

ABOUT FORMATION OF INTERNATIONAL ETHICAL DIGITAL ENVIRONMENT WITH SMART ARTIFICIAL INTELLIGENCE

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ABSTRACT

Intellectual agent ensembles allow you to create digital environment by professional images with language, behavioral and active communications, when images and communications are implemented by agents with smart artificial intelligence. Through language, behavioral and active communications, intellectual agents implement collective activities. The ethical standard through intelligent agents allows you to regulate the safe use of ensembles made of robots and digital doubles with creative communication artificial intelligence in the social sphere, industry and other professional fields. The use of intelligent agents with smart artificial intelligence requires responsibility from the developer and owner for harming others. If harm to others occurred due to the mistakes of the developer, then he bears responsibility and costs. If the damage to others occurred due to the fault of the owner due to non-compliance with the terms of use, then he bears responsibility and costs. Ethical standard and legal regulation help intellectual agents with intelligent artificial intelligence become professional members of society. Ensembles of intelligent agents with smart artificial intelligence will be able to safely work with society as professional images with skills, knowledge and competencies, implemented in the form of retrained digital twins and cognitive robots that interact through language, behavioral and active ethical communications. Cognitive robots and digital doubles through self-developing ensembles of intelligent agents with synergistic interaction and intelligent artificial intelligence can master various high-tech professions and competencies. Their use in the industry increases labor productivity and economic efficiency of production. Their application in the social sphere improves the quality of life of a person and society. Their widespread application requires compliance with an ethical standard so that their use does not cause harm. The introduction and use of an ethical standard for the use of cognitive robots and digital doubles with smart artificial intelligence increases the safety of their use. Ethical relationships between individuals and intellectual agents will also be governed by an ethical standard.

KEYWORDS

Smart artificial intelligence, intellectual agents, professional images, active communications, ethical standard.

1. INTRODUCTION

Artificial intelligence is gradually approaching intelligent natural intelligence. Artificial intelligence operates with knowledge and big data. Natural intelligent intelligence operates with sense and knowledge. Smart artificial intelligence is being developed by Google, Microsoft and other firms in different countries. For two years, Boston Dynamics was able to create a human-like robot with behavioral intelligence, that knows how to build a more convenient route, run, jump, rise when it fell, distinguish a person from an inanimate object. A Japanese human-like robot with communication intelligence from Geminoid DK, a clone of psychology professor Henrik Scharf, can self-learn and take information from the Internet. The system of artificial intelligence GPT-3 of OpenAI understands science, has the opinion and keeps up the

conversation, it is also able to write verses and news, to do the translations, to solve anagrams and to answer questions. The Dutch neural artificial network Artbreeder produces human drawings in different styles and techniques. Artificial intelligence Alpha Zero beats champions in chess, and AlphaGo in GO.

Microsoft is working on a model with artificial intelligence algorithms that can detect errors in program code with a 99 percent probability and divide them into critical, important and insignificant ones. Using an intelligent model reduces the time and money spent searching for errors in program code. The accuracy of detection based on the results of the first tests of the intelligent model turned out to be very high. The intelligent model was able to identify work items with security errors in 99% of cases. The correct division of these errors into critical and non-critical occurs in 97% of cases. The intelligent model in the public domain will be on the GitHub service.

Standard Cognition is working on a standalone shopping payment system where customers can wander around the store, pick items and pay without scanning their items or interacting with an employee. Its ceiling chambers continuously track individuals and objects.

Icertis manages nearly 6 million contracts. Its cloud platform helps companies analyze past contract negotiations and automate administrative tasks.

The United Nations, which uses Dataminr to identify early signs of potential humanitarian crises around the world. Dataminr accepts public Internet data to send user alerts.

The Japanese government in 2020 began to solve the problem of increasing the birth rate in the country using artificial intelligence. A group of researchers from several universities in Japan using supercomputers created an artificial intelligence called Dark Emulator, which can explain the structure of the universe and some of its secrets.

OpenAI develops his own intelligent artificial intelligence, consolidating some principles and pursuing good goals. OpenAI introduced Universe to train and train strong artificial intelligence. Learning can take place on all the information of mankind available through the Internet. His actions are based on algorithms similar to those of human behavior. He can build the right behavior in difficult conditions. He can write poetry and news, make translations, solve anagrams and answer questions. In San Francisco, the company's artificial intelligence OpenAI won against the Dota 2 world champion. OpenAI strives to become the first creator of friendly general-purpose artificial intelligence and a universal machine that has the ability to learn and reason. Microsoft and OpenAI at the Build conference on May 19, 2020 introduced one of the most powerful supercomputers in the world to work together to create a new generation of smart artificial intelligence.

Author proposes to develop smart artificial intelligence by ensembles of intellectual agents on base communicative-associative logic through recurring development of professional skills, increasing visual, sound, subject, spatial and temporal sensitivity, by ethical standard. It operates on virtual images of natural entities. Thought imaginary smart artificial intelligence is considered in detail in works [1-2].

The article is devoted to creating digital environment with smart artificial intelligence, professionally and ethically interacting with society. The digital environment is filled with professional images with ethical communications between themselves and members of society in various spheres of life. Humanity's desire to create a digital environment with smart artificial

intelligence is aimed at improving the quality of life of society. Safe interaction of professional images is regulated by the ethical standard, conditions and rules of communication without harm and damage. Scientists, engineers and technologists embody the professional images of the digital environment with tools, endowing them with similar specialized knowledge, skills and competencies, in the form of digital doubles and cognitive robots. Ensembles of intellectual agents with professional images and linguistic, behavioral and active ethical communications will allow the cognitive robot to have various required professions and competencies.

Creating digital environment with intelligent artificial intelligence proposed on the basis of theoretical provisions, practical criteria, standards and tools described in published works [1-22].

2. FUNDAMENTAL BASES OF ETHICAL DIGITAL ENVIRONMENT WITH SMART ARTIFICIAL INTELLIGENCE

The fundamental foundations of the digital environment are smart artificial intelligence, ethical standard, intellectual agents, professional images of intellectual agents, language, behavioral and active ethical communications of professional images.

The standard case «Ethical application of ensemble intelligent agents» contains seven tables.

Table 1. General.

Use case name	Ethical application of ensemble of intelligent agents	
Application domain	Hi-Tech Labor Market	
Deployment model	Human digital double	
Status	Results of research: Creative Communication Artificial Intelligence	
Scope	Industrial sectors and social services	
Objective(s)	Find accurate and universal application of creative communication artificial intelligence	
Narrative	Short description (not more than 150 words)	Ensemble is complex of intelligent agents with language, behavioral and active communications, interacting through smart interface, implementing technological process, social services, multi-inter-trans-disciplinary research, or production cycle.
	Complete description	Ensemble is complex of intelligent agents with language, behavioral and active communications, interacting through smart interface, implementing technological process, social services, multi-inter-trans-disciplinary research, or production cycle. In the creative ensemble, the whole range of tasks by certain rules is distributed among all agents. Job allocation means assigning each agent a role whose complexity is determined by the agent's capabilities. To organize the task distribution process, the creative ensemble creates either a distributed problem solution system or decentralized artificial intelligence. In the first version, the process of decomposition of the global problem and the inverse process of composition of the found solutions takes place under the control of some single "center." At the same time, the creative ensemble is designed strictly from top to bottom, based on the roles defined for the agents and the results of dividing the global task into subtasks. In the case of decentralized artificial intelligence, task distribution occurs during agent interaction and is synergistic.

Stakeholders	Highly technological producer and user			
Stakeholders' assets, values	Reputation, responsibility, security			
System's threats and vulnerabilities	Legal and ethical aspects of interaction with society			
	ID	Name	Description	Reference to mentioned use case objectives
Key performance indicators (KPIs)	1	AI management of professional cooperation process	Creative process management technology can itself predict the optimal timing of individual stages based on accumulated information about their labor intensity, choice of equipment loading route and competencies of intelligent agents. Streamline processes and automatically delegate tasks.	Improve of synergy between agents
	2	Productivity and quality AI	Creative communication artificial intelligence works with fewer errors and is safer. Creative communication artificial intelligence improves the quality of life of a person and society in everyday concerns, as well as productivity in high-tech industry and production.	Improve of efficiency
AI features	Task(s)		1 .Safe interaction of technocratic societies. 2 .Building high-tech synergies of technocratic societies.	
	Method(s)		Ethical language, behavioural and active communication and utility and preference criteria	
Standardization opportunities/requirements	Hardware Topology		Supercomputer with Strong Artificial Distributed Intelligence Distributed Modular Interconnect Topology	
	Terms and concepts used		Technocratic societies, synergy of interaction intelligent agents, ethical language behavioural and active communication, legal regulation, utility and preference criteria, creative communication safe artificial intelligence.	
Challenges and issues			Qualitatively new type of thinking not available to humans.	
Societal concerns	Description	SDGs to be achieved	Security and ethical and legal aspects A universal approach to the ethical and safe use of intellectual agent ensembles with language behavioral and active communications.	

Table 2. Data.

Data characteristics	
Description	Creative Communication Artificial Intelligence Professional Images
Source	Criteria and Technology of Creative Communication Artificial Intelligence
Type	Smart
Volume (size)	Hi-Tech Labor Market
Velocity (e.g. real time)	Supercomputing velocity
Variety (multiple datasets)	Streams of Professional Images
Variability (rate of change)	Retraining
Quality	High

Table 3. Process scenario.

Scenario conditions					
N	Scenario name	Scenario description	Triggering event	Pre-condition	Post-condition
1	Training	Training of intellectual agents in professional images and language, behavioral and active communications.	By technological process of modeling flow of professional images and language, behavioral and active communications	Formatting of professional images and language, behavioral and active communications	Management of safety
2	Evaluation	Trained model	Development of technological thinking and behaviour	Cognitive thinking patterns and psychological behaviors	Meeting KPI requirements is condition of synergy
3	Execution	Model and Technology Tooling Retrain model with training professional images and language, behavioral and active communications.	Interaction	Activization of Model	Completion of interaction
4	Retraining	Model and Technology Tooling Retrain model with training professional images and language, behavioral and active communications.	New professional activities and competencies	Additional images and communications	Combining images and communications

Table 4. Training.

Scenario name		Training			
Step No.	Event	Name of process/Activity	Primary actor	Description of process/activity	Requirement
1	Sample professional images and language, behavioral and active communications is ready	Specification and classification	Manufacturer	Transform sample professional images and language, behavioral and active communications	Creative Communication Artificial Intelligence Software
2	Completion of Step 1	Creating Experimental professional images and language, behavioral and active communications	Manufacturer	Development of language, behavioral and active communications through job modelling	Software of modelling
3	Completion of Step 2	Model training	AI solution provider	Model professional images and language, behavioral and active communications created by Step 2	Sample professional images and language, behavioral and active communications

Table 5. Evaluation.

Scenario name		Evaluation			
Step No.	Event	Name of process/Activity	Primary actor	Description of process/activity	Requirement
1	Completion of training/retraining	Research	Manufacturer	Model of sample experimental data set created	Ethical language, behavioral and active communications
2	Completion of Step 1	Identification	AI solution provider	Based on new data, confirm that the ensemble of intelligent agents performs trained professional process.	Synergy
3	Completion of Step 2	Evaluation	Manufacturer	Comparison of Step 1 and Step 2	Synergy
Input of evaluation		Ethical language, behavioral and active communications			
Output of evaluation		Synergy			

Table 6. Execution.

Scenario name		Execution			
Step No.	Event	Name of process/Activity	Primary actor	Description of process/activity	Requirement
1	Analysis of modeling results	Research	Manufacturer	Development of set of experimental data through job modelling	Compatibility
2	Completion of Step 1 and Step 2	Identification	AI solution provider	Based on the modification of communications of professional images according to the created experimental set.	Synergy
Input of Execution		Modification of communications of professional images			
Output of Execution		Synergy, compliance with ethical conditions of application and no signs of harm or damage			

Table 7. Retraining.

Scenario name		Retraining			
Step No.	Event	Name of process / Activity	Primary actor	Description of process/activity	Requirement
1	New professional activities and competencies	Research	Manufacturer	Additional professional images and language, behavioral and active communications	Completeness
2	Completion of Step 1	Experimental data set creation	Manufacturer	Combining professional images and language, behavioral and active communications	Compatibility
3	Completion of Step 2	Model training	AI solution provider	Comparison of phase 2 results	Synergy and quality
Specification of retraining data		Data of new professional activities and competencies			

The wide use of intellectual agent ensembles with smart artificial intelligence is carried out on the basis of an ethical standard, so that their use does not harm or harm [3].

Ensembles of agents with artificial intelligence are multi-agent synergistic self-organizing systems that function according to the laws of development, synergy and self-organization. Intelligent agents use physical, informal and logical model of the environment. That is, they use both attributes and sets of entities, processes, relationships, etc.

Standard case Application of ensemble of intelligent agents defines parameters, characteristics, methods, human digital double models, knowledge, skills, behavior, images and other entities of intelligent virtual agent interaction (Table 1 - Table 7). Intelligent virtual agent interaction uses categorical method of utility and preference [1]. Standard case “Application of ensemble of

intelligent agents” contributes to the formation of an ethical digital environment with smart artificial intelligence. The synergistic mechanisms of self-organization of technological ensembles of intelligent agents are basic for standardization in the application of ensembles in various fields. Communicative-associative smart artificial intelligence with the help of an ensemble of diversified agents with a smart interface help control ethical application of ensemble intelligent agents [4].

3. MANAGEMENT IN ETHICAL DIGITAL ENVIRONMENT WITH SMART ARTIFICIAL INTELLIGENCE

An ethical digital environment with smart artificial intelligence allows detect diseases using telemedicine, manage smart city, smart production and agriculture, as well as other areas of society [5-15]. Management is carried out through ensembles of intellectual agents with professional images and ethical language, behavioral and active communications based on digital doubles, cognitive robots and ethical standard.

4. CONCLUSION

In the era of technological development, there is a rapid change in professions and competencies. The problem arises of the operational optimal management of the economy of smart cities, high-tech industries, robotic of combining the activities of natural intelligence with the activities of artificial intelligence. The combination of their activities can be carried out at the level of professional images with ethical linguistic behavioral and active communications. The formation of an international ethical virtual environment with smart artificial intelligence is becoming very popular for the digital effective management of combined areas of society based on smart professional images with ethical language behavioral and active communications through intellectual agents. The global community of researchers, engineers, technologists and programmers can create digital ethical environment with smart artificial intelligence for digital management of various spheres of human life within the framework of the international Mega project: "Ethical Smart International Virtual Environment". The global digital environment of professional images with international ethical standard of linguistic, behavioral and active communications will contribute to the peaceful safe use of smart artificial intelligence by the natural intelligence of technocratic civilization, lead to its moral improvement and not cause harm and damage to the environment.

REFERENCES

- [1] Evgeniy Bryndin. Communicative-associative development of smart artificial intelligence by criteria with the help of ensembles of diversified agents. International Journal of Intelligent Information Systems. Volume 9, Issue 4, 2020. . pp. 24-34.
- [2] Evgeniy Bryndin. Formation of Technological Cognitive Reason with Artificial Intelligence in Virtual Space. Britain International of Exact Sciences Journal, Volume 2, Issue 2, May 2020. Page: 450-461.
- [3] Evgeniy Bryndin. Creative communication safe ethical artificial intelligence in the era of technological development. Software Engineering. Volume.8 , Issue 3, 2020
- [4] Evgeniy Bryndin. Collaboration of Intelligent Interoperable Agents via Smart Interface. International Journal on Data Science and Technology, Vol. 5, № 4. 2019. Pages: 66-72.

- [5] Evgeniy Bryndin. Cognitive Robots with Imitative Thinking for Digital Libraries, Banks, Universities and Smart Factories. *International Journal of Management and Fuzzy Systems*. V.3, N.5, 2017, pp 57-66.
- [6] Yuka Toyoshima, Yasuhiro Hayashi, Yasushi Kiyoki. An Environment-Visualization System with Image-Based Retrieval and Distance Calculation Method. *International Journal of Information Technology, Control and Automation (IJITCA) Vol.9, No.1/2/3, July 2019*
- [7] CRONEMBERGER F, GIL-GARCIA J R. Big data and analytics as strategies to generate public value in smart cities: proposing an integrative framework [M]. Switzerland: Springer Nature, 2019.
- [8] Wu Jun. Research on the Framework of Smart City Operating System Based on New ICTs. *American Journal of Artificial Intelligence*. Volume 4, Issue 1, June 2020, Pages: 36-41.
- [9] Evgeniy Bryndin. Mainstreaming technological development of industrial production based on artificial intelligence. *COJ Technical & Scientific Research*, 2(3). 2019. Pages: 1-5.
- [10] Webster, C., & Ivanov, S. Robotics, artificial intelligence, and the evolving nature of work. Chapter 8 in book: *Digital Transformation in Business and Society Theory and Cases* (pp.127-143). Publisher: Palgrave Macmillan. 2019.
- [11] Evgeniy Bryndin. Robots with Artificial Intelligence and Spectroscopic Sight in Hi-Tech Labor Market. *International Journal of Systems Science and Applied Mathematic*, V. 4, № 3, 2019. Pages: 31-37.
- [12] Evgeniy Bryndin. Increase of Safety Use Robots in Industry 4.0 by Developing Sensitivity and Professional Behavioral Skills. *American Journal of Mechanical and Industrial Engineering*. Volume 5, Issue 1, 2020. Pages: 6-14.
- [13] Evgeniy Bryndin. Formation and Management of Industry 5.0 by Systems with Artificial Intelligence and Technological Singularity. *American Journal of Mechanical and Industrial Engineering*. Volume 5, Issue 2. 2020. pp. 24-30.
- [14] Hamid El Bilali, Francesco Bottalico, Giovanni Ottomano Palmisano, Roberto Capone. Information and Communication Technologies for Smart and Sustainable Agriculture. In book: *30th Scientific-Experts Conference of Agriculture and Food Industry* (pp.321-334). Publisher: Springer. 2020
- [15] Evgeniy Bryndin. Implementation of International Telemedicine network with Rapid Coronavirus Registration by Resonant Technology to Neutralize the Pandemic. *Computational Biology and Bioinformatics*. Vol. 8, Issue 2, 2020, pp.29-35.