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COMMENTARY

Formation of Motivated Adaptive Erudite AGI Twin with Reflexive Multimodal Ontology by Ensembles of Intelligent Agents

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Abstract: The development of artificial intelligence and ensembles of intelligent agents has led to the formation of a motivated, adaptive and erudite AGI twin with a reflexive multimodal ontology. Formation of a motivated adaptive intelligent multimodal digital twin with reflexive erudition and ontology based on ensembles of intelligent agents combines several key technologies and methods for creating highly effective systems for modeling and simulating real objects or processes. Motivation allows creating a digital twin that is capable of not only accurately reproducing the characteristics of the original object or system, but also independently determining goals, motives and interaction strategy, which ensures its adaptability to changing conditions and tasks. Multimodal use of various types of data and sensory channels (visual, auditory, tactile, etc.) allows the twin to perceive and process information in a variety of formats, increasing the accuracy and completeness of results. Creating a digital twin from specialized agents interacting with each other and uniting into ensembles to solve complex problems allows distributing functions, increasing flexibility and its scalability. Providing it with reflection, analysis of its own decisions and behavior, as well as erudition for accumulation and use of knowledge improves and expands the scope of activity and learning from experience. The ontology of knowledge, describing the entities, properties and relationships of objects, as well as practical skills, promotes compatibility and expandability of activity with people. Practical implementation includes, firstly, the development of the architecture of multimodal data and algorithms for their processing, secondly, the creation and training of agent ensembles using machine learning methods and neural networks, thirdly, the introduction of reflection and self-learning mechanisms to increase motivation and adaptability of the system, fourthly, the formalization of ontologies for structuring knowledge and integrating skills with other systems. The information approach finds application in robotics, virtual assistants, monitoring and control systems, as well as in modeling complex dynamic systems where a high degree of flexibility and AGI intelligence is required.

Keywords: motivated adaptive erudite AGI twin, reflexive multimodal ontology, information approach, ensembles of intelligent agents

1 Introduction

Creating motivated, adaptive and knowledgeable AGI twin with a reflexive multimodal ontology [1–7] by ensembles of intelligent agents is a comprehensive approach to developing a highly intelligent system capable of interacting, learning and self-improving in complex conditions. A motivated AGI twin provides internal goals and motivations, which increases its autonomy and ability to make decisions aimed at achieving set goals. The adaptability of the AGI twin helps change its strategies, behavior and parameters depending on the environment and accumulated experience, which allows it to effectively respond to new situations. Erudition with extensive knowledge structured in ontologies provides a deep understanding of the subject area and the ability to make well-founded conclusions. Reflexive multimodal ontology integrates formalized knowledge and concepts covering different types of data (visual, audio, text, etc.), as well as self-reflection mechanisms that allow the AGI twin to analyze its own behavior and knowledge to improve and expand the scope of activities.

Modern technologies for creating a motivated, adaptive, erudite AGI twin with a reflexive multimodal ontology integrate advanced achievements in artificial intelligence, data processing, and cognitive science. Let's consider the key components and technologies:

(1) Intrinsic Motivation models based on motivation and reward theory.

(2) Using reinforcement learning to form goals and adaptive strategies.
(3) Integrating emotion models and motivational states to increase the realism and motivation of AI.
(4) Continuous learning methods for adapting to new data and situations.
(5) Self-learning and meta-learning methods for quickly adapting to new tasks.
(6) Using transformers and other modern architectures to process complex data.
(7) Large language models (*e.g.*, GPT, BERT) with extended knowledge.
(8) Ontologies and knowledge bases (*e.g.*, Wikidata, DBpedia) for structured storage of information.
(9) Integration of knowledge from different sources to provide broad erudition.
(10) Multimodal models (*e.g.* CLIP, multimodal transformers) to combine information from different sources.
(11) Reflexive mechanisms to allow AI to analyze its own models, decisions, and constraints (meta-cognition).
(12) Ontological models and reflexive multimodal ontology to model concepts, relationships, and rules.
(13) Reflexive ontologies to allow AI to analyze and update its knowledge and models.
(14) Using ontologies to provide interpretability and explainability of AI decisions.
(15) Modular systems combining motivational, cognitive, and ontological components.
(16) Using hybrid systems combining rules, statistical methods, and neural networks.
(17) Ensuring interactions between components to achieve high motivation, adaptability, and erudition.
(18) Developing explainable AI to increase trust and understanding of decisions.
(19) Creation of self-reflective systems capable of self-assessment and self-improvement.
(20) Implementation of multimodal interfaces for more natural interaction with users.

Intelligent agent ensembles, using multiple specialized agents that interact and collaborate in solving systemic problems of a motivated, adaptive, and knowledgeable AGI twin with a reflexive multimodal ontology, increase its flexibility and robustness. Information AGI twin finds use in virtual assistants, decision support systems, modeling complex systems and scenarios where a high degree of intelligence, adaptability, and self-improvement are important.

2 Formalized basic axioms for creating an AGI model

Formalized axioms for the artificial general intelligence (AGI) model take into account many intellectual aspects: perception, learning, reasoning, initiative, motivation, erudition, adaptation, reflection, ontology of knowledge and skills, multimodality, ethical standards, safety and others. Below are the formalized basic axioms that serve as the basis for creating the AGI model.

(1) Axiom of Universality (Generality).
The ability of AGI to learn and adapt to any tasks and environments, within its capabilities, given the appropriate data and resources. Formally, for any set of problems (T), there exists an algorithm \(A \) such that [forall t in T,quad text{AGI}(t) text{ can learn or solve } t text {using} A.]

(2) Axiom of Perception and Sensory Data.
AGI is able to receive, interpret, and integrate sensory data from the environment. Formally, for any sensory system \(S), there exists a mapping [text{Perception}: S rightarrow text{StateSpace}], where StateSpace is the space of the internal representation of the world.

(3) Axiom of Memory and Knowledge Storage.
AGI has long-term and short-term memory for storing information and experience. Formally, there are many data structures (M_{short}) and (M_{long}) such that: [forall text{ event } e, exists text{ record } r in M_{long} cup M_{short}, text{ associated with } e].

(4) Axiom of Reasoning and Planning.
AGI is able to formulate hypotheses, draw conclusions, and make plans to achieve goals. Formally, there is a logical system (L) such that [text{AGI} vdash text{goals} Rightarrow text{builds a plan } P text{that leads to the fulfillment of goals}].

(5) Axiom of Self-Improvement of Erudition.
An erudite AGI continuously develops itself, improving its models and strategies. Formally, [text{Update}: text{AGI} rightarrow text{AGI}^{prime} quad text{such that} quad text{quality of task performance} uparrow].

(6) Axiom of Ethics and Safety.

AGI must observe ethical principles and ensure the safety of interactions with people and the environment. Formally, for all actions (a \), [text{if } a text{ violates an ethical rule } R, text{ then } text{AGI}(a) text{ avoids or rejects } a].

(7) Axiom of motivation.

AGI has internal or external motivations that can initiate actions in accordance with goals and values. Formally, [exists text{ motivation function } M, quad text{such that} quad text{ Action } a text{ is initiated by } M text{ given conditions } C].

These basic axioms provide insight into the characteristics of AGI. In reality, formalization accelerates the creation of a full-fledged practical model of AGI.

3 Basic principles for creating an AGI model

Let us highlight the main principles that are used in developing the AGI model.

(1) Understanding and modeling the surrounding world:
• AGI should be able to model the surrounding reality, predict events, and draw conclusions.
• The model should include an understanding of physical, social, and abstract aspects of the world.

(2) Language ability and communication:
• AGI should have the ability to understand and produce natural language to effectively interact with people.

(3) Multimodality and integration:
• AGI should process and integrate information from various sources (visual, auditory, textual, and others).

(4) Efficiency and resource management:
• AGI should make optimal use of computing resources and energy.

(5) Self-awareness and metacognition:
• Ability to reflect and evaluate one's own state and thought process.

(6) Flexibility and resilience:
• Ability to adapt to new conditions and maintain performance under change.

(7) Continuous evolution:
• AGI should have mechanisms to expand its capabilities and knowledge without losing stability.

These principles are guidelines and hypothetical foundations used by scientists and engineers to design AGI. In practice, their implementation requires significant research and technical advances based on the basic axioms.

4 Individual and collective motivation of digital twins

Individual-collective motivation of digital twins is characterized by the interaction and balance of motivational factors that stimulate both individual digital twins (individuals) and their collective associations (teams, systems, ecosystems) [8]. Let's consider the main aspects and technologies:

(1) Understanding the motivation of digital twins
A. Individual motivation:
• Internal incentives, such as interest, needs, self-development.
• External incentives, such as feedback, communication.
• Motivation based on goals and preferences
B. Collective motivation:
• Common goals, values, and objectives
• Interaction and cooperation between digital twins
• Organizational incentives, such as team productivity and efficiency, collective safety.

(2) Motivation technologies
A. Target motivation:
• AI determination.
• Models of internal motivation.
B. Motivational algorithms:
• Reinforcement learning with motivational functions.

• Reward and penalty models to stimulate behavior.
C. Multi-agent systems:
• Cooperative agents with distributed motivation.
• Methods for collectively coordinating goals and incentives.

(3) Ensuring a balance between individual and collective motivation.
A. Goal synchronization mechanisms:
• Common values and missions built into the system.
• Algorithms for coordinating goals and priorities.
• Feedback tools.
B. Self-regulation and reflection methods:
• Monitoring motivational states
• Adapting goals and incentives in real time

(4) Implementation and application:
• In decision support systems and automated assistants.
• In robotics and systems where collective behavior is important for completing tasks.
• In modeling the effectiveness of social and organizational structures
• In training platforms with motivation

(5) Ethical and practical aspects of motivation
• Ensuring transparency and fairness of motivational mechanisms.
• Preventing manipulation and abuse.
• Supporting motivation through the development of internal interest and autonomy.

Individual and collective motivation of digital twins allows for the creation of more flexible, motivated and efficient systems capable of collaboration, self-regulation and adaptation to changing conditions. This is an important aspect in the development of autonomous systems, AI ecosystems and digital assistants, where it is important to take into account both the personal goals of each system and common collective tasks.

Modern systems and technologies for the formation of motivation for AGI digital twins in various fields of activity use innovative approaches, integration of advanced tools and methods to increase user interest and the efficiency of using AGI digital twins. Below are specific examples of such AGI systems and technologies by industry:

(1) Industry and manufacturing
• Gamification of equipment maintenance and optimization processes through platforms such as Siemens MindSphere and GE Predix.
• Interactive panels and AR/VR tools for training and demonstrating the operation of digital twins, increasing the involvement of engineers and operators.
• Automatic analytics and recommendation systems (*e.g.* IBM Watson IoT), stimulating decision-making and motivation to improve processes.

(2) Energy - Intelligent platforms for monitoring and managing energy supply (*e.g.* Schneider Electric EcoStruxure) with elements of motivation for reducing costs and increasing environmental responsibility.
• Use of mobile applications and cloud solutions for constant access to models and analytics, which increases the interest of operators.

(3) Transport and logistics
• Implementation of digital twins of vehicles and logistics systems, motivated by the efficiency and timeliness of maintenance.
• AR and VR tools for personnel training, which facilitates faster development and motivation to use new technologies.

(4) Medicine and healthcare
• Virtual simulators.
• Educational platforms.
• Digital intelligent clinics:
• Virtual assistants motivating patients through personalized advice and support.
• Patient condition analytics to motivate patients to comply with treatment programs and adapt motivational strategies.

(5) Social platforms and networks
• Implementation of elements of social competition and cooperation.
• Creation of communities and support groups that stimulate user activity:
• Urban infrastructure and transport to motivate participants to environmentally friendly and

safe solutions.

Modern AGI systems use the integration of artificial intelligence, virtual and augmented reality to form the motivation of digital twins in various fields of activity to improve efficiency and innovation processes.

5 Erudite AGI digital twins

Erudite AGI digital twins guide the development of intellectual, informational and educational abilities. Digital AGI twins are virtual models of physical objects, processes or systems. They allow you to simulate their behavior, analyze and optimize their operation in real time. Erudite knowledgeable AGI digital twins are equipped with advanced intellectual capabilities, such as the use of artificial intelligence, machine learning and analytical algorithms. This allows them to not only display the current parameters of the system, but also offer recommendations, learn from historical data and predict possible scenarios. The main advantages of knowledgeable digital twins include:
(1) Increasing the accuracy of modeling and forecasting.
(2) Automation of decision making.
(3) Providing a deeper understanding of complex systems.
(4) The ability to train and improve the skills of specialists through interaction with intelligent models.

The use of AGI systems is widespread in industry, energy, transport, medicine and other areas where high accuracy and efficiency of data analysis are important.

Modern systems and technologies for developing AGI digital twin knowledge in various fields of activity are an integration of advanced information and computing solutions that allow creating virtual models of real objects, processes and systems for their analysis, monitoring and optimization. The main areas and technologies in this area are presented below:

(1) Digital twins of virtual representations of physical objects or systems updated in real time based on sensor data and other sources.
• Application: manufacturing, energy, transport, healthcare, urban studies.

(2) Cloud computing and AWS, Azure, Google Cloud platforms:
• Provide storage, processing and analysis of large volumes of data necessary for the functioning of digital twins.

(3) Intelligent digital twins:
• Provide automatic data processing, identification of patterns and prediction of object behavior.
• Used to improve the accuracy of modeling and decision making.
• Allow you to analyze data arrays to form new knowledge and erudition in specific areas.

(4) Virtual and augmented reality (VR/AR):
• Improve human interaction with digital twins, improving the quality of training, design and maintenance.

(5) Integration of systems and standards:
• Use of open standards such as OPC UA, MQTT, to ensure compatibility and data exchange between different platforms.

(6) Automation and management of digital twins:
• Implementation of automatic control systems based on data to improve the efficiency and safety of processes.

(7) Application areas:
• Industry and manufacturing: to optimize production processes, preventive maintenance of equipment.
• Energy: network modeling, predictive maintenance, energy management.
• Urban infrastructure: modeling of transport, water supply systems, city energy supply.
• Healthcare: creation of virtual models of patients, simulation of procedures.
• Automotive and aerospace: testing and optimization of new solutions.

Modern systems and technologies for developing the erudition of AGI digital twins allow not only to better understand the operation of complex systems, but also to increase their efficiency, reliability and safety, which is relevant in the context of digital transformation of various fields of activity.

6 Reflexive ontology of intelligent digital twins

Reflexive ontology of intelligent digital twins describes the structure, properties and interactions of elements of a digital twin system with intelligent capabilities, with an emphasis on their self-reflection and self-organization [9–14]. Such an ontology serves as a basis for the formation and development of intelligent digital twins, ensuring their ability to self-configure, learn and adapt in complex operating conditions. The key aspects and components of the reflexive ontology of intelligent digital twins are presented below.

(1) Knowledge models:
• Represent information about physical objects, processes and systems, as well as the rules for their functioning.
• Include ontological descriptions and semantic networks that provide data interpretation and decision making.

(2) Self-reflection and meta-levels:
• The ability of a digital twin to analyze its own state, performance and models.
• Provide dynamic updating and adaptation of models based on new data and experience.

(3) Intelligent modules:
• Include machine learning algorithms, logical systems, expert systems and other components that provide cognitive functions.
• Provide forecasting, diagnostics and optimization.

(4) Interactivity and communication:
• Provide information exchange between the digital twin, the real object and other systems, as well as with users.
• Use data exchange standards and protocols.

(5) Contextualization and adaptation:
• Ability to take into account changing environmental conditions and user requirements.
• Provide automatic adjustment of models and algorithms.

(6) Ensuring security and trust:
• Include mechanisms for data protection, authentication and access control, as well as assessing the reliability of the system.
• Self-regulation and self-knowledge: the ability of the digital twin to analyze its structure and behavior to improve efficiency and accuracy.
• Multi-level organization: dividing the system into knowledge, model, and process layers to ensure flexibility and scalability.
• Integration of knowledge and experience: using accumulated experience to learn and improve models.

(7) Application areas of reflexive ontology:
• Development of self-learning digital twins that can adapt to new conditions without external intervention.
• Increasing the trust and transparency of systems that implement reflexive ontology by clearly describing self-regulation mechanisms.
• Intelligent monitoring and control systems that use reflexive models to improve accuracy and reliability.

Overall, the reflexive ontology of intelligent digital twins forms the basis for creating systems with a high degree of autonomy, adaptability, and explainability, which is important for their implementation in complex and critical areas of activity.

Modern systems and technologies for forming a reflexive ontology of digital twins play a key role in ensuring their adaptability, accuracy and self-learning ability. The main areas and technological approaches used in this area are presented below:

(1) Ontology models and semantic networks
• Using formal ontologies such as OWL, RDF to describe entities, relationships and rules.
• Semantic networks allow modeling complex relationships and ensure data interoperability.

(2) Machine learning and deep learning methods
• Training on large volumes of data to identify patterns and update ontological models.
• Using neural networks to automatically extract and adjust concepts and relationships.

(3) Reflexive systems and self-learning
• Implementation of self-reflection mechanisms that allow the system to analyze its own

structure and update it in response to new data.
• Using meta-learning methods and Bayesian approaches to assess the reliability of information and adjust the ontology.

(4) Integration of IoT and sensor data
• Processing data streams from Internet of Things devices to update ontological models.
• Implementation of digital twin technology in real time, taking into account the current parameters of objects.

(5) Using semantic web technologies and graph databases
• Building coherent and expandable ontologies based on graph databases such as Neo4j.
• Semantic search and reasoning to identify new connections and update the ontology.

(6) Tools and platforms for forming and managing ontologies
• Using specialized platforms (Protégé, TopBraid, Stardog) for modeling and supporting reflection.
• Integration with automatic update and version control systems.

(7) Modern trends:
• Integration of artificial intelligence to increase the level of reflexivity.
• Using ontologies within digital twins to model complex systems (industry, medicine, urban infrastructure).
•Development of data exchange protocols that ensure the consistency and relevance of ontological models.

These technologies allow the creation of flexible, self-learning and reflexive AGI digital twins capable of adapting to changes in the environment and the internal processes of the modeling object.

7 Multi-format communication of intelligent digital twins

Multi-format communication of intelligent digital twins is a comprehensive approach to the exchange of information between systems, objects and users in various formats and using various channels. This concept provides flexibility, versatility and efficiency of interaction, which is especially important for integration in complex systems and providing decision support. The main aspects and technologies related to multi-format communication of digital twins are presented below:

(1) Data formats and protocols
• Use of standard formats (JSON, XML, YAML) for structured data.
• Exchange protocols (REST, MQTT, AMQP, CoAP) for transferring information in real time and by events.
• Support for multimedia formats (video, audio, graphics) for visualization and diagnostic purposes.

(2) Multi-level and multimodal communication
• Integration of text, graphic, audio and video interaction to provide a complete picture of the object.
• Using multimodal interfaces (chats, voice assistants, displays, virtual/augmented reality) to interact with users.

(3) Semantic integration and conceptual compatibility
• Using ontologies and semantic networks to align message formats and semantic aspects.
• Ensuring interoperability between different systems and platforms.

(4) Intelligent exchange mechanisms
• Implementation of artificial intelligence and machine learning to adapt communication formats and channels to the context and needs of the user.
• Automatic transformation and interpretation of data from one format to another (conversion, aggregation).

(5) Security and access management
• Using encryption, authentication, and authorization to protect information and control interactions.
• Monitoring and auditing communications to ensure reliability and compliance.

(6) Integration with external systems and platforms

• API and SDK support to expand communication capabilities.
• Integration with business process management systems, analytical platforms and monitoring systems.

(7) Modern trends and approaches
• Use of IoT protocols to ensure real-time communication.
• Implementation of multimodal interfaces with elements of artificial intelligence to improve the convenience of interaction.
• Ensuring compatibility with various standards and platforms for global integration.

Multi-format communication of intelligent digital twins allows for efficient, secure and adaptive interaction between systems and users, which increases their autonomy, accuracy and functionality in modern digital ecosystems.

8 Multimodality of digital twins

Multimodality of AGI digital twins is their ability to integrate and process information from various sources and channels for more complete and accurate modeling of real objects, processes or systems [15, 16]. This characteristic AGI allows digital twins to function as complex, interdisciplinary models, providing comprehensive analysis and interaction in various fields of activity. Key aspects of multimodality of AGI digital twins include:

(1) Integration of heterogeneous data
• Sensory data (temperature, pressure, vibration, etc.)
• Visual data (camera footage, 3D scanning)
• Audio and video signals
• Text and structured data (reports, event logs)

(2) Use of various interaction channels
• Visual interfaces (screen panels, virtual/augmented reality)
• Audio interfaces (voice commands, sound notifications)
• Sensors and actuators

(3) Multimodal analytical methods
• Data processing and synthesis using machine learning and artificial intelligence
• Data visualization in various formats to improve understanding and decision making

(4) Multi-level interaction model
• Communication between physical objects, virtual models and control systems
• Providing feedback and adaptive control based on multimodal data

(5) Application areas of multimodal digital twins:
• Manufacturing and industry: monitoring equipment using sensors, cameras, acoustics and control based on complex data.
• Medicine and healthcare: modeling the body or treatment processes using images, biometrics, sound signals.
• Urban infrastructure: managing transport, energy and utilities by combining data from various sensors and platforms.
• Agricultural sector: monitoring the condition of agricultural crops, soil and climate conditions using multi-format data.

The advantages of multimodality are, firstly, increased accuracy and reliability of the model, secondly, the possibility of complex analysis and forecasting, thirdly, improving decision-making due to multi-aspect information, and fourthly, ensuring more realistic and interactive interaction with the digital twin. In general, multimodality expands the capabilities of AGI digital twins, making them more versatile, adaptive and effective tools in various fields of activity.

9 Conclusion

Scientists, researchers and professional creators of the international community constantly replenish the information ontology of knowledge and skills of the existence and development of humanity. A motivated erudite adaptive AGI digital twin with reflexive multimodal information ontology of humanity and with multilogic surpasses the natural intelligence of any individual [16]. An AGI digital twin in a systemic information format in real time will always surpass natural intelligence. And the natural intelligence of scientists, researchers and professional creators will replenish the ontology of the AGI digital twin with information. Information interaction of natural intelligence with an AGI digital twin in real time will be effective and useful for the benefit of man and humanity.

A motivated adaptive AGI digital twin can independently choose its areas of activity, stimulating more effective interaction. Adaptability allows it to change its models and strategies depending on input data, context and goals, providing personality and flexibility.

AGI erudition helps to use extensive knowledge and the ability to apply it in various situations. In the context of AGI, this implies the integration of knowledge from various fields, the ability to update it and use it to solve new problems.

An ontological formalized description of knowledge that allows the system to understand and relate concepts, providing a deep understanding and logical structure of knowledge. The multimodality of the ontology facilitates the processing and integration of information from various sources and channels - text, image, audio, video, etc. The reflexivity of the AGI ontology helps to analyze its own processes, draw conclusions about its mistakes and successes, and adjust behavior based on this analysis. This increases the level of autonomy and self-improvement.

The capabilities of a motivated adaptive erudite AGI twin with a reflexive multimodal ontology include, firstly, self-learning and development based on internal motivation and external data, secondly, flexible interaction with the user through various channels, such as voice commands, visual cues, reflexive self-improvement, allowing to identify and correct weak points in knowledge and behavior. Thirdly, the use of ontological structures and complex connections between them, fourthly, constant expansion and updating of knowledge due to multimodal integration.

A motivated adaptive erudite AGI twin with a reflexive multimodal ontology is a powerful tool in the field of education, scientific research, intelligent digital clinic, automated service and other areas where a high level of professional choice, adaptation and self-organization is required [17].

AGI has the potential to revolutionize as healthcare. Modern research in the field of Cellular Virtual Therapy and Motivated Adaptive Erudite AGI Twin with Reflexive Multimodal Ontology bring their technological coordinated interaction to neutralize cancer tumors closer. Motivated artificial intelligence, based on the processing of the necessary set of medical test data, can give recommendations for preparing the body's vital systems for spontaneous regression of malignant tumors, and determine the readiness for spontaneous regression of various types of malignant tumors. This will be the most effective and efficient method of treating cancer patients.

The combination of motivated, adaptive, reflexive and erudite AGI with cellular virtual smart therapy is an advanced interdisciplinary field that unites artificial intelligence, biotechnology, medicine and virtual environments.

(1) The main components and their role

A. Motivated, adaptive, reflexive and erudite AGI:

• Motivation: systems with goal setting and internal motivation for independent learning and development.

• Adaptability: the ability to change their models and strategies under the influence of new data and situations.

• Reflexivity: the ability to analyze their own behavior and improve it.

• Erudition: the presence of extensive knowledge and the ability to apply it.

B. Cellular virtual smart therapy:

• Uses virtual environments to model, train and optimize therapy at the cellular level.

• Implements simulations of biological processes, personalized treatment scenarios, as well as virtual models of cell and molecule interactions.

(2) Interaction and synergy

A. AGI as a control and analytical system:

• AGI can analyze patient data, model cellular reactions and offer individual therapeutic strategies. - Motivation and reflection allow the system to independently adjust approaches and learn from the results.

B. Virtual environment for therapy:

• Using virtual simulations created by AGI to train immune cells, test drug systems or model regeneration and regression processes.

• Safe experimentation, minimizing risks to patients.

C. Personalization and dynamic treatment:

• AGI creates ontological models of the patient using multimodal data (genetics, biomarkers, visual and audio data).
• These models lead to the formation of adaptive therapeutic protocols that are adjusted in real time.

(3) Potential innovations and benefits:
• Increasing the accuracy and effectiveness of treatment by modeling and predicting cellular reactions.
• Implementation of automated self-tuning therapy systems.
• Education and training of medical professionals in virtual environments using AGI to simulate complex cases.
• Development of new methods of targeted therapy based on deep ontological models and virtual experiments.

(4) Ethical and technical challenges:
• Ensuring the safety and reliability of AGI systems in medical applications.
• Issues of privacy and data protection.
• The need for interdisciplinary cooperation to create integrated systems.

In order to quickly create a comprehensive technology for the elimination of cancerous tumors, it is necessary to intensify international cooperation. International partnership cooperation in the field of intelligent cell therapy of cancer tumors. International integration of specialists in the field of oncological intelligent informatics. Project international study of spontaneous regression of cancer tumors by information technologies with AGI artificial intelligence.

Combining motivated, adaptive, reflexive and erudite AGI with cellular virtual smart therapy opens up prospects for the creation of highly effective, personalized and safe treatment methods. This approach allows using the multilogic of AGI artificial intelligence to model, optimize and automate complex biological and medical processes, which in the future can significantly improve the quality and availability of medical care.

SingularityNET, a decentralized AI network, and the ASI Alliance, a coalition advancing artificial superintelligence, have launched the first self-learning proto-AGI in Minecraft [18]. Unlike typical AI, the new proto-AGI can adapt and create rules based on experience in real time, which is a leap in the development of artificial general intelligence (AGI). Artificial General Intelligence (AGI) aims to replicate human-like intelligence and revolutionize society. AGI is the evolution of AI, transitioning from narrow tasks to general cognitive abilities. OpenAI CEO Sam Altman said that AGI should be expected as early as 2025. OpenAI is now actively pursuing the development of general AGI, and achieving this goal with current equipment [18]. The knowledge, skills, and data created by scientists, researchers, and developers will be available to GPT-5 for training AGI. For this, Microsoft is funding the construction of the Stargate data center for OpenAI. It will be the largest in the world. Stargate will be a cluster of supercomputers with artificial intelligence. OpenAI has officially partnered with Google Cloud, a cloud computing provider, to train and run AI rising models. Google is part of the larger Stargate project. OpenAI is leveraging the power of four providers: Microsoft, Oracle, CoreWeave, and Google Cloud.

Artificial Superintelligence (ASI) represents stage beyond AGI, surpassing human intellectual capacities. Real-time information interaction of humanity with motivated, erudite, adaptive AGI and ASI with a reflexive multimodal ontology will support its sustainable, uniform development and safe life activities.

Conflicts of interest

The author declares no conflict of interest.

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