Digital Entities and the Concept of Social Life in a New Generation of Social Meeting Platforms

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Abstract— **The synthesis of plausible behaviour of avatars in a new generation of social meeting platforms requires solving many problems. The problems are related to the technical aspects and the social contacts goals. Existing models created for video games are not layered enough and reflect only a fraction of the tasks of a digital universe. This calls for the development and discussion of new conceptual models for digital entities, for the synthesis of their social behaviour, and the nature of interaction "user-virtual universe". The proposed paper addresses one element of a new conceptual system for synthesizing the behaviour of three-dimensional realistic social avatars in a digital universe.**

Index Terms— **AI, digital entity, meeting platform.**

I. Introduction

Psychologists argue that man is a highly social being and therefore needs to communicate and interact with other members of his social environment [18]. The set of individuals who do not need such communication with their liked ones is very small. From this point of view, one needs social communication to empathize with other ones. At the same time, many people are highly dependent on being able to feel empathy from other people, i.e. to feel understanding, to have empathy, and to get help from other people to solve their problems.

Social communication takes many forms. It must cover all the social activity needs of the individual to be effective. Therefore, at times of severe constraints on social activity (e.g. due to catastrophes or pandemics), they act as a catalyst to bring new forms of social communication and interaction to replace suppressed ones.

The Covid-19 pandemic is an example of a catastrophe that drastically limits social contacts and forms of communication. The restrictions introduced have led to extreme social problems. They have affected the mental health of many people. Attempts to compensate for taking away opportunities for social activities and interactions with existing digital communication environments led to "fatigue" with their inadequacy.

At the beginning of the Covid-19 pandemic, mobile communication using smartphones and teleconferencing systems (e.g. Zoom and MS Teams) was a partial substitute for limited social networking. As constraints intensified, these communication environments became inadequate: people started to be classified this generation of social platforms as "disruptive". From the point of view of psychologists, this is a perfectly understandable reaction because the use of a "crutch" in everyday life only reminds us that a person is sick.

The question "What is the alternative?" was repeatedly raised in these few years, and society was forced to find some adequate solution. Much to the surprise of many professionals, the solution has long been proposed and repeatedly explored, but not in the scientific literature, but in novels in so-called "social science-fiction" with post-apocalyptic scenarios. This solution is called the "digital universe".

The digital universe is a virtual-reality (digital) platform where people are represented by avatars. Research by psychologists gives hope that virtual platforms with enhanced features may provide the necessary environment for social communication and networking to mitigate the unfavourable effects of limiting/restricting real-world contacts. Maybe the idea is unrealistic and even utopian but the possibility of social restrictions like those imposed for Covid-19 was also seen as something impossible to happen before a few years.

The man who coined the term "digital universe" and set the foundations for understanding what digital social communication is all about is fiction writer Neal Stephenson. In 1992, he published the novel Snow Crash [1]. He describes a digital social platform where people "live" because their natural universe has been severely damaged by a catastrophe. The digital universe has the name "Metaverse".

What is the concept of the proposed digital universe? The answer is both simple and complicated. In reality, Stephenson describes a digital platform as a virtual world where people "live" as they would like to live in their "damaged" world. The complexity of the problem is how people imagine true-life: everyone has his/her preferences, grievances and disagreements. That's why trying to bring it all together on one platform is such a complex problem: to get all users to be happy is so difficult. The complexity of the problem to be solved forms the general trend in the market for such platforms: before a single standard is introduced, as many digital virtual platforms as possible need to be created and used. Thus, users will only form the list of requirements for platform functionality, the list of necessary constraints for freedom of realized actions in the digital environment (the so-called "digital universe ethics"), the understanding of

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acceptable forms of social activities in the digital universe, and the connectivity between social actions in the life and digital universe.

The proposed paper is part of a project: the project's goal is a defining a new concept to synthesise the social behaviour of digital entities as a part of the "Digital Universe" concept. The development aims to propose models for generating plausible social behaviour based on terms such as "need", "harm", "benefit", "social behaviour", "physicality character model", "character's psychology", and "character's cognitive abilities". The step is necessary as a stage of the "social digital persona theory" development process.

II. "Digital universe" as a concept

The "Digital Universe" concept has three main elements determining its success within a large set of cyber social scenarios. These three elements are the digital environment, avatars, and the quality of “life” (i.e., possible social behaviour patterns). "Metaverse" is the most used name for this class of digital universes [2], [8], [10], [11], [14], [16].

The digital environment is a model of the 3D environment (buildings, exterior, house interior, vehicles, city infrastructure, etc.) where digital avatars "live" and "reside". It, therefore, necessitates the need to conform to the stereotype that digital environments must resemble existing real-world environments for people to feel "comfortable" in them. This stereotype defines not only the interiors and exteriors of buildings and their location in the city but also the necessary infrastructure, transport, general forms of domestic energy, water supply and sanitation, and other elements of the urban environment and infrastructure. The result is a need for serious planning and design of the digital environment to reduce the physical constraints to carrying out the necessary social activities and interactions.

Already in "Snow Catastrophe", the importance of all the environment's elements for understanding the meaning and significance of the described social contacts and interactions between the characters becomes clear. Therefore, Stephenson devotes the necessary space in the narrative to describe the environment:

- The city is planned as one big street along which all the buildings are located: public buildings, hotels, restaurants and bars, residential buildings and shops.
- The planning of the buildings corresponds to people's classical understanding of the particular type of building according to the property owners' needs and financial opportunities.
- The city's infrastructure is also part of the idea of the environment - moving cars and means of public transport, including a form of the metro.
- The main form of domestic energy is electricity: the city has street lighting and it is based on electricity.
- The transport is based on internal combustion engines.
- There are sewerage and water supply.

Stereotypes are necessary, but they are not all-encompassing. There are opportunities to create variants of environments, which most often manifest themselves in the so-called "scale of the digital universe": size and number of towns; location and type of municipalities; administrative organization and structure; climate belt; etc. The variety of customization possibilities is vast and psychologists consider this to be a potential for different scenarios of social organization, the interaction of people, manifestation and clash of ethics and morality.

The digital environment is created to provide a place for social networking. It is not an end, but a means to an end: providing social interaction within a virtual form of human life. Because of this, the main focus in digital universes is on digital versions of people. Stephenson coined the term "avatar" for those digital versions of people who "reside" in the digital universe. He also "assembled" the basic understanding of the necessary characteristics of avatars, but with changes in society and the quality of life, the avatars' social goals have changed significantly. Basic avatar characteristics are assumed to be the minimum necessary for a "full experience" of social contact:

- The model includes body geometry, visual characteristics of the body (colour, texture, etc.), clothing, accessories, other personal elements, etc.
- Each user controls his/her avatar in real-time through peripherals that are part of a virtual or augmented reality system of varying sophistication.
- The user's perception of what is happening in the digital universe occurs through feedback implemented in the computing device. According to the hardware "power" of the virtual system, it can have different implementation variants. The minimum required are text, sound and video. Real-time motion capture is also not a technological problem, while "virtual skin" is still advanced technology to implement for general purposes.
- Each user can access both "online" and "offline" system resources to set up their profile.
- The dimensions and proportions of all elements in the virtual environment are determined according to the dimensions of people: the dimensions and proportions of the character are chosen according to the actual sizes of the people.
- Each user can choose gender, race, nationality of characters and related characteristics: structure and musculature, body element proportions, joint mobility, colour and texture of skin and hair, etc.
- The physical characteristics of the avatar are not arbitrarily assigned but are based on stereotypes, such as athletic, full, fat, thin, etc. Each user can have multiple avatars' physical bodies: the current one is selected at login.
- The mental characteristics of the avatar are only the result of the user's behaviour and the activity history of the current avatar. Therefore, each user should be responsible for the enhancement of avatar characteristics.

The main quality criterion of any newly created digital universe is the plausibility of replacing natural social communication with communication in the digital universe. The developers' understanding of the difference between the concept of "life" (i.e., physical existence) and "social life" is the main factor in the degree of credibility that is achieved. The aim is for environments that bring the user closer to an understanding of "natural" life, i.e. the platforms should

provide the equivalent of real-world environments for physical existence and social communication and interactions between individuals in a particular social group (i.e. within a social community).

The adequacy of the realized social behaviour is determined by the degree and quality of realization of various social signs and stereotypes. Psychology argues that there is the interchangeability of different cues that help us to perceive another person. At the same time, the cues that can be used to evaluate the traits or qualities of a particular individual are many and varied in nature. Thus, a crucial role in selecting a subsequent action and form of interaction plays hidden trait identification. Naturally, there are more important and less significant traits, but this is related to predispositions or conditions of manifestation.

Psychologists have found that people (in general) tend to justify their actions by the good and bad qualities of others, by their strengths or weakness. The self-delusion that the presence of "this particular person" at "this particular moment" is the cause of some of the actions is one of the basic stereotypes of many people's behaviour. This type of stereotypical thinking requires a deep study of the multiperson interactions' explicitness in different social groups as an element of the plausibility of the digital platforms for social meetings and contacts.

The proposed concept of a model of behaviour in interactions with another individual mainly emphasizes the following sources of information:

- Visual prosody and body language: silhouette posture, facial expressions, body language, gestures, occupied posture and other primary visual cues acting as psychological triggers.
- Articulation or sounds produced as additional elements of behaviour.
- Nature of performing movements and way of realizing stereotyped actions of everyday life: Comparison with "normal behaviour" allows us to assess the person's emotional, mental, and physical state.
- Situational and contextual information (i.e., conditions, ethics rules of a social group, and persons' networking constraints) about the implemented multipersons' interaction. The information is highly helpful because it allows being made parallels between things that have happened, conditions and behaviour, knowledge and behaviour, behaviour and social environment, person's behaviour and a group's behaviour.

Our research in this area has defined several axioms:

- There is never only one source of helpful information, so you need to collect data and information from all available sources alongside the characteristics of the individual.
- Information needs to be processed not separately but in combination. That understanding improves judgment correctness because events are very often temporally related.
- Every behaviour has a history without which it cannot be evaluated.
- Living people change their behaviour over time, i.e. they have a recognizable change of action in the same scenario. This is the so-called "human enhancement".

Despite all the technical difficulties everyone working in the field of digital universes understands that the only correct direction of development is the one that can be expressed in the sentence: "The digital universe users should be able to do everything they do in their true-life." Our opinion is shared by many other researchers and developers. [4], [12], [13].

III. CHARACTERS IN THE DIGITAL UNIVERSES

Characters are a traditional technique for storytelling so that the reader or spectator has to reach just what a narrative conclusion needs. The character's physical appearance and behaviour help build the necessary mental relations for a more complete perception of the story being told. Therefore, the most common understanding of the term "character" defines a character as "A personality that is a copy of a human being with all the characteristic traits, abilities and behaviour".

In the case of digital universes, a character is a digital form of a human being created for a specific task. Characters may not express human nature fully, i.e. characters are created according to the specific scenario.

When the behaviour of the character is controlled only by the platform software, such characters are called "system characters" or NPC (non-player characters).

Fursona is a character whose visual presentation depends on the character's mental essence, i.e., shape shows mental nature. Therefore, the appearance of a fursona can vary: Most often, it is an anthropomorphic form of some animal (e.g. a cat that walks only upright) or some mythical form of an animal or character (e.g. a dragon or a troll). The most significant element of the fursona is its behaviour because the mental image of the fursona is obtained by comparing and evaluating it against human behaviour. Therefore, the fursona is frequently used as a counterpoint to one of the characters or as a benchmark for good or bad.

A digital avatar ("avatar" for short) is a computer representation of users in a digital interactive environment by users to represent their digital self (Latin: alter ego). They are a graphical presentation of users (i.e., users' characters) to perform a particular action. So users can lead a virtual life in the digital universe, i.e. users can have a different representation in nature and the digital universe without this being a sign of a mental disorder. The term origin is in theoretical research on split personality in mental disorders.

Avatars can be divided by several attributes:

- Depending on their quality: avatars are divided into 2D, 3D and photorealistic.
- Depending on the body: partial-body avatars and full-body avatars.
- Depending on the control user techniques: voice assistants, VR avatars, AI avatars (avatars with partial artificial intelligence), virtual beings, and artificial beings.

IV. THE CONCEPT OF "LIFE IN A DIGITAL UNIVERSE"

Digital universes are created to realize a plausible replacement for true-life social communication. Therefore, the "digital life" concept describes a set of digital characters'

activities that seek to approximate true-life social activities.

The developed concept encompasses three main elements of social behaviour synthesis:

- Avatar functionality;
- Physical and social activities of the avatar; and
- Relationship between true-life and life in a digital universe

4.1 Avatar functionality

The maxim "I should be able to do everything I do in life" [4], [12], [13] requires several mandatory features of virtual social networking environments to be realized:

- Co-presence is the feeling of being in the same space as another person, i.e., the digital virtual space must be accessible to multiple avatars simultaneously.
- Social connection: Availability of attention, empathy and involvement manifest the completeness of a relationship between persons. Usually, social signs include realistic gestures, body language, social behaviour patterns, and emotionality.
- Anonymity: Digital universe platforms provide an opportunity for users to be able to realize their dreams and desires for a new lifestyle and social activities. This virtual platform advantage cannot be achieved if a user can recognize a true person in an avatar. Therefore, one of the major ideas is the impossibility of linking an avatar to a true person: this is a mandatory requirement for both users and platform administrators
- Commitment: Social environments must allow the individual's commitment to causes and social ideas to be manifested. To this end, the digital universe must allow for advertising and PR campaigns, various forms of public discussion (e.g. via social networks), exhibitions, and other forms of views, beliefs or ideas.
- Self-expression and social identity: The expression of the user's self is one of the major features of digital universes. Self-expression is a kind of "social valve" of true-life in a digital universe. With the ability to select a character's stereotype and body structure, avatars are a natural approach to solving the problem of appearance as part of an individual's confidence in social interactions.

Another presentation of self-expression is attributes such as hairstyle, colour, clothing and accessories, i.e. it is a mandatory requirement that each user can change the visual presentation of his/her avatar. The ability to implement these changes easily and quickly is one of the platform's features that users use most often.

- Communicability: Critical importance for social communication has the ability of avatars to use all forms of true-life communication: gestures, sound, expressions, emotion, speech, phone calls, messaging, letters, courier shipments, etc. Research shows that the more advanced forms of communication consumers can use, the immersion in the virtual environment is more realistic and deeper.
- Trust: Users need to have security in the platform, i.e. they need to be assured that platform administrators are not assisting other users with "inside" information, personal data, or additional administrative actions that provide an advantage over other users. It is, therefore, necessary to respect the following rule: “We equal by birth in the digital environment, but after the birth we grow differently: our enhancement is the result of our behaviour and activities only."
- Learnability: The ability to mentally evolve the avatar is another of the much-anticipated capabilities of next-generation social networking platforms. The research showed that optimal training should be done by explicit and implicit learning: explicite learingn of knowledge, techniques, and skills; implicit modification of abilities as necessary knowledge and skills are acquired. The avatar's enhancement by mental activities affects the psychological sense of the 'reality' of digital life.

4.2 Existing basic stereotypes of the physical and social activities of the avatar

The idea of "living" in the digital universe is closely related to the social activities that users should and can perform in the "skin" of avatars. To achieve this quality, users should feel at least as comfortable in the avatar's body as in the physical space around them (at home, at work, in public places, "outdoors") [3], [5], [6], [7], [9], [15].

As part of the project, we defined the following list of minimum requirements for the digital universe for social networking and group activities:

- Platforms such as Zoom, MS Teams, WebEx and Google Meat have proven inadequate in their approach as a replacement for true social communication. The main problem of these platforms is the two-dimensionality of video streaming, which tie down the successful recognition of social markers in communication.

This problem has long been known in cinema: showed contact level between the artist and the computer character can be enhanced by placing a 3D life-size puppet of the character in front of the artist. Otherwise, the artist cannot realise proper interaction and contact behaviour (e.g., "Steward Little" series). Teachers were the first to be convinced of the importance of the numerous set of social markers available: the absence of student in the teacher's physical space prevents that contact that turns a lecture from listening to an audio book into teaching. This is why platforms such as vFairs, MootUp, Breakroom, LearnBrite, VirBELA, Engage and MeetYoo are rapidly growing their market share.

- Avatars are one of the most logical interoperable elements for a digital universe because it represents the digital self of users. To feel "comfortable" and "at ease" in their avatar's skin, consumers need opportunities to dress and shoe the avatar in famous brands, as well as use accessories (jewellery, bags, hats, etc.) and cosmetics from world-famous companies. Research shows that the digital universe only reinforces the desire for style and fashionability.
- An avatar-based social event platform is any technology that presents event attendees with a virtual representation of their physical presence. By replacing

the profile with a photo, avatars have expanded the possibilities for real-time networking and interactions. Although the quality of avatars is not high enough and varies from platform to platform, this is an ever-evolving application field. In the years of constraints due to Kovid-19, many virtual events using avatars were realized: new product launches, conferences, meetings with readers, and celebrations on different occasions.

- A closely related application, but requiring a very different approach, is the realization of virtual expositions, exhibitions and fashion shows. The big problem in this case is the need to use a very high-quality digital environment, a large number of NPC-agents and their interaction with users. The success of several fashion shows and virtual exhibitions has led to a "boom" in the field, and the 2022 and 2023 calendar of such events rivals the calendar. Avatars of famous models (e.g., Imaan Hammam and Natalia Vodianova) can now be hired to participate in fashion shows.
- Virtual platforms boosted the interest in virtual meetings with celebrities and are therefore much in demand by celebrities whose social role obliges them to have contact with fans and admirers. The growth has been so fast that a secondary market has emerged with digital celebrity autographs.

The major limitation is the avatar's quality both in terms of vision and stereotypical reactions (i.e., behaviour).

The second problem is a technological challenge: has user ability to control the avatar by an AI agent. The survey showed that users want to be able to set the underlying goal and behaviour pattern, and then have everything synthesized by the AI agent.

- The Internet has developed the business of goods in a digital environment. Shopping on the web is an everyday thing now. Market trends studying shows that businesses can get a qualitative leap by providing personal advisors for each buyer and having the option to try out the goods before buying only. The conclusion relates not only to clothing and cosmetics products but it is valid to other products (e.g. mattresses). Digital avatars commanded by AI agents and realistic digital models of goods have great potential in these areas of use in everyday life.
- The purpose of the digital universe is to mimic real life. Therefore, laws are a fundamental element of human sociality. So, a list with ethic rules in the digital universe is the legal order to solve problems. Ethic rules are a mandatory codex for digital persona behaviour in the digital universe: if someone violates the ethics, the administrators' tracking systems automatically should block the account or impose penalties (including monetary).

In a more evolved form, the digital universe can implement the ideas of court, police and prison, but more extended AI agents can be implemented to generate the extended version of sociality organization.

- People are constantly selling or buying goods, receiving and spending money. Buying and selling are everyday human activities, and therefore, without these activities, people feel as if they have lost an essential part of their lives.

Cryptocurrency isn't a new business concept. It was introduced in "Snow Crash" first. Ownership and change of ownership are natural social attributes and activities. There can be no normal society without money and money-based social relationships between persons. Blurring the distinction between people's ownership of the digital universe and real life is one of the big expectations in the new generation of social platforms.

4.3 Relationship between true-life and life in a digital universe

From the beginning, digital universes have created a different form of subcultures, which after their initial development in the digital universe have migrated to true-life. It is not some new phenomena because such subcultures have arisen before (for example: comic books). The problem is that users have wanted to bring the ethical rules of the digital universe into true-life.

The emergence of persistent subcultures has practically always provoked a significant reaction in social groups or human society. The digital universe is no exception, and we identify several perceived stereotypes associated with behaviour in and out of the digital environment. The list of stereotypes that have the most widespread influence on the characteristics of the digital universes includes the following ones:

- Relationships between avatars cannot carry over between users in real life. Therefore, nothing that happens in the digital universe is grounds for claims in real life.
- The digital universe has an ethical and legal code that are binding on avatars, i.e. these are the frameworks of permitted behaviour of the digital platform users. Laws and rules in true-life do not apply to avatars and their behaviour.
- No one can reveal the identity of the user behind an avatar. It applies to both the digital universe and true-life.
- The avatars of the same user in two digital universes should not allow for definable identities.
- Users can convert money to cryptocurrency and vice versa: the platform administrator sets an exchange rate.
- The platform administrator cannot destroy an avatar, regardless of how long it has been unused. Destruction is only for violating the legal and ethical rules of the digital universe.
- Every company and lawyer's office can set up offices in the digital universe. Transactions in these offices can refer to properties and activities in both the digital universe and true life (e.g., instead of visiting a lawyer in another city, it is realized a meeting in the virtual lawyer's office).
- Transactions in true-life cannot refer to property in the digital universe.
- Income in the digital universe cannot be taxed unless the cryptocurrency exchange into money.

- Avatars and everything associated with them (presentation, behaviour, ownership) exist only as an element of a specific digital universe.

Within our concept of the new generation of digital social platforms, we define the development of a system of archetypes as the cornerstone of the process of the digital universe development.

We believe that this formal approach to entity descriptions is the most deterministic, and it allows both the creation of logical models and the formal validation of these models.

V. Conclusion

The future of social interactions in social environments is now clearly defined. For the last 2 years, the leading firms in the computing business (Meta, Google, Microsoft, IBM, NVidia) have literally "poured" enormous money into the development of digital platforms: estimates put it at several tens of billions in the last year. There is still no common standard for the functionality of this class of virtual platform. There is not even a common concept, including a common understanding of the capabilities and limitations of avatars. Nevertheless, the community are really amazing because people feel the need and this kind of environments for social events and business. According to preliminary estimates, business expectations are for over 20 trillion dollars in revenue over the next 10 -15 years.

The development of the hardware is defined as a guideline clearly: wireless connectivity, high transmission speed and quality, realism of images, development of the transferred sensory, in which the most important problems are taste, smell and user's skin sensoring.

The software development is the important issue at this stage. The problem is not technological. it is conceptual because the most used behaviour model is based on IT agent development process for video games. The main problem is the difference in the goals of a video game and a social communication platform: it is the game player's contentment after "mission" ending, whereas social communication and social life are not just fan [17].

The absence of an established international standard for the "digital universe" concept allows presenting many new and innovative ideas. Our view shows that the further the concept design is far from the behavioural models in computer games, the more successful it will be for next-generation social communication platforms.

The proposed paper is part of our theoretical model created within a project focused on the use of enhancement virtual reality based digital universe for a new generation of social networking platforms. The paper is theoretically related to our previous paper on the topic "Digital Characters and the Concept of Feeling, Perception, and Mind" [19].

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