'sanctuary', and the subversion of privacy will further lead to the loss of dignity and the crisis of humanity.

Therefore, when data emerges as a form of capital, the inherent tension between sharing and privacy is bound to generate opposition and conflicts. Consequently, tackling the internal tension between sharing and privacy becomes a significant challenge that we must face in this era.

In short, the above three ethical issues require our utmost attention to ensure that data becomes a humanising force that enhances human capabilities, rather than an inhumane force that diminishes human dignity and privacy.

CONCLUSIONS

This article presents a compelling argument supporting the concept of 'datafied enhancement', discussing its functional classifications. The author argues that the conversational, wearable, ingestible and embeddable technological devices can enhance our physical, cognitive, emotional and moral capacities by massively collecting our bodies' biometric data. Consequently, data not only construct standards about human health, thereby influencing and transforming human behaviours and habits, but they also become a fundamental component of embodiment, serving as a primary means of human enhancement.

However, datafied enhancement is not without its issues, as not all aspects of human life can be datafied, nor is everything that is datafied necessarily valuable. From the author's point of view, to prevent datafied enhancement from becoming a reiteration of dataism, it is crucial to be mindful of the ethical issues that it raises, to value and address issues of data exclusivity, uncontrollable data selves and the subversion of privacy. Only data that is humanised can genuinely enhance human capacities, and only data that prioritises privacy and individual freedom can bring dignity and welfare to humanity.

ACKNOWLEDGEMENTS

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Link duomenija tobulinamo žmogaus: sąvoka, funkcinės klasifikacijos ir etiniai klausimai

Santrauka

Šiame straipsnyje ginamas „duomenų tobulinimo" konceptas, nukreiptas į žmogaus tobulinimą. Pirma, plačiai paplitusi dirbtinio intelekto technologijų plėtra leido rinkti ir analizuoti žmogaus biometrinius duomenis, taip integruojant juos į tobulinimo koncepciją. Antra, tyrinėjama kultūrinė ir intelektualinė duomenų tobulinimo istorija, pabrėžiant reikšmingą duomenų vaidmenį žmogaus evoliucijoje. Trečia, nagrinėjamos duomenų tobulinimo funkcinės klasifikacijos, teigiant, kad komunikacijos technologiniai prietaisai, rinkdami kūno duomenis, gali pagerinti asmenų fizinius, pažinimo, emocinius ir moralinius gebėjimus. Ketvirta, pabrėžiama, kad svarbu atskirti duomenų tobulinimą nuo duomenijos, siekiant išvengti klaidingų nuomonių. Galiausiai atkreipiamas dėmesys į galimas etikos problemas, tokias kaip duomenų išskirtinumas, piktnaudžiavimas asmeniniais duomenimis ir privatumo pažeidimai. Pripažįstant šią riziką, duomenų tobulinimas gali tapti technologija, gerbiančia žmogaus orumą ir skatinančia gerovę.

Raktažodžiai: žmogaus tobulinimas, duomenų tobulinimas, duomenija, etikos problemos