

Exploratory Research on Simulation Hypothesis and the research method analysis

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Abstract—The principle of simulation hypothesis and test process interpretation is investigated in this article. The findings indicate that the simulation hypothesis is the belief that everything is a digital simulation. This scientific theory is the systematic technique that must be followed for any appropriate scientific endeavors [1]. The relationship between philosophy in the context of the hypothesis and quantitative experimental research is continually established with this approach. The scientific method has evolved to include a modern phase that includes the use of computer simulations and simulation experiments [1]. Computer models may be used in modeling experiments to assess theories until they are tested experimentally as they are integrated into hypothesis formulation. An iterative input between these experiments and existing theories makes it possible to improve the hypothesis preliminarily and create smarter research protocols. Technological advancements would eventually lead to the creation of automated human superintelligence, which will in turn lead to the creation of simulations that can help us truly comprehend the world. This lends credence to the notion that superintelligence currently exists and has produced simulations that humans already occupy. The idea that life is pure simulation may seem absurd at first glance, but it is based on decades of experimental study and is supported by scholars, scientists, and entrepreneurs such as Stephen Hawking and Elon Musk [1].

Keywords: Simulation, artificial intelligence, data analytics, computer models

I. INTRODUCTION

The simulation hypothesis, also known as the simulation theory, proposes that anything in

reality, such as the Earth and the rest of the planet could be a computer simulation. Some models are based on the creation of virtual reality, a technology that suggested persuading people that the simulation is "real." [2]. The simulation theory is similar to many other skeptical scenarios that have been proposed in philosophy's history. Nick Bostrom helped popularize the theory in its current version. The idea that such a theory is consistent with all of our perceptual interactions is believed to have major epistemological ramifications, resulting in metaphysical skepticism [3]. The theory has also appeared in science fiction, where it has been used as a key narrative tool in many stories and films. The hypothesis championed by Bostrom has been widely criticized, with theoretical physicist like Sabine Hossenfelder dismissing it as pseudoscience while cosmologist George F. R. Ellis claiming that the hypothesis is entirely impracticable from a technical standpoint" and that "protagonists appear to have mistaken science fiction with science." [3]. The simulation hypothesis suggests that simulations are an unavoidable consequence of technological advancement. Since the simulation hypothesis is metaphysical rather than epistemic, some contend that careful analysis of the metaphysical hypothesis will offer important epistemic insights [4]. The simulation hypothesis is linked to the artificial physics hypothesis, which states that empirical existence (or at least the part in which we have causal contact) is essentially computational or "digital." However, the simulation hypothesis implies the existence of a higher reality, potentially involving a maker, that exists independently of the simulation. Furthermore, not all simulations are computer-based. A simulation is a method of examining the

action and results of a real or hypothetical system utilizing a model [4]. Models may be used in simulations to investigate current or proposed system characteristics. A simulation is used to investigate the properties of a real-life or imaginary environment by modifying factors that are not controllable in a real system. Simulations enable you to test a model to improve system throughput or make assumptions about a real-world situation. Simulations are useful for studying features of a version of a real-life system that would otherwise be too complicated, too large/small, too fast/slow, inaccessible, too risky, or undesirable to engage [5]. A simulator can utilize an approach to examine states that may not be feasible in the original framework, whereas a model strives to be accurate to the environment it represents.

In 2003, Bostrom envisioned a technologically advanced civilization with vast computational resources that requires just a fraction of that power to simulate new realities populated by conscious beings [6]. Given this situation, the simulation reasoning demonstrated that at least one of the below trilemma propositions must be true: To begin with, humans nearly all become extinct before they enter the simulation-savvy level. Secondly, even though humans reach the stage, they are unlikely to be involved in the simulation of their own past experiences [6]. Finally, the likelihood of us working in a simulation is equivalent to one. The primary goal of this paper is to investigate the concepts of simulation hypothesis and method analysis. Additionally, the paper would discuss why the simulation hypothesis is now so important.

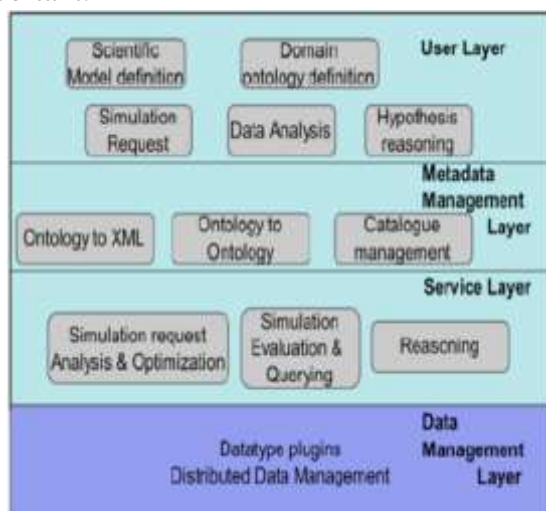


Fig i: Simulated data management

II. RESEARCH PROBLEM

The main problem this exploratory study seeks to resolve is to explore the concept of simulation Hypothesis and the research method analysis. There are several criticisms of simulation hypotheses, particularly in academia who challenge over-reliance on anthropological logic and science skeptics who point out that simulations may not be aware of potential superintelligence. However, as artificial intelligence and deep learning become a dominant industry and a cultural trend, many of Bostrom's innovations are becoming more popular. For decades, countless brainiacs and psychedelia addicts have pondered the topic, developing hypotheses ranging from empirical to supernatural ideas [7]. Some of the questions that human beings would ask themselves are: Is it possible that we are living in a virtual simulation? What exactly is reality? The simulation hypothesis attempts to answer several difficult questions regarding reality.

III. LITERATURE REVIEW

A. Simulation Research Methods

For organizational researchers, computer simulation is becoming increasingly common as a methodological strategy. Other analysis approaches include different hypotheses regarding the actual cause and effect structure of the system to study; for instance, in survey testing, the type and substance of cause and effect must be established a priori to benefit from the collected data [8]. Simulation enables researchers to conclude that organizational systems are inherently dynamic. If other tools will resolve the questions "What occurred, how, and why," simulation can deal with the "What if?" Simulation allows for the study of more dynamic processes since it generates conclusions through "moving forward" into the future, while most analysis approaches aim to decide what occurred and how it changed by looking backward through history. Going backward is necessarily more daunting than looking forwards, since the essence of living systems is to either grow in entropy (disorder) or complexity (order). Simulator practice can be divided into three categories:

- Discrete event simulation, which entails simulating the organizational system as a collection of bodies that evolve in response to resource scarcity and event occurrence [8].
- System dynamics, which entails defining the primary "condition" parameters that describe the

system's actions and then using paired, differential equations to relate certain variables to one another.

- Agent-based simulation, in which actors communicate with other agents and resources to optimize their fitness (utility) operations; agent activity is defined by an integrated schema that is both interpretive and action-oriented [9]. The majority of simulation practitioners stick to one camp and aren't comfortable working in all three realms. This is likely to improve in the future since dynamic hierarchical structures necessitate aspects of all three techniques to accurately capture their complexity.

A. Importance of simulation hypothesis

It's normal to ask if the simulation hypothesis has any real-world implications or whether it's only a good yet strictly hypothetical thought theory. The response is unambiguous in terms of industry and culture: It makes no difference whether we exist in a simulation or not. In the immediate future, the speeding up of automated technologies would have an important effect on industry, culture, and politics [10]. The simulation hypothesis is inextricably linked to scientific advancement and the evolution of superintelligence [10]. Although superintelligence appears theoretical, substantial resources are invested in narrow and artificial general intelligence. Artificial intelligence developments, like with the space race, produce technical advancements that develop, replace, and augment the industry. IBM is making a major gamble with Watson, predicting a \$2 trillion demand for cognitive products in the near future [10]. To combat ransomware and hackers, cybersecurity specialists have heavily invested in AI and automation. In a 2016 conversation with TechRepublic, United Nations chief technology envoy Atefeh Riazi predicted that AI will have a significant economic effect and referring to the technology as "humanity's last breakthrough." [11]

B. Who is affected by the simulation hypothesis?

While long-term predictions about the implications of automated technologies are unwise, developments in computer learning, robotics, and artificial intelligence reflect a paradigm change comparable to the invention of the internet or the new cell phone in the short term. In other terms, the post-automation economy would vary significantly [11].

Manufacturing sectors would be hit hard by AI, and logistics delivery would rely heavily on self-driving vehicles, ships, drones, and aircraft, while financial services employment including pattern detection would be eliminated. Automation, on the other hand, can increase demand for intrinsically interpersonal skills such as HR, sales, human labor, sales, and creative work. Digital innovations are, in several respects, complements, not replacements for, innovation [11,12]. If anyone creates a new album, film, or piece of software, there has never been a great historical moment to be a creative person who wishes to meet millions and billions of potential consumers.

C. When does the simulation hypothesis take place?

"Every part of the learning or some other function of knowledge can be so precisely defined that even a computer can be designed to replicate it," declared Dartmouth College, an Ivy League academic institution, in 1956, ushering in the golden era of artificial intelligence [12]. The conference laid the groundwork for AI and computational protocols that would shape a century of science. The conference was followed and motivated by innovations at Manchester College in 1951, which resulted in the creation of a checkers-playing program and a chess-playing program [12].

Despite the enthusiasm of researchers for the rapid development of human-level computer intelligence, programming intelligence has proved to be a challenging task. The sector had reached the so-called "first AI winter" by the mid-1970s. The advancement of good ideas was hampered by a lack of computational resources during this period. Winter gives way to spring, and by the 1980s, AI and robotics technology had benefited from the brightness of quicker computers and the explosion of consumer electronics products [12,13]. Parallel processing, or the ability to execute several computations at the same time, became popular by the turn of the century. Deep Blue, an IBM machine, beat human chess grandmaster Gary Kasparov in 1997. Recently Last year, Google's DeepMind defeated a person at Go, and the next year, the same program beat four of the top human poker players with ease [14].

These benchmarks, which are being driven and financed by research and academic organizations, governments, and the private

industry, reflect an increasingly growing automation and machine learning industry. Artificial intelligence is actively involved in major sectors such as financial services, hospitals, recreation, tourism, and transportation. Facebook, Google, and Amazon are both experimenting with AI for user uses, and other firms are racing to develop and launch artificial general intelligence [15].

Some AI prognosticators, such as Ray Kurzweil, envision a world in which the human brain is joyfully attached to the internet. Others, though, are less positive. Bostrom and his associates caution that developing general intelligence artificially may result in an existential crisis [15,16]. Of the multiple frightening threats posed by a superintelligence, varying from out-of-control cyborgs to economic chaos, the main challenge posed by AI is the marriage of anthropomorphism with misaligned AI objectives. In other words, people are likely to imbue sophisticated computers with psychological traits such as empathy. However, an artificial computer may be programmed to favor task completion above human needs. A super-intelligent, narrowly based AI programmed to generate papers will turn individuals into a gray goo in the search for capital in a dreaded scenario called instrumental convergence or "paper clip maximizer."

D. Testing the simulated hypothesis

In a joint study released in 2012, physicists Silas R. Beane, Zohreh Davoudi, and Martin J. Savage presented a framework for testing one kind of simulation hypothesis. Under the premise of limited computing power, the cosmos can be simulated by partitioning the continuum space-time into a distinct series of points. Some observational implications of grid-like space-time were investigated in their study concerning the micro simulations by grids theorists to create nuclei based on the fundamental principle of heavy correlations (called quantum chromodynamics). They suggested patterns provide the anisotropy in the propagation of interstellar ultra-high-energy photons, which will be compatible with certain physicists' theory of simulations if detected [17]. In the study "On Testing the Simulation Theory," published in 2017, Campbell et al. suggested multiple hypotheses to evaluate the simulation hypothesis. In 2019, philosopher Preston Greene implied that it might be prudent to avoid learning if we are

having to live in a simulation, while such knowledge would terminate the simulation.

E. How to access simulated realities

Although it is difficult to validate or observe the simulation hypothesis, it is very simple to read more about it. Hope Reese of TechRepublic compiled a list of the best artificial intelligence texts, like Kurzweil's *The Singularity Is Near: When Humans Transcend Biology*, Bostrom's essential tome *Superintelligence*, and James Barrat's *Our Final Invention: Artificial Intelligence and the End of the Human Age* [16,17]. TechRepublic's smart person's guides on Google's DeepMind, machine learning, and IBM's Watson. Tech Pro Analysis offers a short glossary on artificial intelligence (AI) as well as research on how businesses are utilizing machine learning and big data. Finally, a copy of *Planet Coaster on Steam or Cities: Skylines, Sim City, Elite: Dangerous* has important concepts about simulations. These narrowly defined worlds enable one to explore AI games while building their simulated world.

IV. FUTURE IN THE U.S

Simulation hypothesis and the research method analysis are gaining more attention in the United States. Prominent people like Elon Musk lead the way in giving more limelight to the concept and even funding experiments based on the simulation hypothesis [17]. Companies like NASA and Elon Musk's TESLA will be looking at exploring simulation hypotheses to further their space exploration in the future. The movie industry will also be looking at simulating their films to attract more viewers. A good example is the *Matrix* movie which attracted many viewers across the globe.

V. ECONOMIC BENEFITS TO THE U.S

The significance of the simulation hypothesis is shown by the fact that several global companies will use it and see it as an important part of their operations. When companies start to utilize simulated hypotheses, they help to shape their evolution. Elon Musk was the crusader of these concepts and looks to build his companies around them [17]. With increased efficiency, comes increased productivity. Therefore, the adoption of the simulation hypothesis is economically sufficient for the United States companies as it increases its innovation which will be in high demand around the world. Other companies in the Internet space quickly followed

suit. Facebook, Twitter, and LinkedIn are among the other companies that have used Hadoop in their activities, and all of them contributed to the growth. These businesses make a lot of money by analyzing the data that their customers have. Log analysis, web encoding, data management, financial analysis, mathematical modeling, deep learning, and bioinformatics are some of the data processing activities that contribute to financial progress for many companies and economic development in the U.S.

VI. CONCLUSION

This paper looked at the development of simulated hypotheses and their related concepts. The findings showed that the simulation hypothesis (alternatively referred to as the simulation philosophy or the simulation argument) asserts that we will ultimately be able to simulate the human brain entirely in computer language. Progress in computer processing capabilities, memory, and storage would be so fantastic as to allow digital applications to be created with simulated environments, people, and minds. The simulation hypothesis asserts that if making such simulations were feasible and comparatively cheap, then our future self (or other beings) will help generate several other simulations. Statistically, since there is just one truth and several models (and each is indistinguishable from the real thing), people are more inclined to live in simulation than in reality. It seems, the idea of living in a simulation captured the interest of a lot of Silicon Valley elite, most famously Elon Musk, who often talked about it. It is often rumored that at least one super-wealthy engineering billionaire recruited a physicist to find out how to hack the simulation. In several ways, it makes no difference whether we are in a simulation or not. When in a simulation, it is so powerful that it cannot be distinguished from the actual world. As a consequence, this is the environment we live in, and we can make the most out of it.

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