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Expertise of Digital Reality as a Factor of Achieving Society Stability Under Stochastic Conditions (Uncertainty, Instability, Bifurcation)

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Abstract

The paper presents an analysis of artificial intelligence as the most recent phenomenon induced by the technological breakthrough of the Fourth Industrial Revolution. On the one hand, it may change economic progress; on the other hand, it brings risks and challenges for all of humanity. The purpose of the study is to conceptualize artificial intelligence as a phenomenon, a dynamic process, and a research result of a number of scientists. It represents a complex system for analysis, to which the AGILE methodology is applied. Research Objectives are: to illustrate the dynamics of the evolution and development of artificial intelligence as the principal decisive force that could potentially change humanity; to identify artificial intelligence (AI) as a factor in economic restructuring; to define areas of advancement in artificial intelligence; to highlight the advantages of augmented reality in the context of digital technology development; to uncover the risks and threats associated with artificial intelligence. In this context, the authors suggest developing specific practical recommendations to enhance the future control of artificial intelligence.

Keywords
artificial intelligence, AGILEmethodology, complex systems, augmented reality, risks and threats

Introduction

The significance of investigating this subject lies in the fact that artificial intelligence holds the potential to reshape the global economy and world dynamics (Wall, 2018). Technology based on artificial intelligence offers solutions to various challenges while also introducing risks and uncertainties, including security concerns and the potential for job displacement and unemployment (Kaplan & Haenlein, 2020; see also Briscoe & Fairbanks, 2020; Makridakis, 2017; Panch et al., 2019; Rampersad, 2020). Certainly today, artificial intelligence is hardly the most sought-after area for scientific interdisciplinary research (Balmer et al., 2020; De Lamotte, 2020; Górriz et al., 2020; Greenhill & Edmunds, 2020; Robinson, 2020). The era of computing has introduced artificial intelligence, a critical factor shaping the future of humanity, impacting diverse aspects of human existence including health, medicine, agriculture, transportation, environmental issues, and poverty alleviation (Voronkova, 2010). The primary goal of this research is to conceptualize artificial intelligence as a multifaceted phenomenon, a dynamic process, and an outcome arising from the collaborative efforts of numerous scientists.

The Specific Objectives of This Study Include:

- Tracing the evolutionary journey of artificial intelligence's emergence and advancement as a pivotal driving force capable of revolutionizing humanity.
- Exploring artificial intelligence (AI) as a catalyst for redefining economic structures.
- Identifying the trajectories of artificial intelligence's development.
- Illustrating the benefits of augmented reality within the context of digital technology progress.
- Uncovering the potential risks and threats associated with artificial intelligence.
- Formulating practical recommendations tailored to effectively manage and regulate artificial intelligence in the future.

The research methodology

The research methodology employed in this study involves the application of the AGILE-methodology and AGILE-philosophy. Also known as agile software development, these methodologies represent a comprehensive framework that is suitable for analyzing complex systems. In the context of our research on artificial intelligence, these methodologies encompass a range of methods and techniques derived from various approaches to high-level software development. They are underpinned by the principles outlined in the "Manifesto for Agile Software Development" and serve as a means to understand the essence of complex systems, their objectives, functions, and societal roles. This methodology facilitates iterative changes at all stages of system enhancement through reflective practices. It provides specific action algorithms and agile management tools for overseeing processes, products, and businesses, utilizing AGILE as both a family of agile approaches and a philosophical value system. Initially rooted in the IT domain, AGILE-methodology and AGILE-philosophy have extended their influence to diverse fields, including artificial intelligence. This encompasses methodologies such as Scrum, known for its structured approach, and Kanban, recognized

for its emphasis on balance. These methodologies hinge on individual responsibility and contribute to fostering positive user experiences and successful product outcomes. In the words of Academician Oleg Maltsev (2020), a scientist's pursuit entails assuming responsibility for studying an abstract category — be it a phenomenon, problem, or concept — and methodically transforming it into an applied category through various stages of investigation.

AGILE, referring to agile development methodologies, is a project management and software development approach emphasizing flexibility and adaptability to changes during the work process. AGILE includes various methodologies and philosophies aimed at enhancing project management efficiency. The AGILE methodology and AGILE philosophy include:

1. Scrum stands out as one of the most popular AGILE methodologies. It introduces distinct roles (Product Owner, Scrum Master, and development team), events (Sprint, Sprint Planning, Daily Scrum, etc.), and artifacts (Product Backlog, Sprint Backlog, and Increment) to facilitate well-organized and effective project management.
2. Kanban revolves around visualizing workflow and overseeing task flow. Tasks are represented through cards, and their progression on the board mirrors the current state of execution. This methodology is crafted to enhance efficiency and minimize development cycle time.
3. Extreme Programming (XP) is a methodology that underscores technical facets of development, including testing, feedback, and code improvement. It also places significant emphasis on team communication and short development cycles.

AGILE characteristics:

1. Flexibility and Adaptability: AGILE is fundamentally centered on flexibility and the capacity to adapt. It involves working in small iterations, enabling swift responses to new requirements or changes in external conditions.
2. Collaboration and Communication: AGILE places a strong emphasis on close collaboration among team members and stakeholders. Communication is deemed a pivotal element in the success of the development process.
3. Continuous Improvement: The AGILE philosophy advocates a continual commitment to enhancing development processes. Regular reviews and retrospectives are instrumental in identifying areas for improvement.
4. Delivering Value to the Customer: AGILE philosophy prioritizes delivering value to the customer, with a focus on meeting their needs and expectations. AGILE acknowledges the significance of early delivery of value to the customer in the development process. This is realized through incremental delivery, as seen in Scrum, where each sprint introduces new functionality.
5. Self-Organization and Responsibility: AGILE promotes team self-organization and individual accountability. Each team member is expected to make decisions and oversee their own tasks.

AGILE methodologies, along with the overarching AGILE philosophy, establish a foundation for efficient project management, particularly amid swiftly changing requirements and market conditions. These approaches foster collaborative creativity, communication, and ongoing process improvement.

Results

1. The Evolution of the Origin and Advancement of Artificial Intelligence as a Significant Transformative Power Capable of Altering the Course of Humanity

The realization of humanity's grand aspirations and potential is embodied in Artificial Intelligence (AI), an outcome stemming from the visionary leadership and prolonged collaboration among scientists and managers spanning several decades of development. This endeavor culminates in the formation of the Global Alliance on AI, a platform fostering bold

progress. A pivotal avenue for catalyzing transformative change is the swift establishment of the Global Alliance on AI, rallying companies with vested interests in AI advancement. Within the realm of AI lie crucial components such as deep learning, machine perception, deep neural networks, multi-agent systems (MAS), and advanced data analytics, all integral to future growth. Researchers persistently refine these elements, setting higher standards and proposing superior strategies for AI's evolution. This, in turn, contributes to robust safeguards for fundamental human rights rooted in collaboration and trust. At its core, the concept of artificial intelligence revolves around aiding humanity foremost, heightening competitiveness within the AI domain, and securing global leadership positions in the AI market. Notably, more than 30 countries, including Canada, Singapore, China, Kenya, Denmark, and France, are presently enacting national strategies for AI development. These strategies hinge on establishing roadmaps to navigate the intricate yet promising landscape of this ultra-complex industry. Such concerted efforts aim to foster the creation of technological components that stimulate AI's advancement.

The influence of artificial intelligence has seamlessly integrated into our modern lives. This trend aligns with the presence of robots and machines in our surroundings, often following well-defined programmed algorithms. Innovations like Apple's Siri, Microsoft's Cortana, and Amazon's Alexa have democratized access to AI for ordinary individuals. Presently, spirited debates envelop AI-equipped robotic programs, especially within the context of envisioning smart societies and technologies.

2. The Role of Artificial Intelligence in Economic Transformation

The influence of Artificial Intelligence (AI) is reshaping the digital economy and is on the verge of revolutionizing the traditional physical economy. In the early 21st century, AI is aiding devices in navigating the physical realm and fostering connections between humans and computers. Looking ahead, AI systems are expected to tackle systemic challenges and address complex issues beyond human capacity, even extending to overseeing fundamental policing functions. This evolving landscape of AI is leading to digital multiculturalism, fostering intercultural communication and integration. This, in turn, drives shifts in language practices, leading to new ways of perceiving reality and transforming societal values and meanings. This transformation necessitates novel communication approaches, shaping fresh competencies in information and communication technologies, and driving the advancement of these technologies (Voronkova & Sosnin, 2015).

3. Directions of Artificial Intelligence Development

All trajectories of artificial intelligence development contribute to business growth, heightened customer loyalty, and increased profits (Di Vaio et al., 2020; Makarius et al., 2020; Paschen et al., 2020; Vocke et al., 2019). The primary avenue in AI development involves real-time operations, processing extensive data volumes, identifying resemblances and disparities. In sectors such as medicine, it aids early-stage diagnostics; in finance, it combats payment card fraud and handles financial transactions. These capabilities can equally be employed for security monitoring and addressing climate change challenges.multiple fronts.

The second trajectory of artificial intelligence advancement involves the rapid generation of myriad scenarios and templates, utilizing Big Data to test concepts. In this way, artificial intelligence aids in finding solutions to intricate problems by evaluating their practical implementation (Oleksenko, 2020).

The third trajectory of artificial intelligence development is enabling merchants to craft personalized offers for customers, akin to the features seen in platforms like Netflix. It also involves testing product names to gauge customer perception.

The fourth avenue of artificial intelligence evolution encompasses the capacity to process diverse formats such as images, videos, and music files. This results in extensive volumes for analysis (modern phones can recognize users' voices, lawyers can access data on similar cases from legal practices, and artificial intelligence can interact with the environment by receiving data from other systems and sensors, aiding navigation, and controlling machinery).

With these capabilities in mind, artificial intelligence can perform various functions: learning, comprehension, logical reasoning, and interaction. Artificial intelligence finds applications in: (a) safeguarding data and ensuring security; (b) detecting fraud in the financial sector; (c) diagnosing human diseases and predicting potential illnesses based on markers; (d) personalized marketing and customer information retrieval; (e) speech recognition enhancing customer service in contact centers; and (f) integration of intelligent machines into the Internet, learning human habits and preferences to enhance daily life within the context of a smart society and smart technology. Neurointerfaces, reliant on human-machine interaction, provide direct access to computing capabilities like data storage and rapid, accurate calculations (Andriukaitiene et al., 2017).

4. Advantages of Augmented Reality in the Digital Technology Landscape.

Positive outcomes of this phenomenon encompass: (a) streamlining supply chains and logistics; (b) increased leisure time; (c) enhanced treatment results; (d) broader access to resources; and (e) reshoring – substituting foreign labor with automated systems.

In the realm of robotization and artificial intelligence, it is widely acknowledged that computer programs can outperform human experts in chess, and computers excel in calculations, a phenomenon highlighted during the Fourth Industrial Revolution (Schwab, 2017). Concurrently, there's a prevailing belief that ethical boundaries exist for information technology, as the advancing ability to manipulate two fundamental forms of information – biological and computational, the byte and the genome – could lead to the emergence of higher entities. As humanity grapples with the perceived threats and challenges posed by artificial intelligence, a thorough discourse is necessary to explore the potential trajectories that information technology may chart, encompassing both opportunities and risks.

Augmented reality (AR) directly enhances the physical environment through a computer screen or even a mobile phone in real time. It overlays additional digital information, alternative images, and GPS data. Unlike virtual reality, which constructs entirely fabricated worlds, augmented reality enhances real-world perception by superimposing valuable data onto objects, reinforcing the meaningful indices of artificial intelligence. Augmented reality (AR) can be harnessed across various devices equipped with embedded sensors and cameras, including smartphones, tablets, glasses, and even contact lenses. Forecasts indicate that a substantial 2.5 billion augmented reality (AR) applications will be downloaded and utilized on devices in the near future. The advantages of employing such applications are highly compelling, and major corporations are already showcasing practical applications. The evolution of digital technologies is closely intertwined with robotics, which is progressively endowed with supplementary functionalities such as high-quality video cameras and sensor devices. In accordance with Dr. Maltsev's perspective, contemporary realities define new avenues for applied research; notably, due to the rapid technological advancements, the realm of physical existence is increasingly merging with the digital sphere. Consequently, this pattern necessitates novel approaches to system security that align with the requisites and parameters of the 21st century (Maltsev, 2020).

5. Risks and Threats of Artificial Intelligence

The potential risks and threats posed by artificial intelligence have been noted throughout history. Even as far back as Charles Percy Snow, the duality of technology was observed, as it delivers substantial data alongside potential harm (Lewis, 1971). Prominent figures in the field of computer science have consistently cautioned about the dangers associated with artificial intelligence. The creation of super-intelligent intelligence presents an unprecedented challenge, making accurate predictions exceedingly difficult.

The Internet and the intricacies of flawless communication are not inherently malevolent; when wielded skillfully with a dependable approach, the Internet bestows benefit (Maltsev, 2020). Today, universal computerization and our increasing dependence on it have left humanity apprehensive. Our susceptibility to its influence exposes vulnerabilities. The modern system

complexity and the expanding web of interconnections between them have created an environment where certain groups exploit vulnerabilities to our collective detriment. Organized criminals, hackers, and various types of wrongdoers, infiltrating governments, statesmen, and terrorists, vie to control cutting-edge technology for personal gain. No computer system in the United States is impervious to cybercriminal intrusion, with attackers bombarding it with vast amounts of data. An illustrative case occurred in Saudi Arabia, where hackers employed a potent virus to erase information from 75% of a company's computers, equating to 30,000 devices (Harris, 2015). Their intention seemed to be disrupting oil and gas production, causing the virus to obliterate files, spreadsheets, and documents. Some U.S. officials speculated that Iran orchestrated the attack as retaliation for the Stuxnet worm's deployment. If proven true, such actions would escalate international cyber warfare, underscoring that the U.S. will not leave cyber assaults unanswered. Consequently, the issue of economic security remains paramount (Cherep, 2010).

Discussion

Artificial Intelligence (AI) possesses the potential to emerge as a transformative force, profoundly affecting humanity and influencing various facets of our lives. Here are several areas where AI could exert a substantial impact:

1. Medicine: AI has the potential to enhance the diagnosis and treatment of diverse diseases, contributing to the development of novel drugs and treatments. Medical algorithms and neural networks are currently employed for analyzing medical data and processing images.
2. Autonomous vehicles: AI plays a pivotal role in advancing autonomous cars and unmanned drones, fostering the potential for safer and more efficient transportation systems, thereby mitigating accidents and reducing pollution.
3. Manufacturing and automation: AI stands to enhance manufacturing processes, optimize supply chains, and decrease the costs associated with labor-intensive operations. The application of machine learning can further refine robots and automated systems.
4. Energy: AI offers the potential for optimizing energy distribution, forecasting energy consumption and production, contributing to the alleviation of environmental stress, and enhancing energy efficiency.
5. Education: AI can enhance personalized learning and adaptive education systems, improving the effectiveness of education for students.
6. Finance: AI is employed for market analysis, trend prediction, risk identification, and enhancement of investment management in the financial sector.
7. Communications and Language: AI has the capability to enhance automatic translation, voice assistants, chatbots, and speech recognition systems, thereby streamlining and improving communication efficiency.
8. Ecology and Environment: AI applications include environmental monitoring, prediction of natural disasters, and the formulation of strategies to minimize humanity's impact on nature.

Nevertheless, it is crucial to bear in mind that the advancement of AI brings forth significant ethical, legal, and safety considerations. The utilization of AI necessitates meticulous regulation and oversight to avert potential adverse outcomes and guarantee alignment with societal norms and values. Alongside the prospective advantages and transformations linked to AI utilization, there exists a range of challenges and concerns that warrant consideration:

1. Ethical Concerns: The deployment of AI in life and health, defense, and various decision-making processes prompts inquiries regarding integrity, equity, and accountability. How can ethical and regulatory compliance be assured in systems developed and trained by AI?

2. Security and Privacy: As automation and data collection expand, the escalation of threats to information security and privacy becomes more pronounced. How can we guarantee the safeguarding of data and systems against hackers and malicious actors?
3. Employment Dynamics and Human Roles: AI-facilitated automation may lead to diminished demand for specific types of labor and evolving skill requirements. How can workers be effectively retrained and upskilled to navigate and adapt to these new realities?
4. Limitations and Misuse: The potential for AI misuse, such as the automated spread of misinformation and the manipulation of elections, poses a significant risk. How can robust controls and regulatory measures be implemented to prevent such misuse?
5. AI Dependence and Governance: Questions arise regarding the extent to which society is becoming reliant on AI and the governance and oversight mechanisms required to ensure the stability and security of AI systems.
6. Exacerbation of Inequalities: Artificial intelligence has the potential to amplify existing social and economic disparities, particularly if access to AI technologies is restricted and uncontrolled automation results in job reductions. Policies and measures must be formulated to mitigate these inequalities and ensure equal opportunities.
7. Transparency and Explainability: Ensuring transparency and explainability in AI systems, particularly in critical decision-making scenarios, is crucial. The ability to explain AI decisions fosters accountability and user trust in these systems.
8. Sociocultural and Psychological Impact: The implementation of AI has the potential to influence sociocultural and psychological aspects of life, including relationships, work, education, and personal life. It is imperative to thoroughly study and comprehend these changes, adapting society to new challenges.
9. Environmental Implications: The utilization of computing power and big data for AI training can result in substantial energy consumption and environmental impact. There is a necessity to explore methods for minimizing the environmental footprint of AI technologies.
10. Global Collaboration: The advancement and governance of AI should involve international collaboration and dialogue, recognizing that AI technologies transcend borders and can have a widespread global impact.
11. Bioethics and Medical Ethics: With the progress of biotechnology and the convergence of AI with medical science, ethical considerations arise concerning the utilization of AI in medicine, including the creation of genetically modified organisms and disease diagnosis. Ongoing development and refinement of ethics and norms in this domain are essential.
12. Accessibility and Inclusivity: Ensuring equitable access to AI technologies across all demographic segments and regions is crucial to prevent deepening the digital divide. This includes addressing the needs of individuals with disabilities and accommodating cultural differences.
13. Law and Regulation: Law enforcement entities need to adjust to the emerging challenges presented by AI, addressing issues of accountability for the actions of autonomous systems and the decisions they might undertake.
14. Education and Training: To harness the full potential of AI, society should dedicate resources to educate and train AI professionals, ensuring the availability of essential skills and knowledge.
15. Interdisciplinary Research: Addressing the intricate challenges linked to the advancement and implementation of AI necessitates interdisciplinary research and collaboration involving scientists, engineers, advocates, community organizations, and members of society
16. Public Accountability and Engagement: It is imperative for society to actively participate in formulating AI policies and regulations. This ensures that the technology serves the public interest and avoids limitations on the rights and freedoms of the community.

17. Competition and Innovation: Encouraging competition and innovation in the realm of AI fosters the creation of novel solutions and technologies, guaranteeing a diverse array of technological options.

Artificial intelligence carries the potential to profoundly transform society, necessitating vigilant attention to regulatory, ethical, safety, and social considerations for positive outcomes. Sustaining an ongoing dialogue and collaboration among all stakeholders is crucial to ensure the sustainable and ethical development of AI.

While artificial intelligence presents significant potential, it also introduces challenges and risks. To optimize benefits and mitigate negative impacts, there is a continuous need for research, development, and the formulation of effective regulatory and safety strategies in AI use. This heightened effort will enable society to harness the advantages of AI while minimizing associated risks.

As a potent force with the capability to instigate change across various facets of human life, artificial intelligence requires ethical and responsible development and application. Active engagement with society and regulators is essential to strike a balance between innovation and safety, ensuring the ethical evolution and responsible use of AI.

Conclusions

In the eyes of future generations, our efforts to mitigate threats and safeguard the "essence of technology" will be assessed, aiming to ensure the maximum benefit for humanity. With foresight, we can anticipate and prevent forthcoming threats today, avoiding reaching the "point of no return" or the brink of a pandemic crisis. A new divide exists between those leveraging third-millennium technologies for universal welfare and those advocating the dismantling of tools without considering the harm inflicted on others. This clash defines the soul and future of technology, an ongoing battle, often concealed from the public eye. Even under authoritarian regimes, the Internet endures, though the level of control varies across nations." The Internet represents a global trend in our modern world's development, characterized by informatization, globalization, and algorithmization, within which artificial intelligence evolves and reshapes the essence of our contemporary reality. Superintelligence holds the potential to mitigate existential risks, provided it materializes before breakthroughs in nanotechnology or synthetic biology.

Practical Recommendations For Shaping the Future of Artificial Intelligence Control

1. Humanity, endowed with superior intellectual capabilities, should optimize the use of available time for training to effectively manage artificial intelligence.
2. Artificial intelligence society should be developed as a complex organized system characterized by traits like integrity, adaptability, harmonious system-environment interaction, and distinctiveness.
3. Autonomous artificial intelligence devices are triggering a transformative shift in our daily lives, impacting various domains including shopping centers, restaurants, factories, cities, and firefighting units.
4. Embracing technologies aligned with the Fourth Industrial Revolution, such as blockchain, bitcoin, digital currency, 3D printing, and manufacturing, will expedite the development-to-production cycle.

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