Intelligent Revolution – a New Civilization and Cognitive Era

Inteligenčna revolucija – nova civilizacijska in kognitivna doba

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ABSTRACT.
The rapid advancement of artificial intelligence is significantly enhancing human capabilities, even as human progress itself appears to stagnate, hindered by decadent ideologies and adverse societal trends. Over the past few decades, AI has achieved remarkable milestones, from mastering complex games to revolutionizing industries such as healthcare and finance through advancements in machine learning, natural language processing, and robotics. A particularly notable achievement is the development of GPT models, which have set new standards in language generation and expanded the horizons of AI's potential. This paper examines the impact of AI on various sectors, including societal and individual cognitive advancements, highlighting both the opportunities and challenges of widespread AI adoption. The discussion focuses on the transformative power of AI technologies and the ethical, economic, cognitive, and social implications of this ongoing revolution. As AI continues to drive innovation and transform industries, humans are increasingly integrating with these technologies through the pervasive use of smartphones, personal computers, and wearable devices. This integration has already enhanced our cognitive and functional capabilities, effectively amplifying human potential. However, as AI's influence on human life deepens, critical questions arise about the future of this symbiotic relationship and the trajectory of societal progress.

POVZETEK
Hitri napredek umetne inteligence izboljšuje človeške zmožnosti, medtem ko se zdi, da človeški napredek stagnira, oviran z dekadentnimi ideologijami in negativnimi družbenimi trendi. V zadnjih desetletjih je UI dosegla izjemne mejnike, od obvladovanja kompleksnih iger do revolucije v panogah, kot sta zdravstvo in finance, z napredki na področju strojnega učenja, obdelave naravnega jezika in robotike. Posebej pomemben dosežek je razvoj modelov GPT, ki so postavili nove standarde v generiranju jezika in razširili obzorja potenciala UI. Ta članek preučuje vpliv UI na različne sektorje, vključno z družbenim in individualnim kognitivnim napredkom, ter poudarja tako priložnosti kot izzive, ki jih prinaša široka uporaba UI. Razprava se osredotoča na transformativno moč UI tehnologij ter na etične, ekonomske, kognitivne in družbene posledice te tekoče revolucije.

Medtem ko UI še naprej spodbuja inovacije in preoblikuje industrije, se ljudje vse bolj integrirajo s temi tehnologijami prek vseprisotne uporabe pametnih telefonov, osebnih računalnikov in nosljivih naprav. Ta integracija je že okrepila naše kognitivne in funkcionalne sposobnosti ter učinkovito pomnožila človeški potencial. Ko vpliv UI na človeško življenje narašča, se pojavljajo ključna vprašanja o prihodnosti tega simbiotičnega razmerja in o smeri družbenega napredka.

KLJUČNE BESEDE
Umetna inteligenca, simbioza med človekom in strojem, tehnološki napredek, kognitivni vpliv

KEYWORDS
Artificial Intelligence, Human-Machine Symbiosis, Technological Advancement, Cognitivel Implications

1 Introduction

The rapid development of artificial intelligence (AI) is transforming industries and redefining/improving the essence of human capabilities. While AI progresses at an unprecedented pace, human societal progress appears to be stagnating, increasingly entangled in decadent ideologies and negative societal trends. This duality between AI's rise and human inertia is critical to understanding the current technological landscape. Over recent decades, AI has achieved remarkable milestones, including mastering complex games like Go and chess, advancing natural language processing (NLP), and driving significant innovations in sectors such as healthcare and finance. For example, the development of GPT (Generative Pre-trained Transformer) models represents a breakthrough in AI's ability to

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generate human-like text, setting new standards for machine language generation and understanding [1, 2].

This paper examines the transformative potential of AI across various sectors, including healthcare, finance, education, and entertainment, highlighting both the opportunities and challenges that accompany widespread AI adoption. In recent years, significant advancements in AI have occurred at an accelerating rate. For example, breakthroughs in reinforcement learning and unsupervised learning have expanded the capabilities of AI systems, with applications ranging from autonomous vehicles to sophisticated recommendation systems [3]. Additionally, the ethical, economic, cognitive, and social implications of AI's proliferation are increasingly coming to the forefront, as debates intensify over issues such as algorithmic bias, privacy, and the potential for AI to displace human jobs [4]. These discussions underscore the need for robust governance frameworks to ensure that AI technologies are developed and deployed responsibly [5].

As AI technologies like machine learning, NLP, and robotics continue to evolve, they increasingly integrate into human life, augmenting cognitive and functional abilities through ubiquitous technologies such as smartphones, personal computers, and wearables. This integration, often referred to as a form of human-AI symbiosis, has already multiplied human potential, enabling tasks and processes that were previously unimaginable [6]. The consequences of this symbiotic relationship are profound, raising critical questions about the direction of societal progress and the future of humanity as AI [7, 8] becomes more embedded in everyday life.

We analyze the implications of AI's rapid development, particularly the considerations that must be addressed to navigate the ongoing AI revolution effectively. By integrating recent scholarly insights with a broader analysis of AI's impact, this paper seeks to contribute to the understanding of how AI is reshaping industries and human capabilities, as well as the future trajectory of this unprecedented technological evolution.

2 AI progress

A recent and transformative achievement is the development of Generative Pre-trained Transformers. These models represent a leap forward in natural language processing, capable of generating human-like text, translating languages, and even writing code. The GPT-3 model, released by OpenAI in 2020, is particularly notable for its ability to perform a wide range of tasks with minimal input, showcasing the power and versatility of large-scale language models [9].

Here we present one major achievement over the last five years, having in mind the constant AI progress in areas like autonomous driving or pattern recognition:

2019: AlphaStar in Real-Time Strategy Games

In 2019, DeepMind's AlphaStar achieved a significant milestone by reaching the top players of professional StarCraft II play, a complex real-time strategy game that requires long-term planning, resource management, and real-time decision-making. This achievement underscored the potential of AI to operate in dynamic and highly strategic environments, far beyond turn-based games like Go [10].

2020: GPT-3

The release of GPT-3 by OpenAI in 2020 marked a significant advance in the field of NLP. GPT-3, with 175 billion parameters, demonstrated unprecedented language generation capabilities, performing tasks such as translation, summarization, and question-answering with high proficiency and minimal fine-tuning. It set a new benchmark for the potential of AI in creative and linguistic tasks [9].

2021: DeepMind's AlphaFold 2 in Protein Folding

In 2021, AlphaFold 2, developed by DeepMind, solved one of biology's greatest challenges by predicting protein structures with remarkable accuracy. This breakthrough has significant implications for drug discovery, understanding diseases, and designing new biological processes, demonstrating AI's potential to revolutionize the life sciences [11].

2022: DALL-E 2 and Image Generation

OpenAI's DALL-E 2, released in 2022, demonstrated the power of AI in generating highly detailed and creative images from text descriptions. This model pushed the boundaries of AI in the visual domain, showcasing its ability to combine artistic creativity with technical precision, and opening new possibilities in design, marketing, and entertainment [12].

2023: GPT-4 and Multimodal AI

In 2023, OpenAI introduced GPT-4, which expanded the capabilities of its predecessor by being multimodal—able to process and generate both text and images. GPT-4's ability to handle complex queries across different formats has made it a powerful tool for applications in education, customer service, and creative industries, further blurring the distinction between products of human and machine intelligence [13].

The last five years have seen groundbreaking AI achievements each year that have pushed the boundaries of what AI can do. From mastering strategic games and understanding protein structures to generating high-quality text and images, AI's progress continues to accelerate, bringing us closer to a future where AI plays an integral role in nearly every aspect of society. In the next section, we examine human progress.

3 Impact of AI progress across various fields

As AI continues to evolve, its influence is expected to permeate multiple sectors, driving innovation and transformation. This section analyzes the potential impact of AI across key fields such as healthcare, finance, education, entertainment, and transportation, highlighting both the opportunities and challenges these advancements may bring.

Healthcare: AI has the potential to revolutionize healthcare by improving diagnostics, personalized medicine, and patient care. Machine learning algorithms are already being used to analyze medical images with greater accuracy than human radiologists, and AI-driven predictive analytics are helping to identify at-risk patients before conditions worsen. Additionally, AI can streamline administrative processes, reducing the burden on healthcare professionals and allowing for more efficient patient management. The integration of AI in healthcare is expected to lead to better patient outcomes, lower costs, and a more proactive approach to health management [14]. The JSI team is in the last phases of donating a home doctor system to all Slovenians.

Finance: The finance industry is experiencing significant transformations due to AI, particularly in areas such as algorithmic trading, risk management, and fraud detection. AI algorithms can analyze vast amounts of financial data in real-time, enabling more informed and faster decision-making. These technologies also enhance the accuracy of credit scoring and personalized financial advice, offering tailored solutions to individual customers. However, the increased reliance on AI also raises concerns about market stability, ethical use of data, and the potential for systemic risks [15].

Education: AI is poised to transform education by providing personalized learning experiences, automating administrative tasks, and enabling new forms of interactive learning. AI-driven adaptive learning systems can tailor educational content to the needs of individual students, allowing for more effective learning outcomes. Additionally, AI can assist teachers by automating grading and providing real-time feedback, freeing up more time for personalized instruction. GPTs further offer significant improvements in education. Integrating AI in education also presents challenges, such as ensuring equitable access to AI-driven tools and addressing concerns about data privacy [16]. At JSI, we tested the quality of various GPTs on educational tasks.

Entertainment: The entertainment industry is undergoing a significant shift due to AI's capabilities in content creation, recommendation systems, and audience engagement. AI-generated music, art, and scripts are becoming increasingly sophisticated, thus differentiating between products of human and machine creativity as often impossible. Recommendation algorithms, powered by AI, personalize content delivery to users, enhancing their experience and increasing engagement. However, this rise in AI-generated content raises questions about the future of human creativity and the potential for AI to disrupt traditional content production models [17]. Recommendation algorithms were one of the central parts of the H2020 smart-city Urbanite project with most of the software developed at AI.

Transportation: AI is driving innovation in transportation through the development of autonomous vehicles, smart traffic management systems, and predictive maintenance. Self-driving cars, powered by AI, promise to reduce accidents, lower emissions, and increase the efficiency of transportation networks. AI can also optimize traffic flow and reduce congestion through real-time data analysis and adaptive traffic control systems. However, the widespread adoption of AI in transportation faces challenges related to safety, regulatory frameworks, and public acceptance [18].

In the next section, human progress and integration with AI are presented.

4 Human progress including merging with ICT and AI

4.1 Historical overview of human progress

Human progress is a story of relentless evolution and technological advancement, spanning millions of years. Beginning around six million years ago, the earliest hominins diverged from the common ancestor we share with chimpanzees, marking the start of a journey toward modern humanity. One of the earliest major milestones was the development of bipedalism, which allowed early humans to travel long distances and use their hands for tool-making. The invention of tools around 2.6 million years ago further distinguished our ancestors, enabling them to manipulate their environment in unprecedented ways.

Approximately 200,000 years ago, Homo sapiens emerged, equipped with greater cognitive abilities and complex language, facilitating social structures and cultural developments that set the stage for future innovations. The advent of agriculture around 10,000 years ago marked a fundamental shift in human society, leading to settled communities and the eventual rise of civilizations.

Fast forward to the Industrial Revolution in the 18th century, human progress accelerated dramatically. Innovations in machinery, transportation, and communication reshaped societies, laying the groundwork for the Information Age. The 20th century saw rapid technological advances, including the development of the computer, the internet, and the beginnings of artificial intelligence, all of which have profoundly impacted human life.

4.2 Recent progress: merging with ICT and AI

In the past few decades, the convergence of information and communication technologies (ICT) and artificial intelligence has fundamentally altered the trajectory of human progress. This merger has enhanced human capabilities and begun to blur the lines between human and machine intelligence, creating a symbiotic relationship reshaping society.

Mobile Phones: One of the most transformative technologies of the late 20th and early 21st centuries is the mobile phone. Introduced commercially in the 1980s, mobile telephones rapidly evolved from simple communication devices to powerful, multifunctional tools. The advent of smartphones in the 2000s, with their integration of internet access, GPS, and a multitude of applications, significantly enhanced human connectivity and access to information. Today, smartphones are essential tools for both personal and professional life, facilitating real-time communication, social networking, and a vast array of digital services [19].

The Internet and Cloud Computing: The development of the Internet in the late 20th century and the rise of cloud computing in the early 21st century have revolutionized how humans interact with information and each other. The internet has democratized access to knowledge, enabling global communication and collaboration, while cloud computing has made vast computational resources and storage available to individuals and organizations alike. These technologies have increased productivity and laid the foundation for the widespread deployment of AI systems, which rely on large datasets and significant computational power [20].

Generative Pre-trained Transformers: The recent advancements in AI, particularly with the development of GPTs, represent a significant leap in the merging of human capabilities with machine intelligence. GPT-3, introduced in 2020, demonstrated the ability to generate coherent and contextually relevant text based on minimal input, performing a wide range of tasks such as translation, summarization, and even creative writing. GPT-4, released in 2023, expanded on this by incorporating multimodal capabilities, processing both text and images, and further enhancing human-machine interaction [13]. These models are not just tools but extensions of human

cognitive abilities, enabling users to perform tasks that require complex reasoning and linguistic skills with the assistance of AI.

Wearable Technology and Augmented Reality: Wearable devices, such as smartwatches and fitness trackers, have integrated AI into daily life, monitoring health metrics and providing real-time feedback to users. These devices exemplify the merging of human biology with technology, offering new ways to enhance physical and cognitive performance. Augmented reality (AR) technologies are also becoming increasingly prevalent, overlaying digital information onto the physical world and creating immersive experiences that enhance learning, navigation, and entertainment [21].

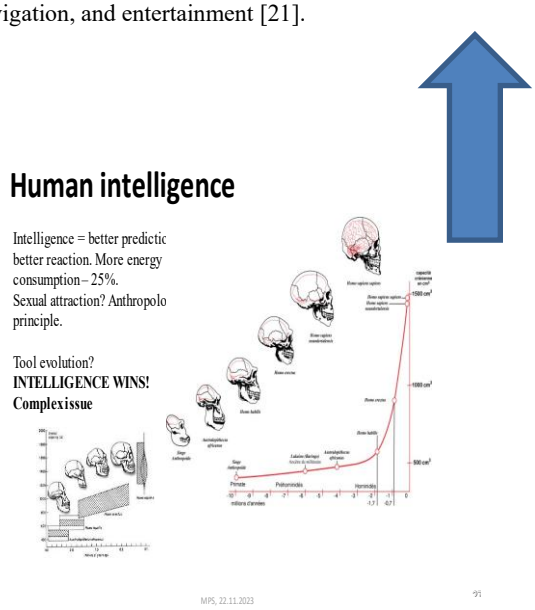

Figure 1: Progress of the human brain and intelligence. Source of the draft (modifications original): https://www.aquatic-human-ancestor.org/anatomy/brain.html

Human progress, from the earliest hominins to the modern age, has been marked by the continuous development and integration of technologies that enhance human capabilities. In recent decades, the merging of ICT and AI with human activities has accelerated this progress, creating a symbiotic relationship that extends human cognitive and physical abilities. Technologies such as mobile phones, the internet, GPT models, and wearable devices have not only transformed how we live and work but have also set the stage for future advancements that may further blur the lines between human and machine intelligence.

The key idea of this overview is that humans and user interfaces are already deeply intertwined, both through physical hardware like mobile phones and more abstract systems such as software and information networks. As these systems fast become more sophisticated, they enhance human cognitive, intellectual, and mental functions, effectively expanding our capacities. This growing interconnection between humans and technology echoes the concept of *cyborgization*, where external devices supplement and expand the functions of the human mind. The development of smartphones, wearable technology, and even future brain-computer interfaces suggests that this synergy is only deepening. Contrary to claims that our brain size is deteriorating, the measure of human intellectual capacity should now include not just our innate abilities but also the external systems that augment them [19].

The view that technology significantly enhances human cognitive ability aligns with Harari's notion of humans becoming "cyborgs" as they increasingly rely on tools that supplement mental processes. Similarly, [22] discusses the extended mind theory, which posits that external tools, such as smartphones, are integral components of the human cognitive system, challenging the notion that brain size or biological limitations strictly define mental capacity. These technological extensions of human cognitive ability have created new frameworks for evaluating our intellectual potential, making it more accurate to assess human functionality in a combined system of biological and technological entities.

The emergence of human-like properties such as consciousness [23], observed in advanced GPT models, represents a pivotal step in the evolution of artificial intelligence and human progress. These models, capable of understanding and generating natural language, are beginning to mimic forms of cognitive processes, thus contributing to what could be described as the dawn of a new "intelligent era." This era, driven by AI's ever-increasing capabilities, promises a deeper integration between human cognition and machine intelligence, potentially fostering innovations in problem-solving, creativity, and the expansion of knowledge.

Researchers like David Chalmers have explored the idea that AI systems, such as GPT models, may embody elements of extended cognition, which can extend human cognitive abilities beyond their biological limits. The more these models evolve, the more they may contribute to an era where AI complements human intelligence in unprecedented ways, leading to new forms of civilization that heavily rely on intelligent systems to solve complex global challenges [7, 22].

Figure 1 illustrates the functional growth of human problem-solving capabilities, driven by the integration of ICT and AI solutions, which serve as amplifiers of natural intelligence. Human cognitive abilities are being multiplied several times through this merger with ICT and AI, as represented by the blue arrow. While the original figure without the blue arrow shows the increase in human skull volume, and thus brain size, the blue arrow highlights the exponential growth in problem-solving capacity. A simple analogy can be drawn: consider a person walking barefoot versus using a car or plane. The speed of movement changes dramatically, even though the human's physical body remains unchanged. Similarly, while human biology (the brain) did not improve, the ability to tackle complex tasks surged drastically with the aid of ICT and AI

5 DISCUSSION

In recent years, there has been growing concern that Western civilization is experiencing a period of decline, marked by political fragmentation, cultural disintegration, and economic challenges. Scholars have pointed to a loss of social cohesion, declining institutional trust, and the rise of non-productive and conflicting ideologies [24, 25].

On the other hand, the rapid advancements in artificial intelligence are driving unprecedented changes across various

fields, fundamentally altering the landscape of industries and society. As AI technologies continue to evolve, they offer both tremendous opportunities and significant challenges that require careful consideration.

Balancing Innovation with Ethical Concerns: One of the primary discussions surrounding AI is the balance between innovation and ethical considerations. AI has the potential to revolutionize fields like healthcare, finance, education, and transportation by improving efficiency, accuracy, and personalization. However, these advancements also raise critical ethical questions, particularly regarding data privacy, algorithmic bias, and the potential for AI to perpetuate or exacerbate existing inequalities. For example, while AI-driven personalized medicine can enhance healthcare outcomes, it also risks marginalizing those without access to the necessary technology or data [14].

Moreover, the use of AI in finance, particularly in areas like algorithmic trading and credit scoring, has the potential to deepen economic disparities if not carefully regulated. The challenges of ensuring fairness, transparency, and accountability in AI systems are significant and demand robust governance frameworks to prevent misuse or unintended consequences [15].

The Human-AI Symbiosis: Another crucial aspect of the discussion is the growing symbiosis between humans and AI. As humans increasingly rely on AI technologies in daily life—through smartphones, wearables, and AI-powered applications—there is a merging of human and machine capabilities. This integration has the potential to significantly enhance human cognitive and physical abilities, leading to what some describe as an augmented human experience. However, this symbiosis also raises questions about dependency, control, and the future of human autonomy. As AI systems become more embedded in decision-making processes, it is essential to consider how these technologies may influence human behavior, decision-making, and even identity.

The development of AI models like GPT-4o has shown how closely intertwined human and machine intelligence can become. These models have not only expanded the possibilities of human-machine interaction but have also challenged our understanding of creativity, communication, and the nature of intelligence itself. As AI continues to evolve, it will be crucial to monitor and understand the long-term implications of this symbiotic relationship on human society and culture [13].

The author of this paper continuously highlights the significance of this merging, noting that the increasing integration of AI into human life first of all augments human capabilities but also to a certain degree presents complex ethical and philosophical challenges. As AI begins to mirror human-like consciousness in certain aspects [22], the line between human and machine products is becoming increasingly blurred, raising questions about the future of this relationship and the implications for human identity and autonomy [23]. The level of consciousness in large language models (LLMs), evaluated through Tononi's axioms of intelligence, was found to be significantly below that of human consciousness, but notably improved compared to earlier AI systems [23].

The Future of Work and Society: AI's impact on the workforce is another critical area of discussion. While AI can enhance productivity and create new opportunities, it also poses a significant threat to traditional job roles, particularly in industries where automation can replace human labor. This shift could lead to widespread job displacement, necessitating a rethinking of economic structures, education systems, and social safety nets to address the needs of a rapidly changing labor market [16].

The potential for AI to drive social and economic inequality is a pressing concern. Without proactive measures to ensure equitable access to AI technologies and to address the disparities that may arise from AI-driven economic shifts, society risks deepening existing divides. One of the best solutions is introducing the AI courses already in elementary schools.

Navigating the AI Revolution: As AI continues to advance, society is at a crossroads, faced with the task of navigating the complexities of the AI revolution. The potential benefits of AI are immense, but there are also certain risks. Ensuring that AI technologies are developed and deployed responsibly will require a concerted effort from governments, industry, academia, and civil society. This includes developing ethical guidelines, regulatory frameworks, and educational initiatives that can help society adapt to the changes brought about by AI. At the same time, these regulations should first of all enhance proper progress, research and development, and not pose additional bureaucratic burdens.

In cognitive terms, GPT models represent a promising approach to creating forms of artificial consciousness and cognitive information beings. These models simulate aspects of human cognition, such as language understanding and generation, by mimicking neural networks that resemble the processing of human brains. As they evolve, GPTs could potentially help us explore and understand the fundamental components of human consciousness, offering insights into both artificial and human cognition [26].

In conclusion, the discussion surrounding AI is multifaceted, touching on ethical, social, economic, and technological dimensions. As we advance, it is essential to balance harnessing AI's potential with addressing the challenges it brings, such as bias, privacy concerns, and the risk of job displacement. By proactively engaging with these issues, we can ensure that the AI revolution creates a future that is not only innovative but also promotes individual and societal human progress. Despite the ongoing debates and misunderstandings, the transition toward an information-driven era seems inevitable, as AI continues to integrate into every facet of human life, shaping our collective destiny.

Tool Usage: ChatGPT-4o and various grammar and word processing tools were applied to enhance the language quality. ChatGPT was also employed periodically to refine informal draft ideas into well-structured, formal text. The text was regardless of the language modifications finally examined and modified by the author.

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