

ОБЩИЕ ВОПРОСЫ ФОРМАЛИЗАЦИИ ПРОЕКТИРОВАНИЯ: ОНТОЛОГИЧЕСКИЕ АСПЕКТЫ

УДК 004.89

DOI: 10.18287/2223-9537-2021-11-4-402-421

Trans-AI: How to Build True AI or Real Machine Intelligence and Learning

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Abstract

We are at the edge of colossal changes. This is a critical moment of historical choice and opportunity. It could be the best 5 years ahead of us that we have ever had in human history or one of the worst, because we have all the power, technology and knowledge to create the most fundamental general-purpose technology (GPT), which could completely upend the whole human history. The most important GPTs were fire, the wheel, language, writing, the printing press, the steam engine, electric power, information and telecommunications technology, all to be topped by real artificial intelligence technology. Our study refers to Why and How the Real Machine Intelligence or True AI or Real Superintelligence (RSI) could be designed and developed, deployed and distributed in the next 5 years. The whole idea of RSI took about three decades in three phases. The first conceptual model of Trans-AI was published in 1989. It covered all possible physical phenomena, effects and processes. The more extended model of Real AI was developed in 1999. A complete theory of superintelligence, with its reality model, global knowledge base, NL programming language, and master algorithm, was presented in 2008. The RSI project has been finally completed in 2020, with some key findings and discoveries being published on the EU AI Alliance/Futurium site in 20+ articles. The RSI features a unifying World Metamodel (Global Ontology), with a General Intelligence Framework (Master Algorithm), Standard Data Type Hierarchy, NL Programming Language, to effectively interact with the world by intelligent processing of its data, from the web data to the real-world data. The basic results with technical specifications, classifications, formulas, algorithms, designs and patterns, were kept as a trade secret and documented as the Corporate Confidential Report: How to Engineer Man-Machine Superintelligence 2025. As a member of EU AI Alliance, the author has proposed the Man-Machine RSI Platform as a key part of Transnational EU-Russia Project. To shape a smart and sustainable future, the world should invest into the RSI Science and Technology, for the Trans-AI paradigm is the way to an inclusive, instrumented, interconnected and intelligent world.

Key words: *Artificial Intelligence, Machine Intelligence, Machine Learning, Trans-AI.*

Citation: Azamat Abdoullaev. Trans-AI: How to Build True AI or Real Machine Intelligence and Learning. *Ontology of Designing*. 2021; 11(4): 402-421. DOI: 10.18287/2223-9537-2021-11-4-402-421.

Introduction. What is NOT a True and Real AI

Dear Reader, let me start with revealing a big old secret to you. True Artificial Intelligence (AI) is NOT 1: a branch of computer science dealing with the simulation of intelligent behavior in computers; 2: an area of computer science that deals with giving machines the ability to seem like they have human intelligence; 3: the capability of a machine to imitate intelligent human behavior. Real AI is NOT neural networks, machine learning (ML), deep learning (DL), multiple linear regression, RFM (Recency, Frequency and Monetary) modeling, cognitive computing, or predictive intelli-

gence/analytics, but something what transgressing all special models, algorithms, and techniques [1, 2, see also¹].

It all started with the classic paper COMPUTING MACHINERY AND INTELLIGENCE (1950), opened as follows. "*I PROPOSE to consider the question, 'Can machines think?' This should begin with definitions of the meaning of the terms 'machine' and 'think'.*" Instead, it was suggested the 'imitation game', played with three people, a man (A), a woman (B), and an interrogator (C), known as the Turing Test [3].

Today Turing-like "AI has become meaningless" and "often just a fancy name for a computer program" [4], software patches, like bug fixes, to legacy software or big databases to improve their functionality, security, usability, or performance.

With AI poised to disrupt everything, it is time to know.

¹ Below are the author's current publications on various Internet resources:

EIS has Created the First Trans-AI Model for Narrow AI, ML, DL, and Human Intelligence; <https://futurium.ec.europa.eu/en/european-ai-alliance/posts/eis-has-created-first-trans-ai-model-narrow-ai-ml-dl-and-human-intelligence>.

Trans-AI: meet the disruptive discovery, innovation, and technology of all time; <https://futurium.ec.europa.eu/en/european-ai-alliance/posts/trans-ai-meet-disruptive-discovery-innovation-and-technology-all-time>;

Man-Machine Superintelligence Paradigm Shift: Trans-AI, Deep AI, or Real-World AI as a Real Trustworthy AI, or why ML/DL/ANNs/DNNs must be disrupted; <https://www.linkedin.com/pulse/deep-artificial-intelligence-ai-ml-dl-cc-paradigm-shift-abdoullaev/?trackingId=%2BfWRvXJ3Q1Sukg9oP1MWvA%3D%3D>.

The Real-World AI: the matter of life or death / European AI Alliance. 17 August 2021. <https://futurium.ec.europa.eu/en/european-ai-alliance/posts/real-world-ai-matter-life-or-death>.

Man-Machine Superintelligence Paradigm Shift: Trans-AI, Deep AI, or Real-World AI, as an integral Trustworthy AI Model. Azamat Abdoullaev. 12 September 2021. <https://futurium.ec.europa.eu/en/european-ai-alliance/posts/man-machine-superintelligence-paradigm-shift-trans-ai-deep-ai-or-real-world-ai-integral-trustworthy>.

<https://futurium.ec.europa.eu/en/european-ai-alliance/posts/worlds-first-trans-ai-model-narrow-ai-ml-dl-and-human-intelligence-innovating-superintelligent-human>.

Global AI Academy: AI4EE; <https://www.linkedin.com/pulse/global-ai-academy-sota-learning-excellence-centres-azamat-abdoullaev/?published=t>.

The Real-World AI: Why We Need It Now More Than Before; <https://www.bbntimes.com/technology/the-real-world-ai-why-we-need-it-now-more-than-before>.

The World's First Trans-AI Model for Narrow AI, ML, DL, and Human Intelligence: Innovating A Superintelligent Human-Machine General-Purpose Technology Platform; <https://futurium.ec.europa.eu/en/european-ai-alliance/posts/worlds-first-trans-ai-model-narrow-ai-ml-dl-and-human-intelligence-innovating-superintelligent-human?language=sk>.

Real Superintelligence: Why and How We Create the Top Human-Machine Technology Platform; <https://futurium.ec.europa.eu/en/european-ai-alliance/posts/real-superintelligence-why-and-how-we-create-top-human-machine-technology-platform>.

Machina Sapiens vs. Human Sapiens, or why Musk is after humanoid robots while being deeply scared of AI; <https://futurium.ec.europa.eu/en/european-ai-alliance/posts/machina-sapiens-vs-human-sapiens-or-why-musk-after-humanoid-robots-while-being-deeply-scared-ai?language=ga>.

The RSI Technology: Self-Aware Machines, Conscious AI, and Sentient Robotics; <https://futurium.ec.europa.eu/en/european-ai-alliance/posts/rsi-technology-self-aware-machines-conscious-ai-and-sentient-robotics>.

What's Wrong With the EU AI? Why the I-EUROPE PLATFORM Is the Cardinal Solution; <https://futurium.ec.europa.eu/en/european-ai-alliance/posts/whats-wrong-eu-ai-why-i-europe-platform-cardinal-solution>.

The end of "normal science and technology", or why humanity faces global risks and mass technological unemployment; <https://www.linkedin.com/pulse/why-humanity-faces-global-risks-technological-azamat-abdoullaev/?published=t>.

Why the EU lags behind in AI, Science and Technology; <https://futurium.ec.europa.eu/en/european-ai-alliance/open-discussion/why-eu-lags-behind-ai-science-and-technology>.

What are Machine Intelligence, Artificial Intelligence, Machine Learning and Data Analytics? Or Why the EU AI must be up-righted; <https://futurium.ec.europa.eu/en/european-ai-alliance/posts/what-are-machine-intelligence-artificial-intelligence-machine-learning-and-data-analytics-or-why-eu>.

EUR 1+ Trillion Transnational EU-Russia Project: Man-Machine Real Superintelligence (RSI) Platform: the biggest challenge for the next decade; <https://futurium.ec.europa.eu/en/european-ai-alliance/posts/eur-1-trillion-transnational-eu-russia-project-man-machine-real-superintelligence-rsi-platform>.

Science And Technology XXI: New Physica, Physics X.0 & Technology X.0; <https://www.litres.ru/azamat-abdoullaev/science-and-technology-xxi-physics-x-0-technology-x-0/chitat-onlayn/page-5/>.

1 What is True AI or Real Machine Intelligence and Learning

True AI, or Real Machine Intelligence and Learning (MIL), is Transdisciplinary AI (Trans-AI) of Real-World Causal MIL which is programming/encoding/mapping/ representing reality, physical, mental, social and digital, in computing machinery and robots, to effectively, efficiently and sustainably interact with the world.

It is embracing the human-imitating AIs, narrow and weak, strong and general, superhuman or superintelligence, programming/encoding/mapping/representing human brains/cognition/mind/ intelligence/behavior in computing machinery and robots.

The Trans-AI is innovated not as an alternative to the pre-determined mainstream paradigm, but as a unifier to all the human-like AIs, from neural networks to ML to symbolic AI to cognitive AI and beyond.

The Trans-AI is designed and developed as the Real AI for Everything and Everybody (RAI4EE). Below we are to show how human-centric AI/ML/DL projects, as the AI4EU platform, are integrated by the RealAI4EE Platform.

The Trans-AI paradigm integrates the natural, human, social, and engineering AI models in a unifying context, a whole that is greater than the sum of its parts and transcends their traditional boundaries.

Transdisciplinary research integrates information, data, concepts, theories, techniques, tools, technologies, people, organizations, policies, and environments, as all sides of the real-world problems.

“Addressing societal challenges, as embedded in the Sustainable Development Goals (SDGs), using transdisciplinary research” is considered a “mainstream *modus operandi* for research” by the OECD Global Science Forum (GSF) [5].

2 The RAI4EE Platform: True and Real and Scientific AI vs. Artificial Human Intelligence

The mainstream human-centric AI has some fundamental problems needing for fundamental solutions.

First, it is philosophy, or rather lack of any philosophy, and blindly relying on statistics, its processes, algorithms, and inductive inferences, needing a large volume of big data as the “fuel” to train the model for the special tasks of the classifications and the predictions in very specific cases.

Second, it is not a scientific AI agreed with the rules, principles, and method of science. Today’s AI is failing to deal with reality and its causality and mentality strictly following a scientific method of inquiry depending upon the reciprocal interaction of generalizations (hypothesis, laws, theories, and models) and observable/experimental data.

Third, there is no common definition of AI, and each one sees AI in its own way.

Generally, there are two groups of AI researchers, specialists and generalists.

As a result, its trends are chaotic, sporadic, and unsystematic, as the Gartner Hype Cycle for AI 2021 demonstrate figure 1.

Most of AI folks are narrow specialists, 99.999...%, involved with different aspects of the Artificial Human Intelligence (AHI), where AI is about programming human brains/mind/intelligence/ behavior in computing machines or robots.

AHI is sometimes defined as “the ability of a machine to perform cognitive functions we associate with human minds, such as perceiving, reasoning, learning, interacting with the environment, problem solving, and even exercising creativity” [6].

The EC High-Level Expert Group on AI has formulated its own specific behaviorist definition [7]. “AI refers to systems that display intelligent behaviour by analysing their environment and tak-

ing actions – with some degree of autonomy – to achieve specific goals. AI refers to systems designed by humans that, given a complex goal, act in the physical or digital world by perceiving their environment, interpreting the collected structured or unstructured data, reasoning on the knowledge derived from this data and deciding the best action(s) to take (according to pre-defined parameters) to achieve the given goal. AI systems can also be designed to learn to adapt their behaviour by analysing how the environment is affected by their previous actions".



Figure 1 - Gartner Hype Cycle for Artificial Intelligence 2021

In all, the AHI is fragmented as in:

- Computer Vision, machine vision;
- NLP, speech recognition, conversational AI;
- ML, DL, Neural Networks;
- Machine Reasoning, symbolic AI, expert systems;
- Machine Action, robotics and autonomous vehicles.

Very few of AI researchers (or generalists), 00.0001%, know that AI is about programming reality models and causal algorithms in computing machines or robots.

The first group lives on the anthropomorphic idea of AHI of ML, DL and NNs, dubbed as a narrow, weak, strong or general, superhuman or superintelligent AI, or Fake AI simply. Its ML models are built on the principle of statistical induction: inferring patterns from specific observations, doing statistical generalization from observations or acquiring knowledge from experience.

“This inductive approach is useful for building tools for specific tasks on well-defined inputs; analyzing satellite imagery, recommending movies, and detecting cancerous cells, for example. But induction is incapable of the general-purpose knowledge creation exemplified by the human mind. Humans develop general theories about the world, often about things of which we’ve had no direct experience.

Whereas induction implies that you can only know what you observe, many of our best ideas don’t come from experience. Indeed, if they did, we could never solve novel problems, or create

novel things. Instead, we explain the inside of stars, bacteria, and electric fields; we create computers, build cities, and change nature — feats of human creativity and explanation, not mere statistical correlation and prediction” [8].

The second advances a true and real AI, which is programming general theories about the world, instead of cognitive functions and human actions, dubbed as the real-world AI, or the Trans-AI.

The first one has their fathers, leaders or champions, who since 1950 systematically had been confusing the general public and funding institutions, with empty promises, as in:

“Human level AI will be passed in 1976 (Shannon), 1980 (Simon), 2000 (Turing or in the mid 2020’s” [9].

If to summarize the hardest ever problem, the philosophical and scientific definitions of AI are of two polar types, subjective, human-dependent, and anthropomorphic vs. objective, scientific and reality-related.

So, we have a critical distinction, AHI vs. Real AI, and should choose and follow the true way.

Today’s narrow AI advances are due to the computing brute force: the rise of big data combined with the emergence of powerful graphics processing units (GPUs) for complex computations and the re-emergence of a decades-old AI computation model - the compute-hungry DL. Its proponents are now looking for a new equation for future AI innovation, that includes the advent of small data, more efficient DL models, deep reasoning, new AI hardware, as neuromorphic chips or quantum computers, and progress toward unsupervised self-learning and transfer learning.

Ultimately, researchers hope to create future AI systems that do more than mimic human thought patterns like reasoning and perception—they see it performing an entirely new type of thinking. While this might not happen in the very next wave of AI innovation, it’s in the sights of AI thought leaders.

Considering an existential value of AI Science and Technology, we must be absolutely honest and perfectly fair here. Today’s AI is hardly any real and true AI, if you automate the statistical generalization from observations, with data pattern matching, statistical correlations, and interpolations (predictions), as the AI4EU is promoting.

“Today’s AI is narrow. Applying trained models to new challenges requires an immense amount of new data training, and time. We need AI that combines different forms of knowledge, unpacks causal relationships, and learns new things on its own” [10].

Such a defective AI can only compute what it observes being fed with its training data, for very special tasks on well-defined inputs: blindly text translating, analyzing satellite imagery, recommending movies, or detecting cancerous cells, for example. By the very design it is incapable of the general-purpose knowledge creation, where the beauty of intelligence is sitting.

Google, as Facebook, Microsoft, Amazon, etc., is addicted with a sort of human-like AI (AHI), rightly dubbed as a fake AI, marked with all sorts of human biases. We can’t classify them, no explain properly and they are a zillion. See the list of cognitive biases, Wiki.

Their ML models are built on the principle of induction: inferring patterns from specific observations or acquiring knowledge from experience, focused on “big-data” - the more observations, the better the model. They have to feed their statistical algorithm millions of labelled pictures of cats, or millions of games of chess to reach the best prediction accuracy. As the article, *The False Philosophy Plaguing AI*, wisely noted: “In fact, most of science involves the search for theories which explain the observed by the unobserved. We explain apples falling with gravitational fields, mountains with continental drift, disease transmission with germs. Meanwhile, current AI systems are constrained by what they observe, entirely unable to theorize about the unknown” [8].

Again, no big data can lead you to a general principle, law, theory, or fundamental knowledge. That is the damnation of induction, be it mathematical or logical or experimental.

Due to lack of a deep conceptual foundation, today's AI is closely associated with its logical consequences, "*AI will automate entirety and remove people out of work*", "AI is totally a science-fiction based technology", or "*Robots will command the world*"? It is misrepresented as the top five myths about AI [11] (see figure 2).

That means we need the true real scientific AI, not AHI, but the Real-World MIL, or the Trans-AI, simulating and modeling reality, physical mental or virtual, not just mentality, as reflected in the real superintelligence (RSI).

The Trans-AI technology is what the Google's founder is dreaming about "AI would be the ultimate version of Google. The ultimate search engine would understand everything on the web. It would understand exactly what you wanted, and it would give you the right thing." - Larry Page²



Figure 2 - Common myths about AI

3 The Trans-AI Elements

All in all, the Real AI as the Trans-AI embraces as its interdependent modules or elements all its domain intelligences:

Philosophical AI (Ontological AI, Epistemological AI, Semantic AI, Ethical AI; AI has closer scientific connections with philosophy than do other sciences, because AI shares many concepts with philosophy, e.g. action, consciousness, epistemology (what it is sensible to say about the world), and even free will. This article treats the philosophy of AI but also analyzes some concepts common to philosophy and AI from the standpoint of AI. The Philosophy of AI and the AI of Philosophy [12]).

Logical AI (Symbolic AI, Knowledge Engineering, Expert Systems, Rules-based AI; logical AI representing human knowledge in a declarative form (i.e. axioms, facts and rules), as embedded into computer programs).

Mathematical AI [13] (see figure 3).

Statistic AI (Data Analytics systems, Predictive Modelling algorithms, ML, DL; model-free neural networks, connectionist, ML AI; Statistical AI, arising from ML, tends to be more concerned with "inductive" thought: given a set of patterns, induce the trend; the use of probabilistic graphical models has revolutionized AI by exploiting probabilistic independencies; Statistical Relational AI (StarAI) combines logical (or relational) AI and probabilistic (or statistical) AI [14]).

Digital AI (Virtual Intelligence, Software Intelligence; data-based and date-processing AI: Input (Perception in the Digital World) > Web Data > Feature extraction + Classification/Prediction/Decision/Recommendation > Output (Behavior in the Digital World). Digital AI models, as image classification and automatic speech recognition, are typically the approach of processing the signal and data from the sources of the image, the sound, the text and the temporal data. At best, it uses the Knowledge Graph to store the ontology from different data, to associate the se-

² Larry Page. Cofounder and board member, Alphabet. <https://www.forbes.com/profile/larry-page/?sh=a56d70f7893e>.

mantic data. But Knowledge Graph considers all the data at the same hierarchical layer, what does not work very well in the real world.

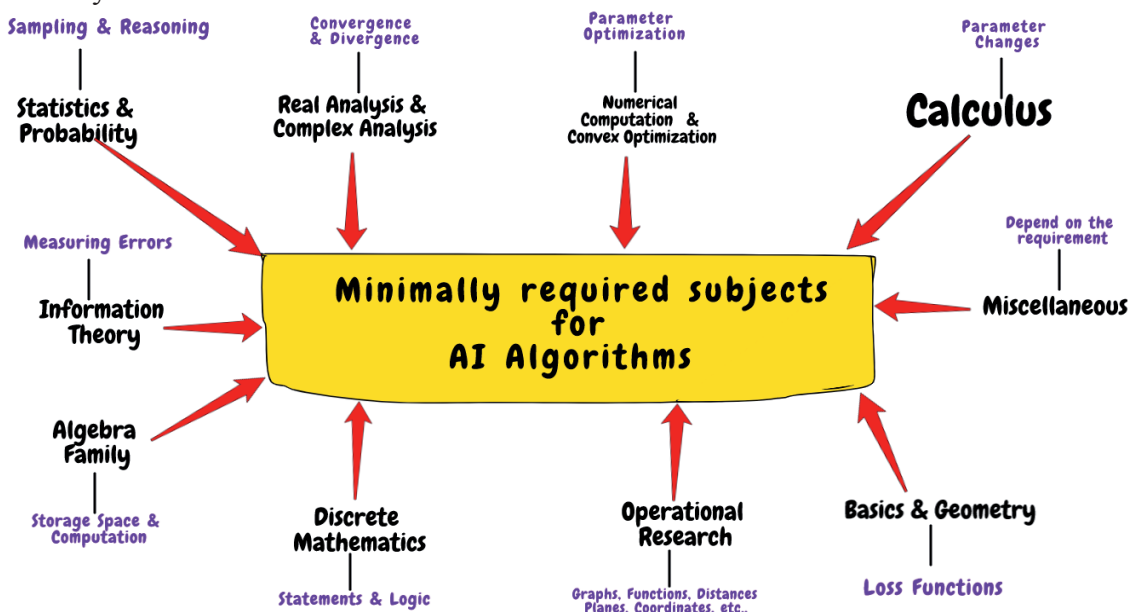


Figure 3 - Mathematical & Statistical Subjects in Artificial Intelligence Algorithms

Physical AI [15, 16].

Chemical AI (AI is being used more and more by chemists to perform various tasks. Originally, research in AI applied to chemistry has largely been fueled by the need to accelerate drug discovery and reduce its huge costs and the time to market for new drugs. However, the applications of AI in chemistry are not limited to drug discovery, extending to designing new molecules and synthesize them [17].

Human AI (Weak and Narrow AI, Strong and General AI, Superhuman and Superintelligence AI).

Biological AI (Sub-symbolic AI, Neural networks, ML, DL, supervised, semi-supervised, unsupervised, and reinforcement learning).

Cognitive AI (Cognitive Computing focuses on mimicking human behavior and reasoning to solve complex problems. Neurosymbolic AI. Cognitive technology is radically disruptive systems that understand unstructured data, reason to form hypotheses, learn from experience and interact with humans naturally. Success in the cognitive era will depend on the ability to derive intelligence from all forms of data with this technology [18, 19]).

Teaching Machines Common Sense Reasoning [18-20].

DARPA program seeks to articulate and encode humans' basic background knowledge for intelligent systems [21].

The Rise of Cognitive AI: Structured, explicit, and intelligible knowledge can provide a path toward higher machine intelligence [22].

Social AI (Social Network Services, as Facebook, YouTube, Instagram, Twitter, LinkedIn, Reddit, Snapchat, Tumblr, Pinterest, and TikTok) [23] (see figure 4).

Economic AI (Industrial AI, Financial AI, Industry 4.0) [24, 25].

Political AI [26].

Environmental AI (The emergence of AI can pave the way towards pursuing the United Nations' Sustainable Development Goals (SDGs) for protecting our environment. AI technologies and

algorithms are being developed to monitor pollution levels, reduce energy consumption, and better understand the effects of climate change [27]).

AI finds application in a wide array of environmental sectors, including natural resource conservation, wildlife protection, energy management, clean energy, waste management, pollution control and agriculture [28]. Microsoft's AI for Earth [29]. Environmental.ai, data driven platform which help to simulate, analyse, and predict Environmental condition of the city [30].

5G promote climate change or harm our planet? 5G is empowering AI, IoT, blockchain and decarbonization [31]. WILL 5G promote climate change or harm our planet? 5G IS EMPOWERING AI, IoT, blockchain and decarbonization [32]



Figure 4 - Social Media Knowledge Graph [23]

4 The World of Reality as the RAI's Universe of Discourse: The Real AI Formula

Reality is studied and interacted by ontology and applied ontologies, known as science, engineering and technology.

The majority believe that perfect top-level ontology of reality is the one that has exactly one node, and exactly one axiom. That node called as Entity, and the axiom is: *For every x, Entity(x)*. "Everything that exists is an entity." Such fundamental ontological and logical assumption is a key obstacle to the real-world, transdisciplinary research and creating a RSI.

Indeed, the perfect top-level ontology is the one that has exactly one node, and exactly one axiom. But the top node is the total whole of Everything, where the World or Reality is Everything. And the first axiom is "Everything exists".

Everything (or Every thing) is all that exists, regardless time or space. It is the opposite or complement of nothing. It is the totality of all things in the world as the largest universe of discourse or the totality of things relevant to some subject matter. Without limits, everything may refer to the universe, or the world.

The Universe [multiverse or all possible worlds] is everything that exists actually or theoretically, according to global ontology and theoretical cosmology predictions. The whole universe is eternal and has always existed. Every entity is a part of everything, including all physical bodies and all abstract objects.

The Universe is commonly defined as everything that physically exists: the entirety of space-time, all forms of matter, energy and momentum, and the physical laws and constants that govern them. However, the term "universe" may be used to denote such concepts as the cosmos, the world or Nature.

World may refer to everything that constitutes reality and the Universe: see World (philosophy). Here, in its broadest sense, the term "world" refers to the totality of entities, to the whole of reality or to everything that is. Still its conceptualizations are as different as different fields. Some conceptions see the world as unique while others talk of a "plurality of worlds". Some treat the world as one simple object while others analyze the world as a complex made up of many parts. In scientific cosmology the world or universe is commonly defined as "[t]he totality of all space and time; all that is, has been, and will be".

In various special contexts, the term "world" takes a more restricted meaning associated with the Earth and all life on it, with humanity as a whole or with an international or intercontinental scope. Then, world history refers to the history of humanity as a whole or world politics is the discipline of political science studying issues that transcend nations and continents. Other examples include "world religion", "world language", "world government", "world population", "world economy", etc.

Overall, reality or the world or everything is "the totality of all entities and relationships, all that is, has been, and will be. Its properties, attributes or traits are four fundamental classes of Thing, or categories of Entity,

Substance (Object/Entity/Thing/Matter), State (Quality and Quantity or Energy), Change (Action and Process or Cause and Effect and Information) and Relationship (Causality, Space-Time or Communication).

This makes the condensed version of Aristotle's categories, leading philosophy, science and research and human practice for a couple of thousand years: (1) substance; (2) quantity; (3) quality; (4) relatives; (5) somewhere; (6) sometime; (7) being in a position; (8) having; (9) acting; and (10) being acted upon.

Attributes as qualities of things are closely related to variables, operationalized for data processing human or machine, where datasets are represented as a matrix of entity variables (organized in columns) and entity items (individuals organized in rows). Values of each entity variable statistically vary or distributed across the variable's domain. A domain is a set of individual/values that the world/entity variable is allowed to have, from two, binary variables, to non-dichotomous variables and higher level of measurement or scale of measure. All measurement in science and statistics and engineering is conducted using five different types of scale, categorical, ordinal, interval, ratio, and cardinal, unifying both qualitative and quantitative degrees.

Then, for example, substance is a fundamental attribute of reality could be operationalized in different ways. It can be dichotomized as categorical variables so that only two values, solid and liquid, or matter and anti-matter or substance and non-substance, are allowed for further processing. Or, it is represented as ordinal variables, as solid, liquid, gas and plasma. It can be made of interval, rational or numeric values as well.

The similar logic refers to the rest world attributes and entity variables of different kinds, types and sorts. We have a hierarchy of variables, ontological, logical, mathematical, physical, chemical, biological, mental, social, or technical variables. As far as any variable is something that may or does vary or change, like a variable element, feature or factor, all of them by the very changing nature are causal variables about causal data.

Again, data as statistics, individual facts, or items of information, collected via experiments or observations, are not a set of values of quantitative and qualitative variables about some individuals and objects.

Real-world data is a universe of individual values of entity variables about substances, states, changes and relationships. Such data, as information and knowledge, is measured, collected, reported, analyzed, visualized, represented, or coded in some human or computer-friendly forms for meaningful usage or machine processing.

The series data (all digital data, web data, human data, machine data, scientific, social, economic, political, environmental data), information (all digital information systems, physical, biological, cognitive, social or technical information), knowledge (science and technology, arts and culture), intelligence (natural intelligence, human intelligence, social intelligence, machine intelligence, or techno-intelligence), wisdom (the sum of universal knowledge, philosophical knowledge) of increasingly generalized concepts is completed with superintelligence (the world's knowledge as organized, digitized, processed and reified).

All in all, the world is formalized as the ordered totality of world's variables, as substantial variable **O**, state variable **S**, change variable **C**, and relational variable **R**, $\mathbf{W} = \langle \mathbf{O}, \mathbf{S}, \mathbf{C}, \mathbf{R} \rangle$, underlying all the rest causal variables with real-world causal data.

The world is not an infinite regress of entities "governed by a recursive principle that determines how each entity in the series depends on or is produced by its predecessor", as it is advanced by mono-disciplinary science and technology.

The world is rather a global dynamic causal network (GCN) where all entity variables influence each other, and formally presented as the infinite Cartesian products of universal world sets:

$$\mathbf{W} \times \mathbf{W} \times \mathbf{W} \dots \times \mathbf{W} \dots$$

It could be approximated as the n -ary Cartesian product over n sets W_1, \dots, W_n as the set of n -tuples.

The GCN can be mathematically modeled as the Cartesian product of n sets, also known as an n -fold Cartesian product, which can be represented by an n -dimensional array, where each element is an n -tuple. A global data table can be created by taking the Cartesian product of a set of rows and a set of columns. If the Cartesian product $rows \times columns$ is taken, the cells of the table contain ordered pairs of the form (row value, column value) [33].

It is generally understood that scientific laws and theories implicitly reflect or explicitly assert causal relationships fundamental to reality, which are discovered rather than invented.

Not mentioning statistics and its ML techniques, science and engineering are limited by special types of linear causal relationships between independent and dependent variables, investigated by experimental research to determine if changes in one variable result in changes in another variable.

In a sense, the world's formula is making the RSI's worldview, its fundamental cognitive orientation encompassing the whole of the world's knowledge, including philosophy, science and engineering, arts and culture, with all possible inter- and trans-disciplinary interconnections; fundamental, existential, and normative postulates, scientific theories and laws.

It is the master equation or world's formula, acting as the ontological framework for scientific and technological knowledge and practice and the master algorithm for human-machine superintelligence, digital superminds.

5 Discussions: How to Develop a True and Real Artificial Intelligence

The dictionary defines AI as 1: a branch of computer science dealing with the simulation of intelligent behavior in computers; and 2: the capability of a machine to imitate intelligent human behavior. But the classic definition is that AI is "the science and engineering of making intelligent machines, especially intelligent computer programs". Or, AI is a way of making a machine, computer, computer-controlled robot, or software reason and act intelligently, to effectively interact with the world.

The mainstream idea of AI is diverted from the standard conception to mimicking human brains/mind/intelligence/behavior. As such, we have created a whole AI family tree,

Narrow AI > Weak AI > Strong AI or Artificial General Intelligence > Superintelligence or Superintelligent AI, as hierarchically ranked below:

- Artificial Narrow Intelligence (Expert AI, ML, DL, ANNs)
- Artificial General Intelligence (Sentient machines, Conscious AI (CAI), General AI (GAI), Strong AI, General AI, Human-level AI)
- The Singularity, superintelligence and super-intelligent AI (SAI).

A list of the companies and organizations deeply involved in AGI development includes:

Facebook, Apple, IBM, Intel, DeepMind, Microsoft, SingularityNET, OpenAI, DARPA, The US Air Force. And that list could also include start-ups and universities such as MIT, NYU, and Oxford. AI as a human-level artificial intelligence isn't more science fiction, it's a national or business strategy. In reality, today's AIs are very different, having little to do with simulating human cognition and intelligence or brains, if only somehow inspired.

Today's AI is mathematical algorithms and statistical rules and predictive analytics, which excel humans in many specific areas, such as judging, strategic games, algorithmic trading, self-driving, diagnosing, computing, measuring, recognising objects, characters, faces, human speech, or translating languages, having no idea what it is doing.

Such narrowly specialized AIs have superhuman capabilities, but only in their specific areas of dominance, much outsmarting humans in doing specific tasks, jobs and works.

There is natural demand for a broad, integrating AI, like as a Composite AI combining different AI techniques to achieve better results, offering two main benefits in the short term: "1. Dealing with "small data;" and 2. Helping to expand the scope and quality of AI applications through increased generalization and better abstraction mechanisms".

The Composite AI, according to Gartner's 2020 Hype Cycle for Emerging Technologies, is the "combination of different AI techniques to achieve the best result" [34].

The idea of Composite AI is followed by SAS [35] and Google [36].

Google's Pathways is developed as "a new AI architecture that will handle many tasks at once, learn new tasks quickly and reflect a better understanding of the world" (see figure 5).

As noted, ML models are overspecialized at individual tasks and rely on one form of input. To synthesize them to several levels Google has built Pathways. This solution will enable a single AI system to generalize across millions of tasks, to understand different types of data and with higher efficiency.

According to Google, Pathways is a new way of thinking about AI that addresses many of the weaknesses of existing systems and synthesizes their strengths. Pathways will enable us to train a single model to do thousands or millions of things.

Google Pathways can handle many tasks at once. Recent years have seen exciting advances in ML, which have raised its capabilities across a suite of applications. Google is continuously making progress in artificial intelligence. All sounds good and well. But there is a good suspicion that Pathways could end up overpromising and under-delivering as it is missing the conception of RSI.

The whole thing isn't just something about a narrow, weak, strong or superhuman AI, ML, DL and deep neural networks; it's a transdisciplinary integration of knowledge fields, methods and techniques – computer science, applied mathematics, statistics, data mining, data analytics, forecasting, optimization, natural language processing (NLP), computer vision and others.

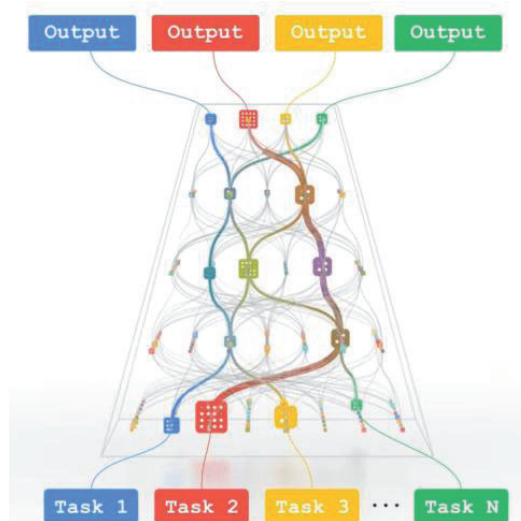


Figure 5 - Google's Composite AI Model (Pathways: A single model that can generalize across millions of tasks) - <https://youtu.be/Nf-d9CcEZ2w>

This is what makes a true AI or real MIL.

Real MI and ML is then a way of making a machine, computer, computer-controlled robot, or software reason and act intelligently, to effectively interact with the world by intelligent processing its data, from real-world data to web data.

EIS has created the Composite Man-Machine Intelligence as the RSI Metamodel of AI/ML/DL models of all possible tasks and types, narrow, general or superhuman, as of 2021.

The RSI will combine a wide range of skills in one entity, as a single integrated system/network /platform of man-machine superintelligence.

The RSI features a unifying World Metamodel (Global Ontology), with a unifying Reasoning and Learning Framework (Master Algorithm), Standard Data Type Hierarchy, NL Programming Language, to effectively interact with the world by intelligent processing of its data, from the web data to the real-world data.

6 The Trans-AI Provenance: EIS Encyclopedic Intelligent Systems

Many “elite researchers in HAI”, not mentioning the general public, are still biased in “human level machine intelligence,” or HLMI, AGI, as if having a 50 percent chance of occurring within 45 years and a 10 percent chance of occurring within 9 years. And there comes out an intelligence explosion, summing with a superintelligence AGI, emulating or mimicking human brains/mind/intelligence will never bring us to RSI.

It is anthropomorphically naive to define it like this: “a superintelligence is a hypothetical agent that possesses intelligence far surpassing that of the brightest and most gifted human minds”.

And it is philosophically naive to believe in the induction principle, that more big data, more speed and more compute could generate something super-valuable, besides of the energy crises.

Computer components could greatly surpass human performance in speed, memory and computing power, still staying a dumb idiot, fast-calculating idiot.

"Biological neurons operate at a peak speed of about 200 Hz, a full seven orders of magnitude slower than a modern microprocessor (~2 GHz)." But the human mind outperforms the most advanced computing machinery due to its small smart data, real intelligence, generalizations, leaning transfer, and programmed ability to deep causal reason, finding from a billion of problem selection alternatives a few.

It is regardless that your “neurons transmit spike signals across axons at no greater than 120 m/s, “whereas existing electronic processing cores can communicate optically at the speed of light”.

A human-like superintelligence emulating human mind running on much faster hardware than the brain does not make an essential difference.

A human-like reasoner that could think millions of times faster than current humans might have only a speed dominant advantage in reasoning tasks, performing the same biases and mental mistakes, but with the speed of light.

The only real prospect here is what emerging as the Trans-AI, man-machine general superintelligence platform, integrating all the multitude of human minds and machine intelligences, problem-solving systems, and data/information/knowledge systems, as the internet/Web:

- Human intelligence, individual and collective,
- Narrow and Weak AIs, experts systems, neural networks, ML and DL;
- Strong and General AI;
- Superhuman or superintelligent AI.

Still, we have to see the general trend: even narrow AI machines are already surpassing humans in many domains, due to mathematical models and statistic algorithms. Every day, narrow neural networks and weak AI applications outsmarting human minds in more and more fields: NLP (ma-

chine translation); Strategic gaming, like chess, the board game Go, and some Atari video games; Autonomous driving; Agricultural industry; Manufacturing; Safety and security; Supercomputing; Communication, as technology platforms, social media networks, bots and digital assistants; Health care; Education; Defense; Space exploration.

The existential question is when will AI be smart enough to outsmart people?

We are one critical step away from a machine intelligence whose superintelligence transcendence/perfection largely depends on its causal power to detect, identify, process, compute, remember and manipulate any number of causal variables from any environment, physical, mental, digital, or virtual.

Unknowingly for the general public, Real-World AI is rising combining and transcending all the special designed intelligent algorithms.

We miss to see that the Real-World AI is emerging as one of the greatest ever techno-science discoveries, looking in the wrong direction of the big-tech companies, just fearing to be AI-disrupted, as Apple, Google, Amazon, Microsoft or Facebook, or big powers, as China, USA, or Russia.

Meantime, in 2020, a generally unknown i-company, EIS Encyclopedic Intelligent Systems LTD, has successfully completed its Transdisciplinary R&D of AI Model as the Trans-AI or Real-World AI or Causal MIL, trademarked as the RSI GPT Platform complementing human intelligence, collective and individual.

The company has spent zero public funding and private investment for its R&D of disruptive discovery of Trans-AI, relying only on its own resources, intelligent and material.

EIS is aimed to build/engineer the Real AI GPT Platform, to be open to the AI civic science platforms, first developing the Proof-of-Concept/Mechanism /Principle Prototype to demonstrate the RSI feasibility for a full-scale global deployment [2-4].

7 Trans-AI vs. Narrow AI, ML, DL and ANNs

AI technology could upend everything upside-down. Again, today's AI is weak and narrow, instead of being transdisciplinary AI (Trans-AI) or real and true MIL. Just look at its patent landscape taken from the report Inventing AI [37] (see figure 6).

It is plain and clear that as it is specialized, fragmented, and isolated, AI fails to realize its enormous potential of the integrating GPT. Its full force and power come as the Trans-AI embracing:

- Big Data Analytics/Information Science
- Logic/Symbol manipulation
- Mathematics, Linear algebra, Functional analysis, Optimization
- Statistics, Probability theory, ML/DL
- Neural Networks/Artificial Brains
- Psychology/Mental models
- Computer Science/Programming/Algorithm /Software/Hardware
- Linguistics/Language models/NLP/NLU
- Science/World's Knowledge/Laws and Rules
- Engineering/Robotics/Automation
- Technology/Information Technology

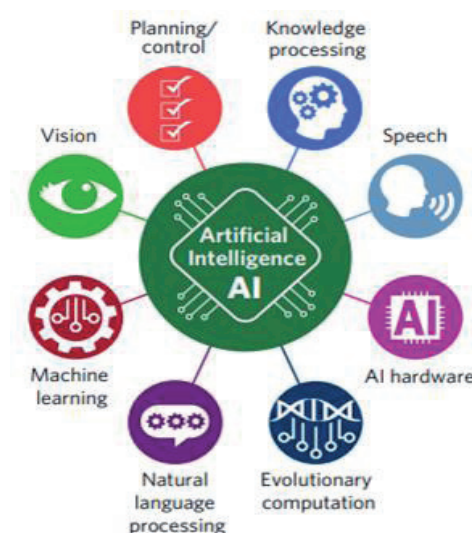


Figure 6 - Narrow AI Patent Landscape [37]

■ Philosophy/Ontology/Epistemology/Ethics /Principles

Once more, Real AI is not a “branch of computer science concerned with building smart machines capable of performing tasks that typically require human intelligence”. It is the science and engineering of making intelligent machines...

AI Science and Engineering is NOT monodisciplinary, interdisciplinary, or multidisciplinary. It is totally transdisciplinary, being about the world/reality/causality/mentality/data, its digital representation, modeling and simulation, processing, inference, and interaction.

The world is at the critical stage now, defying any deterministic forecasting basing on the present and previous states of world affairs. From politics to economics, finance and manufacturing to work, transportation and energy, one can't imagine the world in five years' time without a disruptive impact of global AI technology (AI/ML, Automation, Robotics, Digital Reality, Metaverse).

If to shape a smart and sustainable future, the world should invest into the MIL Science and Technology, for the Trans-AI paradigm is the way to an inclusive, instrumented, interconnected and intelligent world (I-World) [38] (see figure 7).

The most non-standard and realistic forecasting comes from E. Musk. He predicted in his interview to New York Times that humans are to be overtaken by RSI within the next five years. Working with AI at Tesla lets him say with confidence “that we're headed toward a situation where AI is vastly smarter than humans and I think that time frame is less than five years from now. But that doesn't mean that everything goes to hell in five years. It just means that things get unstable or weird.”

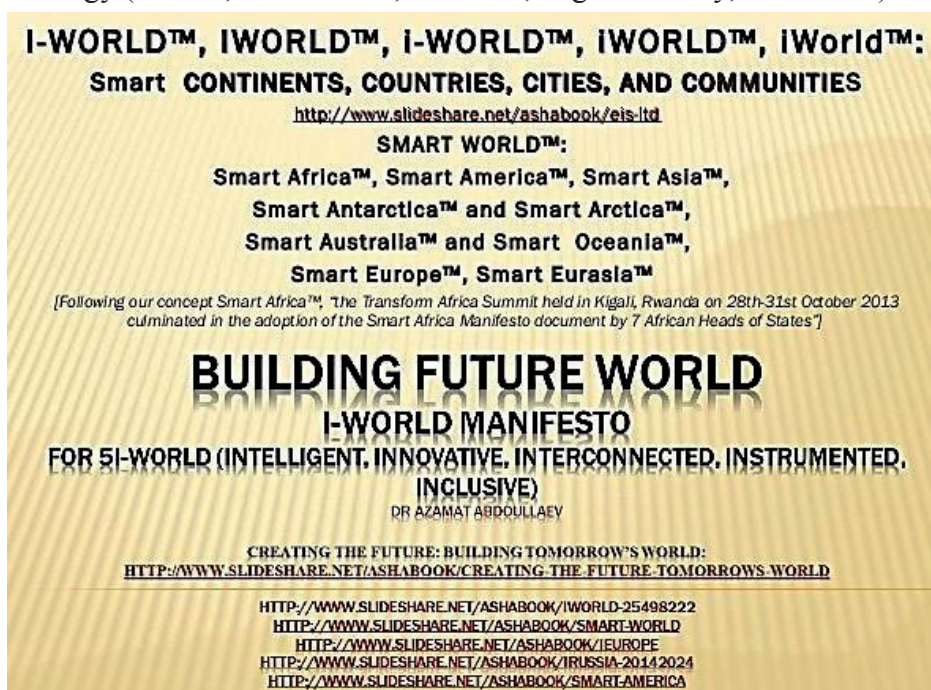


Figure 7 - From Trans-AI to I-World

8 The Real and True AI as the optimal solution of existential risks

For all its 10+k civilized history, humanity has been existing for no noble goal, having only nature-motivated life purposes, to survive and preserve, reproducing and extending themselves, and at best, leaving some notable historical “foot printing”.

In the Age of AI, things become radically different. A new race of superintelligent machines is on the horizon, raising existential questions for the modern humanity

Where Do We Come From? What Are We? Where Are We Going?

If all human race is doomed to be disrupted by the Machina Sapiens or to emerge as a super-human-machine cosmic race. Starting from narrow and weak AIs, one passes to AGI, general or strong AI, all ending with ASI, artificial superintelligence. It all resulted with raising existential concerns for the whole of humanity.

“The pace of progress in AI (I’m not referring to narrow AI) is incredibly fast... The risk of something seriously dangerous happening is in the five-year time frame. 10 years at most.” — Elon Musk wrote in a comment on Edge.org

“I’m increasingly inclined to think that there should be some regulatory oversight, maybe at the national and international level, just to make sure that we don’t do something very foolish. I mean with AI we’re summoning the demon.” — Elon Musk warned at MIT’s AeroAstro Centennial Symposium

“The development of full AI could spell the end of the human race....It would take off on its own, and re-design itself at an ever increasing rate. Humans, who are limited by slow biological evolution, couldn’t compete, and would be superseded.” — Stephen Hawking told the BBC

“I visualise a time when we will be to robots what dogs are to humans, and I’m rooting for the machines.” — Claude Shannon³

The Real-World AI is an alternative to the human-replacing AI. It is a radically new transdisciplinary AI paradigm. The Trans-AI is designed, developed, and deployed aiming to simulate reality as well as model mentality, reflecting all in digital reality, to understand, learn and interact with any environments, physical or mental, social, digital, or virtual. It is embracing the AAAI algorithms, techniques, and methods as well as human individual and collective intelligence, or superminds, in the up-down ways.

As a result, we have the hybrid machine-human superintelligence (cyber-human superminds) as the Real-World AI or the Trans-AI GPT Human-Internet Platform.

It is emerging as the disruptive general-purpose technology platform, in the context of the Internet, the web, narrow ML/DL/AI technology platforms, big data analytics applications, the internet of things and all advanced emerging and digital technologies.

Summing up

The Trans-AI platform is innovated as the RSI. It features a unifying World Metamodel (Global Ontology), with General Intelligence (Reasoning and Learning) Framework (Master Algorithm), Standard Data Type Hierarchy, NL Programming, to effectively interact with the world by intelligent processing of its data, from the web data to the real-world data.

To find a principal solution for one of the most challenging problems, it was necessary to solve the following fundamental problems:

How to build a computational theory of reality, causality and mentality to determine the mechanism and master algorithm of general/universal/real intelligence.

How to teach computers to classify the things in the world with their representations and data, the real-world data, observational data, experimental data and sensor data, their nature, types and structures, syntax, meaning, representation, and use, variables, values, constraints, and behavior.

How to decode/interpret digital data by designation and denotation.

How to generalize narrow AI capabilities beyond their narrow domains.

How to upgrade the statistic data driven AI of MIL into the Real AI of Causal MIL.

To survive and prosper in the future technology world, the world should prioritize the Trans-AI Science and Engineering as the fundamental GPT for most emerging and digital technologies, from AI to ML, from autonomous driving to metaverse to digital reality to quantum computing.

³ Bernard Marr. 28 Best Quotes About Artificial Intelligence. <https://bernardmarr.com/28-best-quotes-about-artificial-intelligence/>.

Supplement I

The AI4EU Platform⁴: The European AI on Demand Platform AI4EU is a one-stop-shop for anyone looking for AI knowledge, technology, tools, services and experts

“The AI4EU Platform will bring the AI stakeholders and AI resources together in one dedicated place, overcoming fragmentation, so that AI-based innovations (research, products, solutions) will be accelerated. The AI4EU Platform will act as the one-stop-shop for anyone looking for AI knowledge, technology, services, software, and experts. AI4EU will function as European AI market driver, offering a critical mass of resources, community networking effects, and rapid development and growth [39, 40].

The European AI on Demand Platform brings together the AI community while promoting European values. The platform is a facilitator of knowledge transfer from research to business application.

To fulfill the user needs and strategic objectives, the following design principles were considered:

- *Service-oriented and Web platform:* The AI4EU Platform is designed to be accessible only by using a web browser, without requiring any client software installation. All AI resources are accessible through a comprehensive service layer facilitating the Platform use and uptake by users.
- *Multi-disciplinary and cross-sector:* AI4EU hosts workflows and algorithms for a wide range of AI symbolic and ML problems. This increases the achievable innovation potential by providing immediate access to AI technologies in multiple fields of expertise as opposed to existing systems that isolate the various research communities.
- *Scalable and interoperable:* The AI4EU Platform is fully scalable and interoperable in terms of data sources, programming languages, IT infrastructures, and third-party platforms. It will efficiently construct toolchains utilising state-of-the-art technology components and large data resources applied across multiple sectors.
- *Curated Data access:* AI4EU data build upon previous EU projects, existing Big Data communities, and data exchange activities that will further be enriched by additional curated data coming from the AI4EU consortium, affiliated partners, as well as from all parties involved in AI experimentation projects.
- *Collaborative, Social and Confidential:* The AI4EU Platform allows users to form virtual and interdisciplinary teams sharing activities (workflows, algorithms, data, and data experiment reports) towards common goals.

In summary, the European AI on-Demand Platform aims to fulfill the needs of the European AI community at large. To that end, it will promote four main services:

- Providing accurate information to all users;
- Facilitating and promoting collaboration between all AI stakeholders for new products/services, and to create jobs and growth with AI;
- Making high-quality and accurate AI assets and relevant documents available;
- Experimenting with AI tools to prototype ideas and applications”

The AI4EU Scientific Vision⁵

AI systems are *human-centred*. Such systems would need to be (figure 8):

- *Explainable AI*, i.e., they allow humans to understand the reasons behind their recommendations or decisions;
- *Verifiable AI*, i.e., they guarantee fundamental properties like safety, privacy and security;
- *Physical AI*, it refers to the use of AI techniques to solve problems that involve direct interaction with the physical world, e.g., by observing the world through sensors or by modifying the world through actuators. What distinguishes Physical AI systems is their direct interaction with the physical world, contrasting with other AI types, e.g., financial recommendation systems (where AI is between the human and a database); chatbots (where AI interacts with the human via Internet); or AI chess-players (where a human moves the chess pieces and reports the chess board state to the AI algorithm).
- *Collaborative AI*, i.e., they can share knowledge with humans and take decisions jointly with them;
- *Integrative AI*, i.e., they can combine different requirements and methods into one AI system⁶.

⁴ The AI4EU Platform. <https://www.ai4eu.eu/ai4eu-platform>. This link is out of date. New link <https://www.ai4europe.eu/>.

⁵ The AI4EU Scientific Vision. <https://www.ai4eu.eu/ai4eu-scientific-vision>. This link is out of date. New link <https://www.ai4europe.eu/>.

⁶ It looks the OECD Global Science Forum (GSF) Recommendations for Governments, research agencies, research institutions and international bodies have a little concern with the EC, which practices funding narrow and weak AI projects having no real [transdisciplinary] value, like as the AI4EU Project, while wasting a huge public funding. AI4EU – The consortium was established to build the first European AI On-Demand Platform and Ecosystem with the support of the European Commission under the Horizon 2020 programme. It supports a large European ecosystem spanning the 28 countries, facilitating collaboration between all Europeans actors in AI (scientists, entrepreneurs, SMEs, Industries, funding organizations, citizens). EU contribution: €20 000 000.

Supplement II

China and the U.S. are competing to be the world's technological master 5–7 years from now. After analyzing patent application data in 10 categories, including artificial intelligence and quantum computing, in 2017 Nikkei has concluded that China will reign supreme in nine categories [42]:

AI = MI, “*The science and engineering of making intelligent machines, especially intelligent computer programs*”. MI is a way of [making a machine, computer, computer-controlled robot, or software reason and act intelligently, to effectively interact with the world]

Quantum computing, utilizing the collective properties of quantum states, such as superposition, interference, and entanglement, to perform computation in qubits.

Regenerative medicine deals with the "process of replacing, engineering or regenerating human or animal cells, tissues or organs to restore or establish normal function".

A self-driving car, an autonomous vehicle (AV or auto), driverless car, or robotic car (robo-car), it is capable of sensing its environment, using AI control systems and environmental sensors, radar, lidar, sonar, GPS, to move safely and autonomously.

Blockchain a growing list of records/compound data/rows, called *blocks*, that are linked together cryptographically. It is used as a distributed ledger (a shared ledger or distributed ledger technology or DLT), a consensus of replicated, shared, and synchronized digital data geographically spread across multiple sites, countries, or institutions.

Cybersecurity, Computer security, or information technology security (IT security) is the protection of computer systems and networks from information disclosure, theft of or damage to the hardware, software or e-data.

Virtual reality is a simulated experience that can be similar to or completely different from the real world to be able to look around the artificial world, move around in it, and interact with virtual features or items. It is applied in entertainment (e.g., video games), education (e.g. medical or military training) and business (e.g. virtual meetings), as augmented reality, mixed reality or extended reality or XR.

"Zuchongzhi 2.1," is 10 million times faster than the current fastest supercomputer and its calculation complexity is more than 1 million times higher than Google's Sycamore processor. It's the first time that China has reached quantum advantage in a superconducting quantum computing system.

A new light-based quantum computer prototype, "Jiuzhang 2.0," with 113 detected photons, which can implement large-scale Gaussian boson sampling 1 septillion times faster than the world's fastest existing supercomputer, according to the Xinhua News Agency.

The only critical issue is China's AI is weak and narrow, instead of being real and true MIL:

So, it is China who is obtaining total technological supremacy.

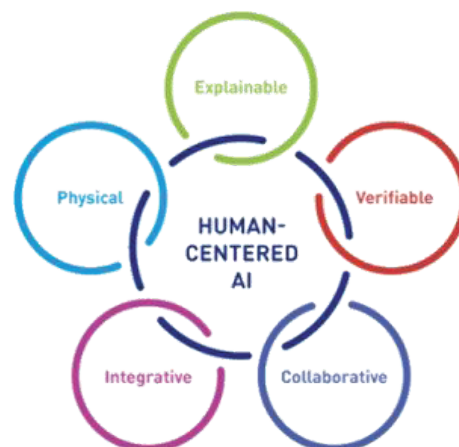


Figure 8 - Five priority areas make research results available to all through the AI on-demand platform

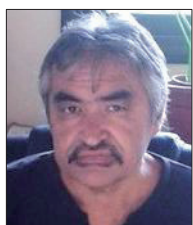
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About the author



Azamat Abdoullaev (b. 1951). From 1975 to 1981, Dr. Abdoullaev was a postgraduate and research associate at the USSR Academy of Sciences, the Institute of Physics (Moscow, Russia). In 1988 he received a scientific degree in physics and mathematics (the PhD equivalent) conferred by the USSR Academy of Sciences, the Lebedev's Institute of Physics, Moscow. In 1989, a year later, he submitted a doctorate dissertation in the philosophical sciences, which was published as a book, 'Introduction into Information World', by the USSR Academy of Sciences. The work pioneered the role of global ontology for building (encyclopedic) intelligent systems. From 1983 to 1991, the author was a research scientist at the Institute of Scientific and Technical Information at the USSR

Academy of Sciences and the Government Committee in Scientific and Technical Information. From 1993 up to date, Director of a Russian company, the first business corporation entirely engaged in research and development of Computer Intelligence Framework enabling a new class of knowledge society artifacts: large scale intelligent systems with encyclopedic knowledge, general reasoning and natural language power driven by standard global ontology and semantics technology. Dr A. Abdoullaev established EIS Encyclopedic Intelligent Systems Limited Company in Cyprus to contribute to the emerging world market of intellectual information technologies and participate in the European Union programs for building knowledge-based economies. Dr A. Abdoullaev is the creator of USECS (Universal Standard Entity Classification System) known as 'the World Directory of Things'. Scopus ID 56128889800. <https://futurium.ec.europa.eu/en/user/10596>. <https://www.igi-global.com/affiliate/azamat-abdoullaev/1192>, <https://www.linkedin.com/in/azamat-abdoullaev-335a0881/>. ontopaedia@gmail.com.

Received October 14, 2021. Revised December 17, 2021. Accepted December 21, 2021.

Транс-ИИ: как создать настоящий искусственный интеллект

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Аннотация

Мир стоит на пороге колоссальных перемен. Это критический момент исторического выбора и возможностей. Это могут быть лучшие 5 лет или одни из худших, потому что у нас есть все возможности, технологии и знания для создания самой фундаментальной технологии общего назначения, которая могла бы полностью перевернуть всю человеческую историю. Самыми важными технологиями общего назначения были: огонь, колесо, язык, письмо, печатный станок, паровой двигатель, электроэнергия, информационные и телекоммуникационные технологии; и все они были дополнены технологией реального искусственного интеллекта. В исследовании говорится о том, почему и как настоящий машинный интеллект, или настоящий ИИ, или настоящий суперинтеллект (НСИ) можно спроектировать и разработать, развернуть и распространить в течение следующих 5 лет. Идея НСИ заняла около трех десятилетий в три этапа. Первая концептуальная модель Транс-ИИ была опубли-

кована в 1989 году. Она охватывала все возможные физические явления, эффекты и процессы. Расширенная модель реального ИИ была разработана в 1999 году. Полная теория суперинтеллекта с её моделью реальности, глобальной базой знаний, языком программирования и основным алгоритмом была представлена в 2008 году. Проект НСИ был окончательно завершён в 2020 году. Некоторые ключевые выводы и открытия публикуются на сайте *EU AI Alliance / Futurium*. НСИ имеет унифицированную мировую метамодель (глобальную онтологию) с общей структурой интеллекта (главный алгоритм), стандартной иерархией типов данных, языком программирования, чтобы эффективно взаимодействовать с миром посредством интеллектуальной обработки его данных, от веб-данных до данных из реального мира. Основные результаты с техническими спецификациями, классификациями, формулами, алгоритмами, проектами и шаблонами хранились как коммерческая тайна и задокументированы как Корпоративный конфиденциальный отчёт «Как разработать человеко-машинный суперинтеллект 2025». Как член *EU AI Alliance*, автор предложил платформу НСИ «Человек-машина» в качестве ключевой части транснационального проекта Россия-ЕС. Чтобы сформировать умное и устойчивое будущее, мир должен инвестировать в НСИ, поскольку парадигма Транс-ИИ - это путь к инклюзивному, оснащённому инструментами, взаимосвязанному и интеллектуальному миру.

Ключевые слова: искусственный интеллект, машинный интеллект, машинное обучение, Транс-ИИ.

Цитирование: Абдуллаев, А.Ш. Транс-ИИ: как создать настоящий искусственный интеллект / А.Ш. Абдуллаев // *Онтология проектирования*. 2021; 11(4): 402-421. DOI: 10.18287/2223-9537-2021-11-4-402-421.

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Сведения об авторе

Абдуллаев Азамат Шамсудинович (1951 г.р.) к.ф.-м.н. (1988), д.филос.н (1989). Диссертация по философии была издана в виде книги «Введение в информационный мир» (1991), в которой впервые показана роль глобальной онтологии для построения (энциклопедических) интеллектуальных систем. С 1983 по 1991 год научный сотрудник Института научно-технической информации АН СССР и Государственного комитета по научно-технической информации. С 1993 года по настоящее время - директор бизнес-корпорации, занятой исследованиями и разработками *Computer Intelligence Framework*, позволяющими создать новый класс артефактов общества знаний: крупномасштабные интеллектуальные системы с энциклопедическими знаниями, общими рассуждениями и возможностями естественного языка, основанные на стандартной глобальной технологии онтологии и семантики. А. Абдуллаев основал компанию *EIS Encyclopedic Intelligent Systems Limited* на Кипре, чтобы внести свой вклад в мировой рынок интеллектуальных информационных технологий и участвовать в программах Европейского Союза по построению экономики, основанной на знаниях. Азамат Абдуллаев является создателем USECS, Универсальной стандартной системы классификации объектов, известной как «Всемирный справочник вещей». Scopus ID 56128889800. <https://futurium.ec.europa.eu/en/user/10596>. <https://www.igi-global.com/affiliate/azamat-abdoullaev/1192>, <https://www.linkedin.com/in/azamat-abdoullaev-335a0881/>. ontopaedia@gmail.com.

Поступила в редакцию 14.10.2021, после рецензирования 17.12.2021. Принята к публикации 21.12.2021.