

**The philosophical shift from the framework of classical
revolutions to the structure of the information
revolution_leading to the creation of an information
philosophy_occurs**

التحول الفلسفي من بنية الثورات الكلاسيكية الى بنية ثورة المعلومات-نحو
التأسيس لفلسفة المعلومات

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Abstract: This study explores the relationship between the Fourth Information Revolution, technological advancement, and fundamental human values. It illustrates how other scientific revolutions (those of Copernicus, Darwin, and Freud) caused radical changes in humanity's perception of its place. The study aims to analyse the effects of the Information Revolution on human perspectives regarding self-identity and status in this new era, emphasising the need to establish a new, comprehensive philosophy that focusses on information as its subject of study by raising questions that lay the foundation for such a philosophy.

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ملخص:

تبحث هذه الدراسة في العلاقة بين الثورة المعلوماتية الرابعة والتقدم التقني والقيم الأساسية للإنسان. إذ يوضح كيف تسببت الثورات العلمية الأخرى (كوبرنيكوس وداروين وفرويد) في إحداث تغييرات جذرية في تصور الإنسان لمكانته. كما يهدف إلى تحليل آثار الثورة المعلوماتية على منظور الإنسان لجوهره الذاتي ومكانته في عصر هذه الثورة، ووجوب التأسيس لفلسفة شاملة جديدة تتخذ المعلومات موضوع دراسة لها، من خلال إثارة تساؤلات تؤسس لهذه الفلسفة. الكلمات المفتاحية: الثورة الكلاسيكية، الثورة الرابعة، عصر المعلومات، فلسفة المعلومات.

1. Introduction:

The essence of philosophical questions is a product of the events of the era, which presents us with problematic issues as a focal point for philosophical inquiry. Philosophical problems have been raised across different epochs, being revived and explored according to the nature of the era and its distinct environment compared to other periods.

The three well-known revolutions by Copernicus, Darwin, and Sigmund Freud led to the dismantling of several long-held assumptions. These included the geocentric model of the universe, the idea of a divine origin for living beings, and the uniqueness of human consciousness. Although these theories are predominantly scientific in nature, they transcended mere scientific discourse to challenge what was considered the highest entities in the natural hierarchy and their dominion. The discovery of the universe's centre prompted a re-evaluation of human subjectivity. The belief that humans possessed unique traits that set them apart from other creatures, including consciousness, was questioned with the discovery of the unconscious. This led to a loss of many individual characteristics, leaving humans with only the train of thought as their distinguishing feature.

With the advent of the 20th century, which saw rapid advancements in technology, marking it as an era primarily defined by technology and information and with the invention of computers—machines performing tasks and functions equivalent to human cognition—the unique characteristic of human thought was soon challenged. The threat to human self-status remains present in the age of the fourth information revolution. This on-going challenge necessitates a constant re-examination of the value of human subjectivity in the light of contemporary developments. Consequently, the information revolution, in its

technical framework, becomes a central topic for philosophical study, focussing on its essence, the major issues it raises, and its ethical implications.

2. The Structure of the Three Revolutions in Their Philosophical Aspect:

Despite the scientific nature of each of the three revolutions, they are distinguished by their philosophical aspect: the challenge to prevailing ideas and the refusal to accept them as absolute certainties. Human beliefs are often characterised by dogmatism, and the purpose of examining the scientific revolutions is not just their scientific aspect but also the intellectual impact they have on the individual's mind, establishing a certainty with no alternative. On one hand, and on the other hand, we will assess how scientific discoveries have impacted the value of human selfhood. Thus, the three classical revolutions have caused a significant shift in philosophy and disrupted the balance of accepted truths in their respective times. These revolutions are:

a. The Copernican Revolution:

People had a deeply ingrained conviction in the geocentric model of the world, which placed Earth at the centre of the cosmos, before Copernicus. The power of the Church, which pressed certain beliefs upon people and drove them to accept them without question, strengthened this belief. In his book *On the Revolutions of Celestial Bodies* (Luciano Floridi, 2017, p.120.), published in 1543, Nicolaus Copernicus refuted the geocentric theory by proving that the solar system is heliocentric and that Earth is not the centre of the universe. This revolution involved more than just the universe's centre; while Copernican philosophy sought to validate heliocentrism, it also marked the beginning of a different kind of revolution concerning introspection in human beings (Luciano Floridi, 2017, p.120). The Copernican Revolution was, thus, the first theory to alter both the external world and human self-perception, which philosophy had traditionally explored.

b. The Darwinian Revolution:

With the publication of *On the Origin of Species* (1859), Charles Darwin presented his theory that upended the hierarchical classification of organisms. Due to similar biological characteristics, humans were categorised by Darwin's hypothesis as being on an equal footing with other organisms, despite previously being thought of as the top of the hierarchy.

Darwin believed that the struggle for survival is how supremacy is attained in the universe and that natural selection selects the dominant species. Different species compete with one another for existence in the hierarchical order, undermining the idea that humans are superior to other living things. Darwin redefined revolution to mean evolution after Copernicus introduced the idea (Luciano Floridi, 2017, p.120).

c. The Freudian Revolution:

Sigmund Freud reinforced the changes in the concept of human subjectivity with a third revolution. Freud discovered that individuals have an inner aspect composed of the unconscious. He argued that **"most of what we do is unconscious, and the conscious mind often constructs logical narratives afterward to justify our actions"**(Luciano Floridi, 2017, p.122). Human selfhood could no longer fully control itself, and individuals must accept the minimal understanding they have of their unconscious mind due to the influence of unconscious drives (Friedel Weinert, 2019, pp.269, 268). Freud's discovery of the unconscious led to a philosophical anthropological revolution, making it impossible to accept that humans fully know themselves or control their conscious actions (Kevin P. Lee, 2017, p. 284), leading to new propositions about past beliefs concerning selfhood.

Thus, the three revolutions' framework has profoundly changed and impacted the essence of the human self-worth in different ways. The belief in human superiority has declined in popularity. Mankind pays a price in terms of self-perception with every scientific breakthrough it makes in its quest to understand and manipulate the world and nature. This is because mankind holds onto ideas that formerly saw it as the supreme master of nature.

3. The Foundational Aspects of the Information Revolution and the Transition beyond the Three Revolutions:

3.1 Early Signs of the Information Revolution:

The foundation for computational tools was established by Blaise Pascal and Gottfried Wilhelm Leibniz, who are credited with initiating the Information Revolution. In his work *The Arithmetical Machine*, Pascal wrote of the Pascaline, a calculator he had made for his father to help with the arduous tasks he managed. By creating the binary numeral system, which is now essential to contemporary digital computers, Leibniz expanded on this concept. Leibniz wrote in his letter, **"I am pleased to inform you that I am presenting to the public a small machine of my invention, which allows you to perform all calculations without effort, easing the work that is often mentally exhausting"** (Luciano Floridi, 2017, p.120).

According to this claim, human thought is capable of producing instruments to help with cognitive activities. These devices serve to relieve the strain of difficult jobs so that people can work more productively and efficiently on other duties, which saves time and effort. Still, if we go back to the equation of the mind as a contemplative machine that computes, we see that the Pascaline sowed the seeds of the fourth revolution. It diminished the special mental powers that humans held, indicating that people were no longer the only entities that could be identified by their intelligence (Luciano Floridi, 2017, p.120).

3.2 Actual Foundation of the Information Revolution:

The true foundation of the Information Revolution emerged with advancements in mathematics, particularly in the late 19th and early 20th centuries (Kevin P. Lee, 2017, p.285), with the discovery of computer principles by Alan Turing and the establishment of information theory by Claude Shannon (Kevin P. Lee, 2017, p.284).

Alan Turing: presented the Turing machine, a concept of computation that is non-human. He proved that issues might be resolved by serial operations—now known as algorithms (Kevin. P. Lee, 2020, p. 52) —using intricate mathematics. Given that the idea of a computer at the time entailed people doing computations by hand, this was a huge advancement in computing. According to Turing, this computing device is just a series of integers that can carry out any arithmetic operation. Turing's idea of a universal machine developed into one of modern computer science's guiding concepts (Kevin P. Lee, 2017, p.288). His concept of universal computation gave philosophy a fresh outlook on humanity, which greatly influenced philosophy. The ability to do serial operations was no longer limited to humans. As universal computation advanced, we had to take into account both humans and other creatures that could carry out tasks traditionally reserved for human intelligence (Kevin P. Lee, 2017, p.283), thus moving us from the pinnacle of logical thought to a reality where digital tools could perform thinking tasks (Luciano Floridi, 2017, pp.123,125).

Claude Shannon: Shannon, too, significantly impacted the Information Age with his information theory. When Bell Labs faced issues with noise affecting extended transmission wires (Kevin P. Lee, 2017, p.284), Shannon addressed this problem in his 1948 paper, The Mathematical Theory of Information. He reduced the core issue to abstract mathematical

principles, attempting to transmit information through encoded symbols (Amr Sherif, 2018, p.183).

The foundation of Shannon's theory is the transformation of problems into sets of probabilistic symbols that are either accepted (shown as 1) or rejected (shown as 0). In order to produce sequences that are processed by including or omitting probability, this produces encoded binary sequences (1-0) that include information (Amr Sherif, 2018, p.183). Though Shannon developed Leibniz's binary system into the concept of information and introduced the bit as the fundamental unit of information, the two ideas were closely related. Binary digits (0 or 1) are represented by bits, and binary symbols larger than eight are expressed as bytes (8 bits = 1 byte) (Amr Sherif, 2018, p.184). Thus, information moves from the originator to the recipient through an abstract mathematical system that translates it into precise quantitative symbols.

The Fourth Revolution—a term coined by Alan Turing and Claude Shannon—saw significant advancements in information science and technology in the years that followed. Numerous philosophical issues affecting the fundamental principle of human selfhood were brought up by this revolution. As a result, an information philosophy that explores issues like existence, epistemology, philosophy of mind, and ethics is required in order to confront the effects of the Information Age on people.

4. The Fourth Revolution: From Information to the Philosophy of Information

The Fourth Revolution has established some of the most significant contemporary concepts, with one of the most crucial being information itself. This idea is multidisciplinary and not limited to any one field of study, which makes it complicated. Because of this, different people have different ideas about what information is, which makes it difficult to define information consistently across the wide range of information-related disciplines.

One of the many disciplines that deals with information is philosophy. Still, information transcends the philosophical framework that gives it its unique study within philosophy when it is treated as a stand-alone concept. As the theoretical foundation for our topic, we will first give concise definitions of information before moving on to the philosophy of information.

a. Information: From an Independent Concept to a Philosophical Concept:

Despite the varied attempts to provide a unified definition of information, it is recognised through several included concepts to frame it within its specific context. For instance, information can be understood as:

- A collection of meanings carried by a set of symbols and signs, or as a tool relying on symbols to influence minds. Davis and Ohlson define it as the processing and organisation of data to make it meaningful to the recipient and to support its actual or perceived value in decisions or actions taken now or in the future (Michael Hill, 2004, p.25).

- Vickery and Vickery argue that information is more than just processed data. The term encompasses all kinds of processed data: facts, interpretations, theories, laws, methods, techniques, tools, problems, and many other things that can alter the recipient's knowledge (Michael Hill, 2004, pp.25, 26).

- According to Michael Hill, information cannot exist on its own. Instead, it is the outcome of perceptual cognition restricted to a particular component, idea, or event through observation. Hill makes a distinction between two types of information: primary information, which is viewed or sensed directly, and secondary information, which is data that is sent from the sender to the recipient using symbols like words, numbers, and images and is then interpreted to provide the necessary information. Information is a collection of conceptual categories that are in line with the logical framework of the seeing mind, which records, interprets, and occasionally modifies our knowledge (Michael Hill, 2004, pp.36, 37).

Information is only recently being conceptualised philosophically. Though information as a subject has always been studied in conjunction with Western philosophy, the area of information philosophy as a separate discipline did not come into being until the second half of the 20th century. Philosophy's interest in information has historically been irregular, with the idea changing throughout time to take on new meanings based on circumstances such as the place and age in which it was researched (Stanford Encyclopaedia of Philosophy, 2020). Consequently, a crucial query emerges: What definition best moves data from a broad field of inquiry into a more specialist area of philosophy?

The philosophy of information can be defined as the philosophical field concerned with the following:

a) A critical study of the fundamental concepts of information and its nature, encompassing its dynamics, applications, and sciences (Luciano Floridi, 2009, p.154): The first part of the concept deals with the philosophy of information as a new field that relies on the traditional Socratic question of essence (What is...?). What is the essential character of information? Is a classic inquiry that is applied to information. As a result, critical inquiry is the main focus of information philosophy as opposed to the quantitative theory of communication data. As a result, the philosophical study of information focusses on the nature of information and how it relates to fundamental philosophical ideas like reality, truth, knowledge, and meaning (Luciano Floridi, 2008, p.114).

b) Development and Application of Information Theory and Computational Methodologies to Philosophical Issues (Luciano Floridi, 2009, p.154): This element deals with the philosophical issues that are affected by the methodological frameworks that are emerging from information science. It entails creating and utilising approaches from computing and information theory in a number of philosophical domains. For instance, the philosophy of information focusses on both information science and philosophy by attempting to reconcile nature (physics) and technology (techno) (Luciano Floridi, 2009, p.155).

Despite the reciprocal influence between information theory and philosophy, philosophy offers two main avenues for addressing philosophical issues:

The current information age prompts the emergence of new philosophical questions. As information becomes a central concern, new enquiries about its implications and effects on our understanding of various philosophical issues arise.

In the context of the information age, the philosophy of information also entails re-examining and maybe resolving traditional philosophical issues (Illari, P. K., Allo, P., Baumgaertner, B., Beavers, A., D'Alfonso, S., Driscoll, P., & Vakarelov, O. 2013, p. 32, 33). Some scholars, for instance, aim to reinterpret the philosophical undertaking by putting information at its centre. They propose that the philosophy of information might take the place of traditional metaphysical frameworks as a new foundational philosophy, albeit one with distinct ontological assumptions. Luciano Floridi argues that modern philosophy is characterised by an existential crisis that information alone can resolve because it is seen as more basic than traditional conceptions of ontology and knowing (Beavers, Anthony F., 2016, p. 17).

b. Key Issues in the Philosophy of Information:

The profound technological effect driving the current Information Age developments has forced a reevaluation of many of the concerns philosophers have addressed throughout history. This necessitates the emergence of new philosophical inquiries aligned with the values of the Information Age and the critical examination of earlier inquiries within the information domain. This begs the question of how knowledge could encourage the formulation of a variety of philosophical queries, as well as questions that challenge established wisdom and are addressed in a fresh context. This leads us to categorise and investigate the Philosophy of Information into multiple issues. The eighteen central issues that Luciano Floridi divided into five main categories are the following: the conceptual study of information, the study of information meaning, the study of intelligence, the study of the relationship between information and nature, and the study of values. These represent the main philosophical issues addressed by the Philosophy of Information (Luciano Floridi, 2011, p. 26).

The issues addressed by the Philosophy of Information within each category are as follows:

a) **The conceptual and semantic study of information raises the following questions:** 1. What is information? 2. What are the dynamics of information? 3. Is a grand, unified theory of information possible? 4. How can data acquire meaning? 5. How can meaningful data acquire its true value? 6. Can information explain the truth? 7. Can information explain meaning? (Beavers, Anthony F., 2016, p. 19).

b) **The study of the relationship between information and nature addresses these issues:** 8. Can information be instantiated? This question relates to the semantic nature that gives meaning to information, and the issue of instantiating information pertains to the possibility of embodying the real within information. 9. Can nature be informationally characterized? 10. What is the ontological status of information? (Luciano Floridi, 2011, p.42,43).

c) **The study of intelligence explores these issues:** 11. Can (forms of) perception be fully analysed in terms of (forms of) information processing at a certain level of abstraction? 12. Can (forms of) natural intelligence be fully and satisfactorily analysed in

terms of (forms of) information processing at some level of abstraction? 13. Can (forms of) natural intelligence be fully and satisfactorily implemented in terms of (forms of) information processing at some level of abstraction? 14. Can an information approach resolve the mind-body duality? 15. How can information be evaluated? 16. If information is inescapable but can only be verified against other information... what does this tell us about our knowledge of the world? 17. Can an information theory serve as a foundation for epistemology? 18. Can science be reduced to modelling information? (Luciano Floridi, 2011, p.38-41).

d) **The study of values raises the following central question:** 18.Can computer ethics be based on philosophical foundations?

The study of intelligence and values are the two main pillars of our research, as they align with the subtitle we will discuss later:

The **study of intelligence** raises a number of problems about information and mental judgement and deals with cognitive issues that can be summed up in the extension of information to epistemology. Knowledge is equal to information plus mental judgement (Michael Hill, 2004, p.42). People may not always accept information that is offered to them as fact; thus, the information we are given needs to be accurate. Thus, information can only become certain when it is mentally examined and elevated to the status of knowledge in our minds (Pieter Adriaans and Johan van Benthem, 2008, p. 30).

The **study of values** focusses on the issue of whether philosophical concepts can serve as a foundation for computer ethics. As the technology and informational landscape continues to evolve, ethical philosophical issues are constantly raised. The framework of computer ethics must address a multitude of concerns posed by the technological environment, including digital privacy, intellectual property, and the effects of digital technology on the human self as an informational entity. Information ethics is therefore viewed as the application side of information study and utilisation (Beavers, Anthony F., 2016, p.25).

Artificial intelligence (AI) is regarded as an appropriate field where values and intelligence research collide. Self-learning artificial intelligence (AI) is an applied result of information technology that imitates natural intelligence capacities, eroding the distinctive intellect characteristic of humans and placing them among informational entities with intelligence (Kevin. P. Lee, 2020, p. 53). Philosophical queries concerning the nature of knowledge generated by artificial and natural intelligence are brought up by this. Important

concerns concerning human values regarding intellectual property, productivity, privacy of knowledge and information, and technical progress are also raised by ethical considerations. As a result, AI serves as a paradigm of representative application in the Philosophy of Information.

c. Artificial Intelligence as an Applied Model in the Philosophy of Information

Philosophers were the main researchers of the nature of the mind and the essence of thought before the developments in technology that led to the creation of computing machines. René Descartes is regarded as one of the most influential philosophers in this field of study because of his contributions to two main problems in philosophy: the ontological question of what makes minds a superior quality in the universe and the epistemological thesis of how to comprehend these superior qualities and realise their reality. Descartes believed that the mind was the essence that could reason its way to the fundamental truths by means of what he called introspection. Even into the 20th century, philosophical research continued to centre on the influence of Cartesian philosophy (Luciano Floridi, 2008, p. 119).

In the 1950s, with Alan Turing's studies on computing, a new field emerged in philosophy based on computation, investigation, and information studies centred on artificial intelligence (AI). The philosophy of mind, originally focused on the nature of the mind, expanded to include studies of AI (Luciano Floridi, 2002, p. 125).

AI is thought of as a logical process built on informational foundations and intended to mimic human cognitive capacities (Brey Philip & Søraker Johnny Hartz, 2009, P, 1369-1370), even though it is categorised under computer science. By bringing intelligence and the mind from the philosophical to the scientific field, artificial intelligence (AI) has the ability to address philosophical questions concerning these phenomena and offer scientific solutions to philosophical problems.

Researchers studying the nature of intelligence have drawn comparisons between artificial intelligence (AI) and human natural intelligence (NEI) to identify salient features and evaluate how well computing devices execute jobs that are traditionally performed by people. A test called the "Turing Test," which links a subject to two sources of responses from two respondents—a human and a machine programmed to respond like a human—is used in one such study. It is the person's responsibility to determine which replies originate from

the machine in order to assess whether or not the machine acts intelligently (Illari, P. K., Allo, P., Baumgaertner, B., Beavers, A., D'Alfonso, S., Driscoll, P., & Vakarelov, O. 2013, p.178).

In response to AI expert Herbert Simon's forecasts that AI could be able to carry out activities similar to those performed by humans, efforts were undertaken to use intelligent computer programs that mimic human cognitive processes to bring AI and natural human intelligence up to par. This strategy, referred to as the cognitive simulation approach in AI, entails developing potent algorithms that mimic human cognitive capacities, verifying the machine's ability to handle information cognitively (Brey Philip & Søraker Johnny Hartz, 2009, P.1370).

As artificial intelligence's algorithmic framework has evolved, it has gained the capacity to participate in deep or reinforcement learning. This entails making amends for past transgressions and laying the groundwork for future decisions that almost entirely eliminate error. As a result, it is anticipated that artificial intelligence (AI) will surpass human functional abilities (Abu Bakr Sultan Ahmed, 2021, p. 8). This raises ethical concerns regarding the existence of an intelligent entity whose cognitive abilities may resemble those of humans and may jeopardise many human traits and functions, possibly even endangering human life in certain situations. As a result, in order to address the numerous issues that pose a threat to human survival from multiple directions, AI ethics must be established.

The role of humans in matters pertaining to trusting computers with sensitive jobs has become questionable if the main goal of AI is to replace people in carrying out tasks that require better cognitive capacities and greater intellectual effort. Who will be accountable, for example, if human casualties result from a computer malfunction? Who will do it—the AI agents themselves, the programmers, or the users? Furthermore, there are important societal ramifications when humans are replaced by machines in a variety of occupations (Brey Philip & Søraker Johnny Hartz, 2009, P.1380). The idea of **"super intelligent AI destroying millions of jobs, replacing lawyers, doctors, journalists, researchers, truck drivers, and taxi drivers, and ultimately controlling humans as if they were pets at best" raises serious concerns**" (Luciano Floridi, 2021, p. 2).

In actuality, Floridi claims that these anti-AI public campaigns represent a serious misrepresentation of AI technology, which has numerous applications for humans, including surveillance and security systems. It is less fanciful than it seems, despite the numerous made-up questions that surround this technology, and laws and regulatory frameworks

pertaining to it will surely be implemented soon. These will set ethical standards and controlled ideals for its use and functionality. Furthermore, the University of Oxford's Digital Ethics Lab (DELab) has generated research outputs on the technological ethics of AI (Luciano Floridi, 2021, p. 2,3).

The lab has identified five fundamental principles that define the technical ethics of artificial intelligence (AI), as follows:

1) **Principle of Benefit:** Enhancing well-being, preserving dignity, and ensuring the sustainability of the planet. This principle aims to make AI technology beneficial for humanity. Sustainability also relates to the ethical use of AI by individuals, encompassing environmental protection to ensure the continuity of life for future generations (Luciano Floridi, 2021, p. 10).

2) **Principle of Privacy, Security, and Caution with Capabilities:** Overuse of AI without considering the caution needed for its technical capabilities may lead to negative consequences, including privacy infringements. Therefore, ethical guidelines are necessary to ensure the safe use of AI (Luciano Floridi, 2021, p. 10).

3) **Principle of Autonomy and Decision-Making Capability:** The use of AI often leads users to relinquish some decision-making powers. It is crucial for individuals to retain this authority, which is vital in their lives, while balancing human autonomy with the delegated autonomy of AI systems.

4) **Principle of Justice:** Promoting prosperity, solidarity, and avoiding injustice. Autonomy in decision-making or the delegative capacity of AI technology cannot be equally distributed among all members of society, leading to disparities in autonomy that are central to the principle of justice. The varying implications of justice suggest a lack of clarity regarding AI, as it is an intelligent agency created by humans, raising a fundamental question: Are we (humans) the patients receiving "treatment" from AI, the doctors prescribing it, or both? Addressing this question necessitates the establishment of a fifth principle (Luciano Floridi, 2021, p. 10).

5) **Principle of Explainability:** Enabling the other principles through clarity and accountability. This principle complements the four others (benefit, non-maleficence,

autonomy, and justice). To address whether we are the doctor or the patient in the AI context, understanding how AI operates and questioning it is essential.

The Principle of Explainability, which encompasses the epistemological meaning of clarity (answering "How does it work?") and the ethical meaning of accountability (answering "Who is responsible for how it works?"), is the missing foundation of AI ethics. It is considered complementary to the four principles, as a complete understanding of AI's functioning is crucial for establishing a system that is beneficial, non-harmful, just, and autonomous (Luciano Floridi, 2021, p. 12).

5. Conclusion

It is clear that the Philosophy of Information has created a new field of study based on the investigation of the field and the nature of the historical changes that gave rise to fresh philosophical issues. It has raised issues regarding the history of information and reinvigorated fundamental philosophical problems about existence, the philosophy of mind, and knowledge. In reference to the question of the individual's inherent worth, which carries implications shaped by knowledge acquired over time, the Information Age has elevated these implications to the level of philosophical and ethical inquiry. This entails discussing matters pertaining to human destiny and defining the moral principles required to uphold human dignity.

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