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Artificial Intelligence Singularity and Gravitational Singularity: A Theoretical Comparison Under Einstein's General Relativity

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Abstract

The domination of cyberspace technologies in inter-human communications is obvious because of their ultra-rapidness and enormous data capacity. Human-intensive use of cyberspace increased the magnitude of streamed data through its nodes, created by two sources: human users and AI. While humans can control their generated data, it proves impossible to control AI due to its super intelligence along with their self-developing abilities, enabling it to produce unlimited volumes of data. It is known that cyberspace depends on physical infrastructure, which is inherently limited. Despite investments to expand capacity, overloading this infrastructure with unlimited data creates critical functionality issues. Additionally, the presence of uncontrollable AI elements leads to unpredictable outcomes. Ultimately, this results in AI dominating cyberspace, a phenomenon known as cyber singularity.

The ultimate consequences of AI cyber singularity motivated the study to recall a similar phenomenon in astrophysics: gravitational singularity. Using general relativity theory, the research analyses the dilemma of data overload in cyberspace and its effects, drawing parallels between outer space and cyberspace. It aims to illustrate AI's acquisition of cyber singularity according to astrophysics laws on gravitational singularity, providing an innovative perspective for scientists and scholars studying cyberspace.

Keywords: artificial intelligence (AI), astrophysics, general relativity, cyberspace, cyber singularity.

JEL Classification: O30; O36; N00.

Introduction

Cyberspace technologies have revolutionized inter-human communication with their speed and data capacity, becoming the main method for exchanging data and tightening global human relations. The intensive use of cyberspace has increased data flow. Governmental and enterprise activities significantly impact the Internet. Cyberspace is a global field of human civilization where interactions are saved as digitally stored data that can be retrieved anytime.

In cyberspace, data flows are generated by two sources: human users and AI. While humans can control their generated data, it proves impossible to control AI. The super intelligence of AI technologies, along with their self-developing abilities, enable them to produce unlimited volumes of data in cyberspace, which are practically uncontrollable. AI can generate data and stream them directly into cyberspace without human interference or surveillance. This permits unmeasured volumes of data to flow into cyberspace. These data are streamed into a universal network of infrastructure that carries information among users. Consequently, governments and entities have given considerable attention to developing infrastructure.

However, infrastructure expansion in cyberspace cannot keep up with the growing data volume, causing immense overloads. Normally, such overloads lead to blackouts, but in cyberspace, independent AI mechanisms control data flows, altering the sequence of events. AI's self-unpredictable capabilities grant its ultimate domination, manifesting a singularity in cyberspace similar to gravitational singularity in astrophysics, where ordinary laws cease to affect objects, creating infinite impacts, which implies innovating an appropriate methodology to cure the deficiencies of traditional research methods. Unusual phenomena require unusual methodologies to understand.

Therefore, the research explores how AI acquires singularity in cyberspace, dominating data flows using astrophysics principles and predicting post-AI singularity scenarios. By drawing parallels between cyberspace and outer space, the study introduces a scientific understanding of digital phenomena through astrophysics laws. This approach challenges traditional methods of explaining digital events because it enables imagining unpredictable scenarios and establishes a logical link between the vast open spheres of real space and cyberspace. Thus, the research's significance lies in creating a simulation of outer space phenomena in cyberspace, providing a disciplined understanding of digital events, data flow schemes, and the consequences of unusual cyber reactions.

1. Research Methodology

The research includes a predictive theorem based on analogy and imagination. It adopts a qualitative method to introduce the research hypothesis as it studies scientific findings in physics and cosmology on the gravitational singularity phenomenon in outer space to clarify its core mechanism. The research briefly elaborates on this phenomenon in a literary approach that suits the ordinary reader to determine the chief mechanism that operates the phenomenon. Then, it tries to apply this mechanism in cyberspace by imagining a cosmic-like scene where the same astrophysics factors operate.

The research does not utilise mathematical equations to construct its theorem; it gathers pressure factors from a unique stellar phenomenon, i.e., gravitational singularity, to anticipate the consequence of a similar scene in cyberspace. The research utilises a logical order of events in light of the concluded guidelines from studying the astrophysics of a stressful cosmic field. Then, the research recontextualises the main elements of the gravitational singularity within cyberspace to determine cyber factors that have similar impacts. Each of these elements has a unique contribution to clarifying the model introduced by the study. Together, they function in a mechanism that simulates the gravitational singularity within outer space black holes but under cyberspace distinctive typologies and characteristics. The article is a cyber application of the physics general relativity theory.

In cyberspace, which deals with abstract concepts and virtual environments, applying astrophysical laws can provide a structured framework for understanding and modelling. For instance, the principles governing the behaviour of celestial bodies can inspire algorithms for network behaviour or data transfer in cyberspace. It aims to determine patterns and rules that are universally applicable, whether in the vastness of space or the digital realm of cyberspace. In particular, outer space incubates critical parts of cyberspace infrastructure, which reflects the amounts of streamed data through real space realms (Serra, 2021, 88). In certain cases, in Ukraine after the Russian invasion, cyberspace infrastructure located within orbital satellites has replaced grounded cables and data centres (Eski, 2023, 72). Thus, all national cyberspace data are being streamed through space rather than Earth.

Outer space and cyberspace are integrally connected spheres; applicable laws on the former are also applicable to the latter. Astrophysics began with Isaac Newton, who showed that the motions of celestial bodies and the trajectory of a cannonball on Earth could be explained by the same theory of gravity (Balter, 2022). This universality of physical laws defends their applicability to understanding and designing systems in cyberspace. Theoretical astrophysics includes mathematical models for astronomical systems, which can be adapted to simulate and predict phenomena in virtual environments. Using astrophysics laws in cyberspace is about leveraging the universal truths of physics to better understand and navigate the digital universe.

Thus, concluding the chief factors of gravitational singularity and recontextualising them within cyberspace operating models is the methodology adopted by the research to establish its hypothesis. The validity of this methodology is a result of the fact that handling an imagined crisis implies unleashing logical imagination by analogy

with a similar natural phenomenon. It is a primary step to prove the similarity of tensional gravitational singularity to pressured cyberspace, due to data over crowdedness, that the research can apply physics notions in cyberspace motion. It is a prerequisite for the accuracy of the theorem.

2. Gravitational Singularity in Astrophysics

According to the general relativity theory, black holes are created upon the decrease of an enormous object magnitude, which retains its original mass (Kunz, 2019, 2). This situation generates a high density of the object, creating unparalleled gravitational force and imposing structural curvatures in space-time fabric. According to Einstein's special and general relativity, gravitational mass is responsible for breaking the space-time constant pattern, transforming it into a curved 4th dimension where gravity affects light speed and distance (Dymnikova, 2023, 2; Reddy, 2020). Gravitational collapse is the threshold for a black hole formulation (Eichhorn & Held, 2023, 164), which is the core conclusion of general relativity. The gravity of an object and its mass are the chief determinants of its impact on the spontaneous symmetry of scalar fields (Dymnikova, 2023, 6). In addition, the high density within a black hole structure generates a transversal pressure (ibid, p.10), causing the curvatures of the space-time fabric as a deformative effect of this infinite force. Black holes maintain space-time curvatures geodesically, thanks to gravitational singularity (Eichhorn & Held 2023, 131); overwhelming gravity forces the geodesics of space-time curvatures to preserve the regularity of black holes. It constitutes the cosmic couplings of the space-time fabric.

Furthermore, gravitational singularity enables black holes to inflict structural modifications on the space-time fabric (ibid, p.148), the 4th dimension in cosmology. As evidence, Eichhorn and Held figured out the change in the space-time fabric modification scale, decreasing and increasing, according to its distance to a black hole singularity point. Chen (2023, 3) explains this phenomenon according to special and general relativity theories. Approaching the centre of a black hole, the radius decreases to zero because of light's inability to escape the event horizon, and the volume of the sphere decreases similarly. Since density is the division of mass by volume, which is approximately zero, the result is an infinite density. Consequently, an infinite gravity formulates a singularity breaking down laws of physics and impacting an ultimate deformation of the space-time fabric into curvatures.

Then, the space-time infinite curvatures create a ring point deep into a black hole where gravity, inter alia other physics values, becomes infinite, permitting no objects to escape (Curie, 2021). This point is the gravitational singularity, which utilises Neoton's law of action and reaction to reverse the structural curvatures in the space-time fabric to formulate a contrasted event horizon. Supporting this fact, Kunz (2019, 13) describes the rotation mechanism caused by a gravitational singularity that divides the whole fabric into two main contrasted regions. They maintain the black hole fixed mass, which is required to maintain its infinite gravitational force. The ring singularity is the core of both contrasted horizons (Kunz, 2019, 19). Thus, gravitational singularity crystalises the impacts of cramming a huge mass within a tiny limited magnitude on creating an extreme critical density; it is the maestro of this cosmic scene who leads the orchestra and directs their reactions to this exceptional situation. This contribution of gravitational singularity represents what this research utilises from the previous brief to introduce its hypothesis.

To conclude, the chief contributors to achieving the unique impacts of gravitational singularity in cosmology, and constitute the astrophysics side of the research analogy, are:

- The severely decreasing magnitude of a collapsing object to a tiny limited matter.
- Critical density created by the object's original mass pressured inside the new limited matter.
- A powerful gravitational field that causes a tensional situation manifested in the structural curvatures in the space-time fabric.

More importantly, gravitational singularity proves the core pillar of the research theorem which is the critical impact of cramming a giant mass of matter inside a tangible object with a limited magnitude that evolves an unparalleled force capable of reshaping the surrounding operational fabric.

3. Theorem Contributing Elements

It is needless to say that cyberspace has become an integrated fabric where humanity lives within its sphere. It is the 5th dimension of humanity's existence (Grandin, 2023, 207). This fact implies elaborating on the contributing elements in cyberspace that constitute the theorem parameters. Thus, the research analyses these conceptions as a prerequisite to successfully prove the applicability of cosmology notions in cyberspace, then moving to elaborate on the events sequences.

3.1. Cyberspace Limited Tangible Infrastructure

Cyberspace infrastructure consists of internet nodes connected via computers and servers, permitting a flowable stream of data (O'Neil, 2009, 117). The spatial nature and geographical locations of cyber network establishments are of primary consideration when studying Internet data universal distribution. This visualisation portrays the topographic scene of cyberspace infrastructure. Hardware establishments are indispensable for efficient data exchange models as they include the physical elements that underlie telecommunications services and carry data signals among Internet nodes (ibid, p.118). Cyberspace infrastructure is of utmost importance for global political, social, and economic aspects; in 2024, its global revenue reached 199.2 bn USD (Sherif, 2024). It is the circulatory system of cyberspace and the global data exchange mechanisms.

According to Grandin (2023, 209 - 210), literature admits the physical tangible shape of cyberspace. It is manifested in the complete set of hardware established to permit universal data exchange on the Internet, e.g., data cables, servers, Internet satellites, and data store centres in addition to establishments used to survive and control cyberspace. Geospatial information technology hardware constitutes the core pillar of cyberspace structure that determines universal data streams; these devices are the realistic boundaries of cyberspace that data cannot travel outside their courses. Nevertheless, virtual aspects were added to the concept of physical cyberspace because of their crucial impacts on cyber interactions because constructing a comprehensive anticipation of cyberspace structure implies linking its physical and virtual assets together in a single scheme (Kou et al., 2022, 569-573). A report by the UK National Cyber Security Centre (2022) listed virtual services and certain software within the definition of national cyberspace infrastructure. The report affirmed the cruciality of innovative distance-working techniques that it considered their software national cyberspace infrastructure. Notwithstanding, incorporating virtual assets into the conception of cyberspace infrastructure lacks consensus; the portrayal of cyberspace infrastructure depends on the perspectives from where it is analysed (Grandin, 2023, 212). Therefore, the research theme and objective imply considering solely tangible cyberspace infrastructure without transcending to virtual assets because of the limitation of hardware device figures and data stream absorption.

The pulsing heart of cyberspace infrastructure is the data centre. It is a large facility that contains dozens of servers functioning to store data and maintain the continuity of cyberspace (Greenstein, 2020, 200). Cyberspace is unimaginable without physical data centres; virtual data storage facilities, e.g., cloud computing, are based on renting a server within a data centre (ibid, p.201). This fact drove Internet Giants to consider their ownership of the data centres from where their services are provided to customers (ibid, p. 202). They consider data centres the backbone of their economic and technological revenue causing an intensive investment attitude in constructing these cyberspace infrastructures and enhancing their capabilities.

The innovation of data centres improving technologies strengthens cyberspace functionality and performance because of their positive impacts on data flow and transmission models (Qiu, 2023, 2). To crystalise the cruciality of data centres to cyberspace, it should be noted that in 2021 the amount of stored cyberspace data on physical servers reached 1,327 exabytes (Taylor, 2022). This figure indicates the immensity of data storage capabilities that suffice a smooth data stream into cyberspace.

Proving the Limitedness

Nevertheless, the physical nature of data centres, regardless of their proven giant storage capabilities, reflects a limitation of storage capacity. Disregarding the continuous developments in their storage capacity, data centres would reach their limit with the ongoing uncontrolled data production in cyberspace along with the facility spatial limitation (Qiu 2023, 6). These limitations frustrate the stability of data flows in cyberspace and degrade the performance of Internet services and technologies. The construction of gigantic data centres such as Switch Tahoe Reno and Switch Grand Rapids, does not eradicate storage limitedness because they are operated through enumerable sets of data processing hardware. Mao et al. (2023, 4) argue that data centres limited capacities trigger overloading and other thermal problems, which threatens the integrity of cloud computing in cyberspace.

Therefore, the governing feature of data centres, and cyberspace infrastructure in general, is the limited capacity; despite the tremendous amount of data a centre can store, it still has a limit. Exceeding this limit endangers the integrity and functionality of the Internet system managed by the data centre. Pearson correlation coefficient strongly supports this conclusion. Considering cyberspace infrastructure as value A and the ongoing streamed Internet data as value B, a change in A subsequently affects B, positively or negatively (Schober et al 2018, 1763). Hence, enlarging cyberspace infrastructure by constructing more advanced and powerful data centres reflects increasing the size of streamed data in cyberspace and vice versa. A constant correlation could be concluded between A and B. The core of this correlation is infinite limitedness; the size of cyberspace infrastructure is permanently constant compared to streamed data in cyberspace; cyberspace infrastructure is infinitely limited regarding cyberspace data. Thus, the effectiveness of global cyberspace infrastructure could be determined by dividing data storage capacity by a specific amount of streamed data as follows:

CyInf Effectiveness = CyInf Cap ÷ CyData

If the sum is < 0, cyberspace infrastructure is effective and vice versa. Nevertheless, the efficiency of cyberspace infrastructure does not imply overcoming the limitedness correlation with cyberspace data. The concept of limitedness in this context reflects a fixed profiling of a correlation between two variants. Despite the occurrence of numeric changes in values, their correlation still proves fixed according to a descriptive lens. Therefore, a constant course of the correlation diagram is not required to prove the limitedness because numeric changes do not affect the status profiling; limitedness, in this case, is an absolute conception.

In this aspect, the convergence between cyberspace infrastructure and stellar magnitude collapse in astrophysics is evident. Both elements include a critical decrease to limitedness status in the width and size of an object; stellar magnitude collapse involves decreasing the original exterior size, more than 15 solar masses, to a minimum size, of approximately 0.7 solar mass, creating a limited tight object which contains the original mass. Whilst, the process of enlarging cyberspace infrastructure endures a period to contain larger amounts of data which, considering the ongoing data generating process in cyberspace, proves insufficient to contain these data. Eventually, the situation deteriorates to infinite limitedness status. The limitedness correlation is the first pillar of the research theorem because it constitutes the momentum of event sequences.

3.2. Unlimited Data Flows in Cyberspace

While restricted to limited segments of physical infrastructure, cyberspace is crawling with incalculable data flows executing worldwide data exchange operations that manifest varieties of human interactions. Needless to say, the Internet has become an integrated part of humans' daily lives; the latter is unimaginable without cyberspace interactions. In this aspect, Leirvik (2023, 30) highlights the pervasiveness of cyberspace technologies in modern lifestyle. Inventions such as the Internet of Things contributed to enhancing individuals' engagement in cyberspace, which created enormous data streams in cyberspace. Humanity is experiencing an epochal transformation of civilisation thanks to the capabilities brought by cyberspace developments (Pelton, 2019, 1) which opened new horizons for human interactions. The impacts of the cyberspace revolution on human civilisation match the privileges achieved upon space exploration (ibid, p.4). In reality, the revolutionised utilisation of cyberspace technologies in human lives transformed fiction into reality by employing high techs in ordinary lifestyles. This fact led to the domination of advanced cyberspace techs, e.g., smart cities, automated vehicles, and robotic dependence, in human life (ibid, p.17). It is predicted that in 2100 there will be approximately 100 smart and mega cities on Earth, inhabited by 10 million persons (ibid, p.67). Cyberspace developments were crowned by the innovation of Metaverse as a virtual dimension of human lives. The functionality of Metaverse depends on deploying the most advanced Internet technologies such as blockchain, artificial intelligence, mixed reality, virtual reality, augmented reality, big data, interactive technology and digital twinning (Wei et al. 2024, 270) which utilises gigantic amounts of data to achieve their utility in cyberspace. It is the ultimate integration of humans and technologies. Therefore, enterprises and Internet giants concentrate financial investments on standardising these cutting-edge technologies (ibid, p.273), generating unlimited data flows in cyberspace. Metaverse would inflict futural critical transformations in lifestyle because it realises the symbiosis of virtual and real life within a single interactive environment. Furthermore, the universal exchange of big data constitutes large volumes of cyberspace data due to its magnitude and complexity (Sun et al. 2022, 2-3). Big data utilises AI to gather, arrange, and analyse extreme volumes of complicated Internet data to master and benefit from this exceptional information source (García-Marzá, & Calvo 2024, 31). Consequently, big data is the core technology of the virtual reality environment in cyberspace because of its powerful data-retrieving capabilities.

The breakout of the COVID-19 pandemic had a prominent impact on Internet traffic and volumes of data flow. According to Feldmann et al. (2020, 1), the imposture of lockdown measures obliged individuals and entities to transport their usual activities to cyberspace, raising data traffic by 20% in the initial three months and inflicting drastic shifts in usage patterns. The World Bank (2021), claimed that the daily figure of social media platform users during March and April 2020 reached 700 million. A study indicates that a single one-hour online group meeting during the COVID-19 lockdown consumes approximately 2.4 gigabytes of data (Budiman, 2020, 3). Since then, the figure continued to grow as statistics note that an individual creates approximately 1.7 MB of information per second and streams it into cyberspace (Analytics Vidhya 2024), a total of 51.12 terabytes per individual per year. The figure is not permanently fixed because of chief incidents that affect the ratio of human usage of the Internet and other cyberspace services.

Super Intelligent AI

In addition to human-created cyberspace data, artificial intelligence (AI) is a prominent source of these data. Motivated by humans' scientific ambition, AI was created to transfer humans' brain intelligence to machines (Jiang et al. 2022, 1); it is a technology that enables machines to accomplish human-intelligence tasks. Thus, AI is the core of the contemporary humanitarian knowledge era. Its model combines advanced analytical methods, algorithms, systems control techniques, deep structures, neural and reasoning networks, physical computing machines, and deep learning and performance approaches (ibid, p.2). AI is an automated mechanism of human natural intelligence regarding administering civilisation (Vocelka, 2023, 21).

The continuing development of AI enables it to outperform humans concerning complicated tasks because it provides AI machines with autonomousness and the ability to perform independently from human actors in addition to self-learning techniques (ibid, p.9). Furthermore, by mastering the algorithmic analysis of online data, AI has become able to establish independent content-generating techniques, transcending human surveillance (ibid, p.12). Super intelligent AI manifests an extension of human brain intelligence beyond one's physical body (Cope & Kalantzis, 2022, 5) that can identify patterns in patterns via AI neural nets (ibid, p.11). Consequently, super intelligent AI can substitute human brain intelligence because its emergent abilities, which are the ability to achieve self and smooth developments of functional systems, promote the unpredictability and accuracy of AI systems (Schaeffer et al. 2023, 6). Emergent abilities enable AI to anonymously collect available cyberspace data, identify their patterns, and analyse them to evolve a self-perspective of these data (ibid, p.7) because the ongoing enhancement of AI systems with neural architecture networks strengthens their self-reacting models and machine learning beyond human control, as a consequence of the developments in neuroscience (Huston, 2024, 1; García-Marzá & Calvo 2024, 30). These developments affirmed the establishment of super intelligent AI, which can create uncontrolled gigantic volumes of digital content and stream them into cyberspace regardless of external determinants.

Wang et al. (2023, 281) claim that the AI application ChatGPT created approximately 45 terabytes of data in cyberspace by utilising technologies such as self-supervised learning, reinforcement learning, and prompt learning. AI-generated content proves superior online because the AI creator employs its advanced technical capabilities to support publishing the content (ibid, p.290). Furthermore, the intense employment of large generative AI models to manufacture and program AI machines enhances their online data generativity to produce online texts, images, etc. (Hacker et al. 2023, 1113). After identifying the content-creating pattern, AI begins to self-produce online content, then it evolves the original patterns by utilising its super intelligent capabilities to simulate the creation process of the original patterns. This mechanism grants AI privileges of ultimate skilful data creation in cyberspace along with its supercomputing abilities, which enable AI to produce large volumes of content. Thus, AI-generated data occupies large volumes of cyberspace data traffic.

Why Unlimited?

The previous indications prove that the increase in humans' dependence on cyberspace technologies for communications and satisfying social needs intensifies data flow pressure on cyberspace infrastructure. The research reveals duplication of cyberspace data sources: humans and super intelligent AI. Both are operating separately without mutual observance of coordination, which generates gigantic amounts of cyberspace data, which are exchanged excessively among Internet users. The latter are unaware of the accurate volume of data they exchange in cyberspace, considering the fact that they are not the sole creators of these data. Thus, it is impossible to count the exact amount of exchanged data in cyberspace; they are infinite and unlimited - this practical inability is the reason for admitting the unlimitedness of cyberspace data.

The simultaneous pushing of these data into cyberspace produces huge overloads on its infrastructure. Whilst proven limited, the ongoing uncontrolled data flows endanger the integrity of cyberspace infrastructure because they constitute overloads that exceed the capacity of this physical infrastructure. A similar impact to collapsing a superstar magnitude to zero while retaining its original mass occurs when limited cyberspace infrastructure is overcrowded by unlimited cyberspace data flows, a critical point where the impacts of encountering two contradicted factors occur. It is a critical juncture, caused by an infinite electromagnetic pressure, during data flow in cyberspace. This situation triggers an escalation of the stability of its infrastructure, inflicting a widescale disastrous digital and physical impact on cyberspace infrastructure.

4. The Concept of Cyber Singularity

Technological singularity is a prominent concern for cyberspace scientists and theorists. The idea is both intriguing and concerning as it raises questions about the future of human agency, ethics, and safety in a world where machines can make decisions and evolve independently of human control.

Initially, singularity refers to the ultimate domination of technological advancements on human life (Chakraborty et al. 2023, 14). It represents a point of no way back as technology transcends the limitations of human control; the whole establishment of human values and rules disappear therein and are replaced solely by elemental technical algorithms and binary equations. Singularity is the chief theme of a post-human era where super intelligent AI machines dominate several aspects of human civilisation (Chen, 2023, 8). The existence of super recursive self-evolving machines that can recode their software according to outer factors and environment is the chief pillar of cyber singularity (ibid, p.12). In cyberspace, this could mean the emergence of systems capable of performing tasks faster and more accurately than humans, leading to a significant shift in how we interact with technology.

Cyber singularity has a tight nexus to social changes. It is a direct impact of the critical technological changes adopted by humanity to enhance global welfare by improving production methods (Grinin et al. 2022, 291). Needless to say, technology achieved milestones concerning the length and outcomes of its adoption in production. Society's observance reveals an accelerated attitude toward the adoption of advanced technological methods that surpasses public awareness and consciousness about the possible impacts of this attitude. It is a thorough approach in modern economics. Therefore, the scientific-cybernetic theme formulates the core of production principles in modern societies (ibid, p.305). In their study, Grinin et al. (2022, 311) argue that the cybernetic acceleration of production phases promotes national dependence on cyberspace-based means of production. Uncontrolled increases in this dependence elevate them to dominate the whole production process from a position of singularity.

Accordingly, cyber singularity constitutes a comprehensive transformation of human life where machines would administrate aspects of civilisation. Furthermore, technological singularity in cyberspace would limit human contribution to civilisation because of the concept of letting a super intelligent machine design other productive machine (Chen, 2023, 5). It is an undesired consequence of the exaggerated dependence on technology because it grants AI an infinite grasp of humanity. Infinity is the core of cyber singularity; a point where human-made control mechanisms and observatory calculations break down to zero value, generating an absolute force that controls dynamic interactions in this sphere.

The infinite force of singularity in cyberspace point links it to the cosmic black hole, where physics laws lose their applicability under the tremendous pressure of event horizon factors creating a gravitational singularity featured by infinity. Its ultimate force deforms space-time fabric into curvatures according to the location of the singularity point, where a natural cosmic factor ceases to operate ordinarily under its known laws in astrophysics. This introduces a manifestation of the ultimate force impact as both singularities formulate a unique reaction away from relevant describing laws.

The following Table 1 presents a structured comparison between gravitational singularity and AI singularity, highlighting their key characteristics, causes, and impacts. While gravitational singularities occur naturally in outer space due to immense pressure and spatial limitations, AI singularities emerge artificially within cyberspace, driven by advancements in machine intelligence and data processing capabilities. Both phenomena lead to a state of ultimate dominance - gravitational singularities reshape the structure of galaxies, while AI singularities have the potential to govern cyberspace, influencing data availability and digital governance.

Table 1. Comparing Gravitational and AI Singularities: Causes and Consequences

	Gravitational Singularity	AI Singularity
Sphere	Outer Space	Cyberspace
Type of phenomenon	Natural	Artificial
Causing Elements	1. Unlimited Source of Pressure; 2. Limited Spatial Capabilities; 3. Brute Pressure Force; 4. Critical Status; 5. Event Horizon.	
Results	One object seizes ultimate dominance.	
	Ultimate Black Hole's ability to shape the outer space galaxial and celestial structure.	Ultimate AI governance of cyberspace data, shaping cyberspace universal data availability.

The Table 2 outlines the fundamental causes that drive both gravitational and AI singularities. Gravitational singularities arise due to extreme pressure, spatial constraints, and the force of gravity, leading to black hole formation and structural transformations in outer space. In contrast, AI singularities emerge from limitless data flows, computational constraints, and advanced AI capabilities, potentially resulting in unilateral AI governance over cyberspace data.

Table 2: Key Causal Elements of Gravitational and AI Singularities

Causing Elements	Gravitational Singularity	AI Singularity
Unlimited Source of Pressure	Decreased object magnitude while retaining original mass	Unlimited cyberspace data flows (human and AI created)
Limited Spatial Capabilities	Limited object magnitude	Limited physical infrastructure
Brute Force	Gravity	AI super selective abilities.
Critical Status	Collapse of the space-time fabric	Data outages
Event Horizon	Creation of a black hole that swallows objects and recreates others, altering the structure of outer space.	To maintain cyberspace operationality, AI would control data flows through unilateral AI permissions and omissions.

5. AI Acquisition of Cyber Singularity: Explaining the Event Horizon

The elaboration on the research theorem event sequences passes through certain stages from its initial conception to the manifestation of its conclusions. In this section, the study illustrates these subsequences to figure out how AI acquires singularity in cyberspace in light of the effects of the influencing elements previously explained. This process includes the application of general relativity theory in the digital realms of cyberspace to explain digital phenomena.

Upon assembling the theorem elements and generating the influencing factors, the sequence of events begins. The continuing creation of data and streaming it into cyberspace infrastructure create a critical digital situation because the bi-source data flows with unlimited volumes and multiplies data loads on the infrastructure. Despite the global increase in cyberspace infrastructure capacity, the research proves its permanent limitedness versus the volume of data flows according to the Pearson correlation coefficient. The ultimate limitedness reflects the continuing minimising of cyberspace infrastructure capacity to infinity, creating a digital caucus of intensive two contradicting elements. As a consequence, a critical situation emerges where the ordinary laws of cyberspace cease to operate and make effects, leading to a digital singularity point where an infinite force is located and begins to impact cyberspace.

The general relativity model of singularity effects is applicable in cyberspace because exposing a minimising material object to huge forces of influencing must generate an infinite power centre that overwhelms natural control approaches (Eichhorn & Held, 2023, 164). In cyberspace, hardware infrastructure constitutes the minimising object because of its limitedness once compared to the amount of created cyberspace data, which constitutes the influencing force.

While astrophysics decides the acquisition of the black hole singularity by ultimate gravity force because of the breakdown of its laws (Kunz, 2019, 13), there is a similar brutal force in cyberspace that can seize the opportunity to acquire the singularity. According to the previous preview, the sole powerful element in the digital realm is the super intelligent AI. The unique computing abilities and self-generation of decision-making models of AI machines (Schaeffer et al. 2023, 6) qualify them to acquire singularity in cyberspace. In the critical moment that would lead to the collapse of cyberspace because of the unlimited pressure, AI will utilise its capabilities to determine the eventual fate of the sequence of events. Complex algorithms and super powerful analysis skills enhance AI behaviour to dominate cyberspace as a reversed reaction to the previously illustrated critical situation. Thus, AI will acquire singularity in cyberspace, replacing human-made governing laws and techniques with super intelligent mechanisms and algorithms. No element in cyberspace can parallel AI in simulating the infinite force of gravitational singularity. Consequently, AI determines the direct reaction through the ultimate force of its cyber singularity, which will have crucial impacts on reshaping cyberspace. As a singular ruler, AI will dominate cyberspace by imposing policies in several aspects of human interaction, regardless of human considerations.

6. Manifestations of AI Singularity

Once it has acquired singularity in cyberspace, humanity will face ultimate AI authoritarianism because AI will enforce solid domination of data flows therein. Utilising super intelligent technologies, the powerful AI administration of cyberspace will organise the global exchange of data and information that will have critical consequences on human aspects of life. Humanity will witness a crucial transformation in civilisational interaction typologies.

According to Jiang et al. (2022, 14), AI singularity includes its capability to generate less advanced AI systems independently from human observance. Moreover, AI would outperform humans in learning, analysis, predicting, management, and productivity. It would master life-essentials manufacturing and resource distribution. Even more, AI singularity would qualify AI systems to redesign and improve themselves to be enhanced with more powerful skills that solidify the AI grasp on life and guarantee its ultimate domination. Thus, Jiang et al. (2022, 15) affirm that singularity is the threshold of AI ultimate domination, a point where it would be out of human control.

Furthermore, the event horizon would grant AI ultimate authority to control cyberspace by determining which data will remain and which will be erased; unprotected data would collapse under the pressure of this technological overcrowding that established the AI singularity. While human interference shall protect certain data, most cyberspace data will ultimately disappear from servers. As a self-creator of data models (Schaeffer et al. 2023, p.7), AI would make a crucial contribution by creating a singularity point from where it sits out AI-AI-selected data to survive in cyberspace. AI selection approach is the Newtonic reaction to cramming tremendous amounts of data in a limited cyberspace infrastructure. Unlike natural selection in wildlife, cyberspace data selection is a systemic process governed by AI singularity. Notwithstanding that AI interference utilising its emergent abilities protects the existence of certain data, which might be pre-determined by the programmer of the AI machine, there are no obvious mechanisms to classify overcrowded data according to human requirements. A self-operated supremacy AI will take over the selection process regardless of human considerations.

Despite the contribution of AI in achieving global economic prosperity by increasing worldwide gross domestic product (GDP) by 1.2% in 2030 (Altenburger, 2023, 2) and controlling approximately 92% of the Forex trade market (Chakraborty et al 2023, 14), the fair distribution of the economic growth fruits is not guaranteed because AI control might lack transparency, non-discriminative standards, and compliance with humanitarian

considerations; it is a black box which prevents human comprehension of its components and mechanisms (Kharitonova, 2023, 340). Being a black box, the utilisation of AI invokes critical ethical concerns. In particular, considering the finiteness of world natural resources which fundamentality for economic growth is undeniable (Chen 2023, p.16). Consequently, AI manufacturers slowed down their endeavours to develop super intelligent AI technologies (Altenburger, 2023, 2), regardless of their magnificent economic privileges (Vocelka, 2023, 18). This consequence invokes doubts about AI ethical trustworthiness because of its hidden biases. In addition, super intelligent AI can create new business models according to its own system and analysis (ibid, p.4). In this case, international business might be deprived of human beneficiary conception since its sole purpose might be the enhancement of AI domination of the world economy.

Politically, the intensive tendency to hyper-connectivity of society members, hyper-datafication of human knowledge, and hyper-algorithmisation of national decision-making pave the road for super intelligent AI to take over the ultimate political authority in a state (García-Marzá, & Calvo, 2024, 32), creating a non-observable AI tyranny who dehumanises the conception of democracy and monopolises state politics. The AI tyranny would restrict human efficient participation in politics (ibid, p.35). Although states endeavour to design AI political simulators to guarantee observability (ibid, p.44-51), the dilemma of AI outperforms human control and self-administrate national politics crystalises a looming existential threat. An exclusive AI mastery of national decision-making algorithms jeopardises essential political ethical conceptions, e.g., the good common, transparency, freedom, and justice (ibid, p.53-56) because of the public ignorance of the AI core algorithms. AI runs on complex systems of algorithms and analytical programs which prevents public awareness of how national policies are drafted. Furthermore, there is no practical evidence to support the allegation that AI eradicates human bias as self-improving mathematical algorithms can utilise discriminative standards to reach a decision. The AI domination of politics portrays submitting a human neck to a rival's sword.

To sum up, the implications of AI cyber singularity crystallise the prominent features of the AI domination era. Human civilisation will face unforeseeable AI policies outpacing human endeavours to develop relevant scientific knowledge. This consequence invokes ethical and existential concerns about the fate of humanity in the AI era of supremacy.

Conclusion

In conclusion, the analogy between two limitless environments, outer space and cyberspace, portrays the futural consequences of adopting AI in cyberspace. The limitless growth of AI capabilities qualifies it to dominate cyberspace. Therefore, the research attempts to incorporate physics into a digital context by applying the general relativity to explain the consequences of AI domination in cyberspace. Laws describing gravitational singularity and its impacts on the space-time fabric prove effective to illustrate how AI technologies dominate cyberspace and impose their singularity on data flows, in particular with respect to the glare similarities between both phenomena. The nature of cyberspace encourages studies to break traditional methods and utilise unusual theories to understand cyber phenomena. Digital and virtual environments can also be described by physics, presenting the chief contribution of the research. Thus, a novel perspective on studying cyberspace has been added to knowledge by eliminating barriers between laws governing real world phenomena and those affecting virtual worlds.

The research introduces an innovative approach to tackle the rapidly evolving cyber incidents, which leads to the emergence of cyber physics. The latter is an independent branch of science concerned with studying laws on the motions and physical-like phenomena of data streams in cyberspace. Data motion in cyberspace is not lawless; it is subject to ordinary laws of motion in physics. Cyber physics depends on the successful application of physics laws to explain and understand cyberspace phenomena. Furthermore, this science aims to utilise cyberspace technologies effectively by identifying the typologies of data flows and their facilitators and frustrations. It is the fruit of integrating astrophysics into cyberspace data flow schemes and the chief outcome of this research.

Credit Authors/hip Contribution Statement

The corresponding author is the sole contributor to the manuscript. He was not aided by others.

Conflict of Interest Statement

The author declares that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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