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RESEARCH ARTICLE

Initial designs of artificial humans: intellectual property and ethical aspects

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ABSTRACT

Startups and tech giants, working on the computer replication of human personality, are showing remarkable progress. A substantial part of this activity concentrates on the engineering of artificial life-enabling instruments that fall within the scope of intellectual property law. However, the rendering of virtual people based on a pre-designed technological basis raises new social dilemmas. This article covers five aspects of the activity. First, the initial experiments and main approaches to the computer emulation of humans are observed. Secondly, the interrelated ethical, legal, and technological challenges of the artificial person phenomenon are examined. Thirdly, licensing provisions on using the backbone platform of replicated individuals are considered. Fourthly, the allocation of virtual humans under the legal regime of the public domain is discussed. Finally, amendments to upgrade the relevant standpoints of law, fuelled by the progress of mind-uploading engineering, are elaborated. Overall, the study adds value to the development of legal and ethical principles for the science and technology of artificial life.

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KEYWORDS Artificial human; cyber ethics; intellectual property

> In the age of artificial intelligence and technological transhumanism, we need new predictive and proactive regulations protecting the rights of people and their digital extensions.[1]

1. Introduction

1.1. Artificial life initiatives

The virtual human is one of the conceptual artefacts to emerge from the progress of artificial intelligence (AI) science. In the current state of the art, artificial persons mostly tend to be 'software programs which present as human,

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[1]SJ Lilley, *Transhumanism and Society: The Social Debate over Human Enhancement* (Springer Science & Business Media, 2012) 47–53.

and which may have behavior, emotion, thinking, autonomy and interaction modeled on physical human capabilities'.[2] Computer-generated characters used as digital assistants, chatbots, and video game avatars can imitate human-inspired behaviour, tendencies, and even some of their cognitive abilities. Increasingly sophisticated machines lead researchers to anticipate the development of an 'artificial human' or 'digital identity' as the novel entity based on a particular individual, which exists and acts like her or his continuation, extension, or replacement.[3] Contemporary philosophy and media mirror the phenomenon as artificial immortality,[4] virtual personality,[5] emulation of a mind,[6] augmented eternity,[7] and uploading of consciousness.[8]

Wired magazine, in 2017, published a story about a venturous experiment in this field. A son created a computer model of the personality of his deceased father ('Dadbot') through the training of an artificial neural network using the individualising and conversational materials accumulated during the life of his parent. Further communication of the experiment's author with the digital realisation of his closest relative allowed him to assert that he recognises the father in reactions and replies of his emulated version. The replicated identity has a set of qualities and performances that include communication manner, vocabulary, attitude to events, and even the character of the physical predecessor. One of the meaningful results of this experiment became the confirmation that the 'artificial consciousness' of the modelled personality is not frozen in time but continues its evolution under the influence of incoming information flows.[9]

Microsoft Research since 2000 has been supporting the Digital Immortality project of two researchers, Gordon Bell and Jim Gray. Digital immortality is a technology of transmittance of a human's memory and cognitive abilities on more durable media.[10] Recently retired, but still thinking and talking on artificial life topics, Gordon Bell supposes that lifelogging and the photographic memory, which may serve as the data source for human replication facilities, can be another background feature of modern communication devices and computer platforms.[11]

[2]D Burden and M Savin-Baden, *Virtual Humans Today and Tomorrow* (CRC Press Taylor & Francis Group, 2019) 17–19.
[3]B Siciliano and O Khatib, *Springer Handbook of Robotics* (Springer, 2016) 1789–2159.
[4]M Häyry and T Takala, *The Future of Value Inquiry* (Rodopi, 2001) 43–52.
[5]P Gebhard and K Kipp, 'Are Computer-Generated Emotions and Moods Plausible to Humans?' in *Intelligent Virtual Agents: 6th International Conference, IVA 2006, Proceedings* (Springer, 2006).
[6]D Dietrich and others, *Simulating the Mind: A Technical Neuropsychoanalytical Approach* (Springer Science & Business Media, 2010) 377.
[7]MH Jacobsen, *Postmortal Society: Towards a Sociology of Immortality* (Routledge, 2018) 178–83.
[8]RJ Gennaro, *The Routledge Handbook of Consciousness* (Routledge, 2018) 18–27.
[9]J Vlahos, 'A son's race to give his dying father artificial immortality' *Wired* (2017). www.wired.com/story/a-sons-race-to-give-his-dying-father-artificial-immortality/ (last accessed 3 April 2022).
[10]G Bell and J Gray, 'Digital immortality', Microsoft Research. MSR-TR-2000. www.microsoft.com/en-us/research/wp-content/uploads/2016/02/tr-2000-101.pdf (last accessed 4 April 2022).
[11]M Elgan, 'Lifelogging is dead (for now)' Computerworld, 2016. www.computerworld.com/article/3048497/lifelogging-is-dead-for-now.html (last accessed 4 April 2022).

Google, in 2012, launched the Google Brain project focused on the development of various aspects of AI and machine learning. The goal of machine perception efforts is to improve a machine's ability to hear and see so that computing machines may naturally interact with humans by focusing on building deep learning systems to advance the state-of-the-art and apply ideas to real products.[12]

The startup community is also actively working on projects in the field of artificial humans and digital immortality. Startup Luka has designed a personified chatbot that imitates communication with a dead person based on the accumulated array of his intravital text messages. This chatbot is created by training the neural network to reproduce the conversation patterns of this person with friends and relatives, using the TensorFlow development tool.[13] The idea and technical solution of the Luka experiment form the basis of the Replica application, which allows generating and upgrading the so-called 'virtual friend' with whom the user can talk. The startup founders report that already several million people worldwide use 'AI friends'.[14]

The Augmented Eternity project applies contextual inference network and machine intelligence technology. This approach enables the building of a digital avatar of a person that can support context-aware interaction with people after the death of the human. The actual multimodal context of life diverges from the internal reactions and expressions of a human, thus each person, in reality, looks like a thousand personalities at once, and this fact is often missed in AI systems today. This project tends to overcome the problem by making an evolving ontological mapping of an individual based on her digital interactions and allows to represent itself in the form of a software agent. The startup is aiming to open-source its developed 'identity render kits'.[15]

1.2. The technological nature of the virtual human and its implications

For now:

> A virtual human is, fundamentally, a computer program. In the far future, it may be something else, but for the foreseeable future, a virtual human is

[12]Google Brain Team (2012). https://ai.google/research/teams/brain (last accessed 4 April 2022).
[13]TensorFlow is the AI platform for dataflow, neural networks, machine, and deep learning applications. Google Brain team has invented the computer platform and made it accessible under the permissive free software license Apache License 2.0. Artificial intelligence developers actively use this instrument.
[14]O Balch, 'AI and me: friendship chatbots are on the rise, but is there a gendered design flaw?' *The Guardian* (2020). www.theguardian.com/careers/2020/may/07/ai-and-me-friendship-chatbots-are-on-the-rise-but-is-there-a-gendered-design-flaw (last accessed 4 April 2022).
[15]H Rahnama, 'Augmented Eternity and Swappable Identities' *MIT Media Lab* (2019). www.media.mit.edu/projects/augmented-eternity/overview/ (last accessed 4 April 2022).

> simply code and data which has been designed, and may be evolving, to give the illusion of being human.[16]

There are two leading approaches to the designing of digital identity.

The first method involves the use of Machine Learning/Deep Learning (ML/DL) methods[17] and the stack of related technologies embracing pattern recognition and matching, synthesis of cognitive processes,[18] emulation of emotions.[19] Besides natural language processing, image analysis and face tracking systems make the list of human replication techs. This method works as follows. Developers train the generative adversarial network (GAN) on a simple-to-complex basis to reproduce memories, communicative patterns, emulate mental processes and outward expressions, using the corpus of individualising and life-logging information (personification dataset), belonging to the particular individual, thus producing its impersonated computer avatar.

At the first stage, the model uses the simpler selective algorithm choosing relevant communicative and behavioural exemplars from the collection of authentic responses of the human original. At the next step, it learns to generate new contextually determined reactions typical for her or him. The continuously training avatar acquires the ability to reproduce at a relatively fine-grained level of detail the reasoning and emotions of the reconstituted individual. The data kit for machine learning includes a maximum of available information generated and accumulated by a person within their ongoing or completed life. It embraces the data reflecting the human's knowledge, the system of its views, apperception, written and read materials, audio and video conversations, messages, photos, and other life-logging records.[20]

The second method, titled whole brain emulation (WBE), has its roots in computational neuroscience research. It focuses on understanding the brain by making mathematical and software models of neural systems,[21] also known as a human connectome.[22]

> The basic idea is to take a particular brain, scan its structure in detail, and construct a software model of it that is so faithful to the original that, when run on

[16](n 2), 3.
[17]E Alpaydin, *Introduction to Machine Learning* (MIT Press, 2020) 533–655.
[18]O López-Ortega, *Computer-assisted Creativity: Emulation of Cognitive Processes on a Multi-agent System* (Elsevier, 2013) <https://doi.org/10.1016/j.eswa.2012.12.054>.
[19]M Goya-Martinez, 'The Emulation of Emotions in Artificial Intelligence Another Step into Anthropomorphism' (2016) *Emotions, Technology, and Design* 171. <https://doi.org/10.1016/B978-0-12-801872-9.00008-9>.
[20]L Museros, O Pujol, N Agell, *Artificial Intelligence Research and Development: Recent Advances and Applications* (OS Press, 2014) 35–44.
[21]MH Lee, How to Grow a Robot. Developing Human-Friendly, Social AI (MIT Press, 2020) pp. 125-143.
[22]O Sporns, G Tononi and R Kötter, 'The Human Connectome: A Structural Description of the Human Brain' (2005) 1(4) *PLoS Computational Biology* e42. <https://doi.org/10.1371/journal.pcbi.0010042>.

> appropriate hardware, it will behave in essentially the same way as the original brain.[23]

The roadmap of the WBE project contains an analysis of existing and prospective technologies needed for its implementation as well as a list of the main uncertainties in relation to how it would function and proposed experiments to reduce these queries.

These two basic technological approaches at a proper stage of their evolution will likely be integrated. Today, however, the emulation of artificial personalities remains at the level of experimentation rather than mature technology. Falsifiable design is the term given to low-level personality imitation trials in 2007,[24] though nowadays scientists have already resolved or at least come close to addressing most of the discovered uncertainties. The updated guide of the WBE project clearly defines the stages of artificial identity emulation and establishes measurable requirements for applicable technologies and quantitative criteria at each step.[25]

The above experiments and designs of artificial life rely on computer technologies.[26] This phenomenon inevitably raises questions of ethical sovereignty, legal autonomy, and technical independence of replicated humans.[27] The mere existence of a virtual person, its moral and legal status may prove to be critically dependent on the backbone technology used for its emulation and subsequently from designers and rightsholders of the platform. Skeptics point that we are too far from full-fledged personality uploading, but experiments run, underlying technologies rapidly improve, so it is time to solve this query. The alternative would be to turn a blind eye to this already visible problem.

2. Methods

The methodology applied in this study decomposes the legal and ethical challenges of artificial humans, which are rooted in the engineering nature of this phenomenon. It includes analysis of, and recommendations

[23] A Sandberg and N Bostrom, *Whole Brain Emulation: A Roadmap. Technical Report #2008-3* (Future of Humanity Institute, Oxford University, 2008) 7. www.fhi.ox.ac.uk/brain-emulation-roadmap-report.pdf (last accessed 4 April 2022).

[24] N Szabo, 'Falsifiable design: a methodology for evaluating theoretical technologies' *Unenumerated Blogspot* (2007). http://unenumerated.blogspot.com/2007/02/falsifiable-design-methodology-for.html (last accessed 4 April 2022).

[25] MD Serruya, 'Connecting the Brain to Itself through an Emulation' *Frontiers in neuroscience* (2017). <https://doi.org/10.3389/fnins.2017.00373>.

[26] CM Signorelli, 'Can Computers Become Conscious and Overcome Humans?' *Frontiers in Robotics and AI* (2018). <https://doi.org/10.3389/frobt.2018.00121>.

[27] UN Secretary-General's High-Level Panel on Digital Cooperation, *The age of digital interdependence: report of the UN. High-Level Panel on Digital Cooperation* (United Nations Digital Library, 2019). https://digitallibrary.un.org/record/3865925 (last accessed 4 April 2022).

concerning, the application and updating of the currently available IP tools for overcoming the discovered issues.

2.1. Legal challenges of replicated human

The technical nature of a virtual human implies using a sort of pre-engineered development and execution platform for its modelling. To draw an analogy, we should take ubiquitous computer programs, which run under operating systems like Windows, iOS, or Linux, and following their logic characterise the software basis, which supports the functioning of an artificial person, as the Operating System of Artificial Person (abbr. OSAP). We can define the OSAP as essentially the backbone technology of a virtual human.

In software engineering, a functional link often exists between the operation platform and applications built on it. Customised applications, frequently, can run exclusively in the frame of their native operational platform. In this relation, a computer model of a human character as a trained neural network core, sitting inside the OSAP, presumably, will be tightly coupled, down to inseparability from this particular technological ecosystem.

Legally the technical basis of a virtual human is a valuable piece of intellectual property (IP) that can belong to a commercial corporation, a team of authors, an independent self-regulatory community, or one unique individual author. Whatever the case, any potential user must obtain the right to utilise the product from its copyright holder, usually by concluding a license agreement. The owners of commercial-driven IP products typically precisely define and limit all the methods and granted rights for its use. We see that this technological and consequently legal dependence of a virtual person upon its technical basis and copyright ownership gives rise to new social challenges.

2.2. IP-related issues of a virtual person

Owners of operating systems reserve and use their imperative right to compulsorily change the software to fix errors, improve functionality, update versions, etc. Let us assume that they can potentially apply similar processes to the technical basis of artificial humans. The feasibility of such activities implies that there are manipulation threats for virtual individuals. In the case of wicked intention, it becomes possible to control such persons against their will. If we hypothetically admit that artificial individuals can have legal personhood,[28] the enforceable external interventions bring critical

[28]See. e.g. VAJ Kurki, 'The Legal Personhood of Artificial Intelligences' (Oxford Scholarship Online, 2019) <https://doi.org/10.1093/oso/9780198844037.003.0007>.

juridical consequences.[29] The outer influence in the realm of private law could initiate legally binding arrangements, for example, the conclusion of a contract, the acquisition or alienation of goods, illegal activity over the internet, etc. In the field of public law, manipulative technologies could take place in election procedures or the realisation of free speech and expression guarantees.

It is impossible to work around the IP stipulations for those creative works that are built on or co-opt the substantial part of another copyrighted item, and especially for software producing other software. Compiler programs could be a good example of illustration. There will be legal implications for the technologically driven occasions when the 'compiled code delivered by the compiler program has additional content that was not in the original source code'.[30] It happens when the compiler, during compilation, copies parts of its code into the executable program. In such a case,

> it might be envisaged that the executable program shall be considered a derivative of the compiler. In a situation like this, the author of the compiler program might want to claim proprietary rights in the executable based on copyright law.[31]

These legal demands can refer to an artificial person that has been compiled based on the underlying OSAP.

There is another IP-related aspect. In addition to exclusive economic rights belonging to the rights-holder(s) of the OSAP, the circle of its authors, which may comprise programmers, designers, system architects, and other involved creators, keep their moral rights to the copyrighted work.[32] Moral rights protect the personal relationship between a creator and their work. The scope of moral interests embraces rights to attribution and integrity of creative work but not limited to them. The rule of attribution gives creators a choice to either put their name on the copyrighted item or publish it anonymously or under a pseudonym. This right cannot be licensed or assigned away: 'An employer who hires the author to create a work cannot avail himself of this right, though they may own the copyright to it'.[33] The right of integrity prevents any modification, distortion, and mutilation of the work.

Moral rights of attribution and integrity of copyrighted work that are valid in much of the world could act as follows. As noted, there is a high

[29]See. e.g. TL Jaynes, 'Legal Personhood for Artificial Intelligence: Citizenship as the Exception to the Rule' (2020) 35 *AI & Society* 343–54 <https://doi.org/10.1007/s00146-019-00897-9>.
[30]M Perry and T Margoni, 'From Music Tracks to Google Maps: Who Owns Computer Generated Works?' (2010) 26 *Computer Law and Security Review* 625.
[31]Ibid.
[32]Berne Convention for the Protection of Literary and Artistic Works, Sept. 9, 1886 (revised July 24, 1971 and amended 1979), art. 6bis.
[33]E Schéré, 'Where is the Morality? Moral Rights in International Intellectual Property and Trade Law' (2018) 41 *Fordham International Law Journal* 775–80.

probability that a replicated person will have deep integration with a pre-designed technical basis and imbibe a part of its source code. In this case, according to IP rules, we shall characterise the resulting creation as the modification or derivative work of the underlying software, and later we will examine the question in detail. In both cases, attribution and integrity rights belonging to authors of the tech core may extend to the virtual identity founded on it. Thus, the replicated human formally receives the undesired co-authors – developers of the technological platform, endowed with their long-lasting moral rights. The right of paternity enables the developers to stamp their names on the virtual human. The rule of integrity gives them the right to prohibit the use of their platform for engendering a virtual person, plus modification and upgrade of the backbone system without their consent.

2.3. Ethical ambivalence of artificial human

In these juridical circumstances, the independence, autonomy, and self-sufficiency of virtual humans are questionable matters. It is hard to be sure in the free will of an emulated individual, whether it acts on its own volition or under some outer influence. This state of things contradicts the values of a sovereign and secure being of an artificial human in cyberspace.[34]

We believe that the concept of sovereignty and free will in cyberspace, consequentially, originates in Hegel's Philosophy of Right, declaring the direct link between the ethical life, ideas of freedom, and self-consciousness. Hegel writes:

> Ethical life is the Idea of Freedom as the living good which has its knowledge and volition in self-consciousness, and its actuality through self-conscious actions. […] Ethical life is accordingly the concept of freedom which has become the existing [vorhandenen] world and the nature of self-consciousness.[35]

The same doctrinal roots we find in the theory of Ethical Individualism by Rudolf Steiner. It supposes the transformation of the world without violating the natural laws already in place – '[…] treat the life of moral self-determination as the continuation of organic life'.[36]

The integrity of an artificial human with the underlying technology sequentially moves us to explore the matters where the provisions of IP law overlap with the grounds of ethics. The copyright norms that are applied to the software basis of an artificial person jeopardise its right to

[34] J Armitage and J Roberts (eds), *Living with Cyberspace: Technology and Society in the 21st Century* (Continuum New York, London, 2003).
[35] GWF Hegel, *Philosophy of Right*. [originally 1821] (Cambridge University Press, 1991) at 189.
[36] R Steiner, *The Philosophy of Freedom* [1894] *Lulu.com*, p. 132.

life in cyberspace, liberty, security, and privacy interests. We can barely solve the problems within the framework of current IP legislation because it does not imply such a deep convergence of software and human identity and, accordingly, it stays insensitive to the ethical problems that flow from this fusion. Moreover, the copyright system is quite functional to regulate the world's software industry, so it does not enthusiastically adopt proposed revisions.

It is necessary to formulate the query and vividly express the request at the higher level of ethics to initiate an upgrade of the legal system for resolving the issues related to the artificial life phenomenon. As Crowe writes in his work on legal philosophy, ethical theory, and public law: 'It is impossible to fully assess the validity of a law without having reference to these fundamental ethical ideas'.[37]

In this regard, seven requirements outlined by the European Commission Expert Group on AI in the *Ethics Guidelines for Trustworthy AI* form the ethical ground for virtual human phenomenon-driven adjustments of legal regulations. The general discourse of the guidelines asserts that a trustworthy unit of AI should be lawful, ethical, and robust. One of the particular provisions recommends to 'adopt a trustworthy AI assessment list when developing, deploying or using AI systems, and adapt it to the specific use case in which the system is being applied'.[38] This clause sets the ethical principle to handle the legal issues that originate from the deep integrity of an emulated identity with its technical basis.

3. Results and amendments

3.1. Analysis of basic technology exclusive licensing

Next, we study how to ensure correlated ethical, legal, and technical autonomy for replicated persons in the frame of actual legislation using two main licensing types of the underlying technology: non-exclusive and exclusive licenses.

Let us run a thought experiment when someone intends to make a virtual copy of themselves and is eager to guarantee their self-sufficiency and sovereignty. The first probable way to do it is to acquire the OSAP and become its sole owner by concluding the exclusive license or transfer of copyright ownership agreement.[39] Such agreement assumes that the entire set of IP rights,

[37] JG Crowe (2006). A thesis submitted for the degree of Doctor of Philosophy 'Existentialism, liberty and the ethical foundations of law'. <https://doi.org/10.14264/uql.2016.111> (last accessed 4 April 2022).
[38] High-Level Expert Group on Artificial Intelligence set up by the European Commission (AI HLEG), (2019). *Ethics Guidelines for Trustworthy Artificial Intelligence*. European Commission. https://ec.europa.eu/digital-single-market/en/news/ethics-guidelines-trustworthy-ai (last accessed 5 April 2022).
[39] C.M Newman 'An Exclusive License Is Not an Assignment: Disentangling Divisibility and Transferability of Ownership in Copyright' (2013) 74 *Louisiana Law Review* 61.

including exclusive economic rights and moral rights, shall pass to the acquirer. The legal status of a sole owner eliminates any external pretensions to the copyright holder having the computer program core in their possession. Also, it gives him/her the right and possibility to arrange support, modification, and improvement of the operating backbone platform at their discretion.

The buyer can obtain an already existing software package from its copyright owner (whether company or private person) or through the on-demand development of a new OSAP. In either case, the seller shall resolve the question of economic and moral IP rights belonging to hired developers of the product. Generally, with some domestic nuances, common law states recognise works made for hire in the employment context by providing conveyance of ownership in an employer for the creative results of employees produced in the course or scope of employment. For instance, § 201 (b) of 17 U.S. Code states:

> In the case of a work made for hire, the employer or other person for whom the work was prepared is considered the author for purposes of this title, and, unless the parties have expressly agreed otherwise in a written instrument signed by them, owns all of the rights comprised in the copyright.

The issue associated with the clearance of moral rights is more complicated. The United States recognises moral rights only to works of visual arts, and software per se does not figure in the narrowly defined category, so there are no moral rights associated risks to the made-for-hire software in the US. Other Anglo-American statutes embracing Australia, the UK, and Canada, to name a few, recognise the moral rights to the software, which in the work made-for-hire case is vested into either an employee or an independent contractor.[40] Accordingly, the problem of moral rights compliance exists in these countries. In practice, the subject overcomes the problem through the expressed waiver of moral rights, which works in common law states.[41]

The intellectual property system in civil law countries stands on the 'author's rights' doctrine versus the 'copyright' concept of the Common

[40]R Evenden, 'Copyright Protection of Computer Programs in Australia' [2001] *ANZCompuLawJl* 7; (2001) 44 *Computers & Law* 27. http://classic.austlii.edu.au/au/journals/ANZCompuLawJl/2001/7.html (last accessed 5 April 2022).

[41]'Unlike economic rights, moral rights cannot be sold or otherwise transferred. However, the rights holder can choose to waive these rights, in whole or in part. A mere assignment or license of copyright in a piece of software does not, in and of itself, amount to a waiver of the moral rights in the software. It is therefore recommended that, where possible, all assignments and licenses of copyright include a written waiver of the author's moral rights in the software, and that all employees who participate in the creation of a piece of software sign a written waiver of their moral rights in the software'. PB Kerr, 'Computer software law in Canada' (online 2007). http://users.trytel.com/~pbkerr/computer.html (last accessed 5 April 2022).

law.[42] Civil law countries prescribe initial ownership for works made by employment or contract in the employee. Some of the nations (France, Germany, Russia, and China) have specific exceptions for software, exclusive ownership of which vests in the employer. At the same time, the employee author retains moral rights, as they are inalienable once originally consigned in the employee. According to the civil law tradition, authors cannot assign or even waive their moral rights. Provisions of civil law make impossible the complete transfer or alienation of all IP rights for the OSAP to the acquirer, at least in part of moral rights.

To sum up the exclusive licensing option, we have to note that common law provisions make it probable that there will be the complete conveyance of all economic and moral IP rights to the OSAP in favour of the acquirer. The rules encompass the possibility of exclusive rights transmittance, the option of moral rights waiver, and the conveyance of copyrights from hired developers to their employer. These terms included in the agreement eliminate any IP-related pretensions of previous rights holders and assure legal independence and sufficient technical autonomy for the artificial human. By contrast, IP norms in the civilian world do not imply the transfer or waiver of the author's moral rights. Even after the transfer of exclusive economic rights, the moral rights of the OSAP developers will extend to the artificial person created on this technical basis. Thus civil law legal systems cannot provide legal and technical independence for a virtual person.

3.2. Analysis of basic technology non-exclusive licensing

What legal arrangements could provide the independence of emulated persons in case of non-exclusive licensing of their technological core?

According to current rules, if an artefact is created based on previously designed work (the OSAP in our case), it shall be treated either as a modification or a separate derivative work. Software modification means its alteration in one of the following forms. Adaptive maintenance is the software modification to keep it usable in a changing environment, corrective maintenance is the reactive modification of a software product to correct discovered faults, and perfective maintenance is the software modification to improve its performance or maintainability. Among these definitions, only perfective customisation may partly refer to the emulation of an artificial person based on a pre-developed software kernel. The main criterion that prevents us from treating the act of human virtualisation as a modification

[42]See. e.g. P Baldwin, *The Copyright Wars. Three Centuries of Trans-Atlantic Battle* (Princeton University Press, 2016) 1–14; P Goldstein, *International Copyright: Principles, Law, and Practice* (Oxford University Press, Inc., 2001) § 5.2.I.4, 306–8.

of underlying software is that the operation does not imply the emergence of a new quality, obtaining characteristics of a higher order, which occurs within the engendering of an artificial identity.

Derivative work is an expressive creation that includes major copyrightable elements of an original. Derivative work becomes a separate work independent from the original one if the conversion of the underlying work is substantial and sufficiently bears its author's personality. Derivative work should itself be an authentic creation of skill, labour, or judgment. To be regarded as new copyrightable work, the derivative item must be different enough from its precursor and contain a substantial amount of novel material. The incremental enhancements, editions, and remakes have to be original and copyrightable in themselves.

The set of derivative work attributes justifies the use of this legal conception towards the artificial human phenomenon. The application of the personification dataset injects the original copyrightable authorship into the derivative work. This component assures the necessary amount of novelty to the derivative item and makes it copyrightable. In other words, the category of a derivative work seems to be most relevant for the legal characterisation of an artificial human among the doctrinal IP concepts available today.

Proceeding from the point that emulated human identity, rendered on a pre-design software platform, shall be treated as a derivative work, it makes sense to apply special provisions in the non-exclusive license meant to support the sovereignty of a virtual human.

First, the licensor grants to the licensee the right to produce a derivative work based on its initial software (OSAP), using the personification dataset belonging to the licensee. Second, all IP rights, including exclusive and moral rights to the obtained derivative work, belong to the owner of the personification dataset used for the engendering of the artificial human. Authors of the underlying software declare their expressed warranty of waiver from their moral rights in the resulting derivative item. Although, as argued above, we should note that this provision will only be valid in common law countries. Third, the licensor reserves all IP rights in their possession for the initial, nonmodified software, including the right to license the product to other customers on the free market. These terms balance the interests of contracting parties and provide the minimum level of legal independence and technological autonomy for a virtual person from the copyright holder of the licensed backbone technology.

3.3. Legal characterisation of personification dataset

Here we face the fact that the personification dataset – the main component of person virtualisation – is not reflected and protected by present IP law.

As we noted, the personification dataset is a collection of materials used and generated by a particular individual, which influences the formation and evolution of its consciousness. The composition covers self-created information and the content produced by other authors, including original works protected by copyright and those that are not. In both common law and civil law jurisdictions, there are conceptions of compilation and collection of works.

'Compilation is a work formed by the collection and assembling of pre-existing materials' according to 17 U.S. Code § 101. 'Collection of independent works' figures in Part I, Chapter I, and Section 3A of UK Copyright, Designs and Patents Act. 'Collection of works' is found in the IP code of Germany (German Act on Copyright and Related Rights, Section 4 (1)), France (French Intellectual Property Code, Article L112-3), and Russia (Russian Civil Code, Article 1259 (2)). Semantic definitions of compilations and collections make them appropriate legal categories for the lawful determination of a personification dataset. These works may contain material even if someone else owns the copyright for them, but the compiling author needs the authorised permission to do so. Original compilations and collections are endowed with copyright protection.

IP concepts of compilation and collection could embrace and give the desired legal status to the personification dataset, possibly, as an additional *sui generis* subcategory of copyrighted works.

3.4. Artificial persons as non-copyrightable entities

Another theoretically possible legal interpretation of a virtual human is computer-generated work (CGW).

Computer-generated means that the creative work is generated by a computer in circumstances such that there is no human author.[43] Who is the author of computer-generated work? It is necessary to distinguish between two potentially confusing types: works that are created through the assistance of a computer, and works that are computer-generated. In the first case, 'where computers are utilized traditionally to generate a predicted outcome under the direct guidance of human authors […], their use as a mere tool poses no challenge to identifying the creator of the work'.[44] However, from another perspective:

> it is possible that some future computer programs could qualify as authors. We could well have artificial intelligences that are responsive to incentives, unpredictable enough that we can't simply tell them what to do, and that have

[43]See e.g. Copyright, Design and Patents Act, U.K., 1988.

[44]N Basri, 'The Question of Authorship in Computer-Generated Work' *Penn Law* (online 2020). www.law.upenn.edu/live/news/9691-the-question-of-authorship-in-computer-generated (last accessed 5 April 2022).

> attributes of personality that make us willing to regard them as copyright owners.[45]

The fully automatic computer generation of artificial humans based on a predesigned technological core and personification dataset looks reasonably expected.

In this context, there are four theoretically valid options to determine the rights holder and beneficiary of computer-generated work: (a) the author of the program; (b) the user of the program; (c) the program; and (d) none.[46] The first two variants do not contradict the current conceptual IP regulations. The third option belongs to the fruitful but unconcluded discussion on the legal personhood of artificial intelligence. The most promising alternative is the fourth point, which presumes that the copyright for CGW should not vest in anyone. The researchers admit placing CGW created in the total absence of human intervention in the public domain.

The public domain consists of creative works to which no exclusive intellectual property rights apply. Legal foundations of the public domain suppose that rights for the items may have expired, been forfeited, expressly waived, or may be inapplicable. The last criterion of the inapplicability of copyright to a particular type of intangible objects could potentially refer to the phenomenon of replicated humans. Placement of emulated persons in the public domain eliminates any possible IP-related pretensions to them. The opportunity of allocation to the public domain may act as a rational alternative to the licensing methods to ensure the sovereignty of virtual people.

Meantime, there are no statutory foundations for that. We think that modern society should establish the grounds because of the expansion of neurocomputing-based transhumanistic practices. The essence of these foundations concludes in constraints of IP rights to a replicated person for everyone except its human-original, or its representative. This would be a rule for the exclusive right on self-replication. A qualifying hallmark of the norm shall be using the personification data set belonging to a particular person applied for its computer emulation. A personification data set itself is worth being legally recognised as a copyrightable object. Strong arguments are needed if there are to be significant changes to IP doctrine. The fact that engineering capabilities previously have never penetrated so deeply into human life, but today they have been inserted down to computer reproduction of individuality, can serve as ethical justification. At the legal level, a dedicated international convention could be a proper form for the constitution of the proposed principles.

[45] J Grimmelmann, 'There's No Such Thing as a Computer-Authored Work – And It's A Good Thing, Too' (2016) 39 *Columbia Journal of Law & Arts* 403–16.
[46] Perry and Margoni (n 30).

4. Discussion: merits, threats, and regulation of human virtualisation technology

Today, the technology of personality replication stands at an early stage of its development. It is not yet mature enough and it has not penetrated the mass market services. This article describes only the initial experiments in this area. The experience of social development shows that innovative technologies can cause both positive and harmful effects to society. Even one of the most prominent theorists of transhumanism, Nick Bostrom, recognises the potential danger of disruptive solutions.[47] It is necessary to agree with this position since the early stages of novel technology applications do not generate enough statistical data for making reliable conclusions about their safety or the dangers they bring. In the face of a lack of information for analysis, most of the world's legislators prefer to pose certain legal restrictions or a complete lawful ban on using disruptive technologies and applications that have not proven their reliability, social and economic security.

It is happening today, for example, with the international prohibition on all forms of human cloning since they are incompatible with dignity, decency, morality, and the protection of life.[48] Similarly, cryptocurrencies based on blockchain technologies, such as bitcoin and other altcoins, do not have full-blown permission to be used in many countries because of the risks they induce into financial systems. Therefore until 2021, the European Union predominantly followed the same cautious 'watch and wait' strategy, though now the attitude to cryptocurrency is changing.[49] In the AI sphere, the European Commission's independent advisory group recommends legislatively prohibiting the systems of total digital surveillance of people and social credit scoring (rating), which are developing in China and North Korea.[50]

In this context, technologies for human virtual replication based on deep learning of neural networks and whole-brain emulation methods may also raise similar concerns due to the unpredictability of the consequences of

[47]Technology policy should not unquestioningly assume that all technological progress is beneficial or that complete scientific openness is always best, or that the world has the capacity to manage any potential downside of a technology after it is invented. Some areas, such as synthetic biology, could produce a discovery that suddenly democratizes mass destruction, e.g. by empowering individuals to kill hundreds of millions of people using readily available materials. In order for civilization to have a general capacity to deal with 'black ball' inventions of this type, it would need a system of ubiquitous real-time worldwide surveillance. In some scenarios, such a system would need to be in place before the technology is invented. N Bostrom, 'The Vulnerable World Hypothesis' (2019) 10 *Global Policy* 455.

[48]See, e.g. United Nations Declaration on Human Cloning, 2005.

[49]G Pavlidis, 'Europe in the Digital Age: Regulating Digital Finance Without Suffocating Innovation' (2021) 13 *Law, Innovation and Technology* 464. DOI: 10.1080/17579961.2021.1977222.

[50]See, Natasha Lomas, 'Europe should ban ai for mass surveillance and social credit scoring says advisory group' *TechCrunch* June 26, 2019.

their implementation. The question that arises is how the legislator should react to the de-facto start in the usage of such products, their applications, and the underlying technologies: should the legislator encourage or restrict their adoption?

In our viewpoint, the situation is ambiguous. The ambivalence stems from the hypothesis that the technology of human personality computer replication is simultaneously a humanistic and dangerous invention. As often happens in the sphere of innovation, we have to answer the question: where lies the boundary between these two poles?

4.1. The merits of human virtualisation technology

On the one hand, the ability to recreate a human personality by computer means can have a positive social outcome. This effect is that the technology can relieve grief over the loss of a loved one – a relative or friend. The mentioned experiment on the creation of 'Dadbot' and the ongoing communication of its author with his virtual father illustrates this positive result well. The capabilities of the Replica.ai startup also serve the same goals, plus it allows for the creation of a virtual friend who is 'always on your side'. In these cases, the target technology solves significant social problems of overcoming loneliness, alleviating suffering from the loss of a deceased person, and meeting the need to have someone who supports you.

With regard to educational applications, the considered technology may also be efficient in the following way. The pedagogy process can involve the application of teaching avatars of persons who are well known to the students. This approach promises to enhance confidence in the learning process and the quality of absorption of studied materials. We also might hypothesise the positive effects of human virtualisation methods for medical aims. Here we can mention the support for elderlies, caring for patients with Alzheimer's disease, and nervous system disorders. In addition, the considered technology is beneficial for humanistic purposes enabling the computer emulation of terminally ill people since it gives them a chance to continue their living as virtual personalities.

Moreover, the movement towards neurocomputing replication can be an informed and deliberate choice for modern people. Adhering to transhumanistic views, they can voluntarily desire to perpetuate their existence in a virtual form after the finishing of physical life. Even today, techno enthusiasts can generate their digital twin to train and educate it during all times of their bodily living. The goal of this lifelong training is to achieve a precise reproduction of the character of the original person. In scientific journals, we find more and more articles on endowing artificial intelligence units with civil

personhood and capacity.[51] If this recognition eventually happens, the prospects for living in a virtual form will become even more attractive since a virtual person will be able to enjoy most of the civil rights of ordinary people.

The list of conceivably favourable applications of the technology is far from being exhausted by the cases described above. We took just a few self-explanatory examples, which look positive and deserving of social approval.

4.2. The threats of human virtualisation technology

However, there are some downsides. The described technology opens up powerful and sophisticated opportunities for criminal attackers. Especially if digital avatars gain legal personhood,[52] the hackers will have more foundations to replicate someone else's personality to use it for illegal purposes – for example, for the seizure of property, conducting unauthorised transactions, or fraud using identity substitution. Society has already bumped into the malicious use of similar techniques. Often, even a primitive imitation of a human's voice is enough for criminals to achieve their goals. Deepfake tools become more and more effective, enabling the authentical simulation of voice, face, synchronised facial expressions, communication style, and the general appearance of a person. As of now, deepfakes fail due to their imperfections.[53] At the same time, deepfake methods continue to improve rapidly, and their recognition becomes an increasingly difficult task.

In addition, there is a manipulation risk of virtual people by the owner of the operating platform on which they run. As mentioned above, the operating system holding corporation or person can intervene with the program code using development tools and backdoors. This situation stems from the nature of software, containing engineering entrances for debagging and constant improvement. Understanding the technological dependence and the possibility of external intervention will be a mental problem for a virtual person who previously existed in a natural physical form and did not experience such challenges. Today it is not clear how to solve this problem, other than buying out the exclusive rights for the platform. We described this prospect earlier in this article; however, this option is only a theoretical variant, available to a vanishingly small number of people in the world.

[51] B Bennett and A Daly, 'Recognizing Rights for Robots: Can We? Will We? Should We? (2020) 12 *Law, Innovation and Technology* 60 <https://doi.org/10.1080/17579961.2020.1727063>.

[52] RD Brown, 'Property Ownership and the Legal Personhood of Artificial Intelligence' (2021) 30 *Information & Communications Technology Law* 208–34 <https://doi.org/10.1080/13600834.2020.1861714>.

[53] J Langa, 'Deepfakes, Real Consequences: Crafting Legislation to Combat Threats Posed by Deepfakes' (2021) 101 *Boston University Law Review* 761–801.

The list of possible threats of human virtualisation technology can include the provocation of deviant or inauthentic behaviour.[54] Excessive devotion to the virtual avatar of a departed person, such as a child or a parent, can cause behavioural perversions like dependence on simulacra, withdrawal from reality, and mental disorders. Here we can draw an analogy with a morbid addiction to computer games.

Overall, we can pretty exactly predict the threats to the individual and society that computer reproduction of human personality techs can bring. That said, the progress of computer-based transhumanistic practices does not stop. But on another side, society has instruments for effective and rational regulation of relations in this area of innovative movement. We think the law and regulative means are adequate tools to meet the risks.

4.3. Legal regulation of human replication

As a legal remedy against the negative consequences of human replication application technology – but, without imposing a ban on its development in a positive direction – we propose the following system of legal instruments.

First, following the doctrinal foundations of intellectual property, we recommend the establishment of the exclusive right to self-replication. The right to self-replication shall be the legal norm, according to which the possibility of digital replication belongs only to the human-original itself. Besides, human-original can delegate this right to their representative, who must confirm the sovereign will of its principal. Like in the 'Dadbot' experiment, the human-original deliberately and consciously initiated this process. This legal regime aims to prevent unauthorised copying of people and minimise the manipulative perils of this technology.

The second step is to recognise the personification dataset as a copyrighted item protected by intellectual property law. Copyright includes the moral and exclusive rights of the author to allow and prohibit the use of its creative work. The moral rights last endlessly and embrace the right to the integrity of protected work. It is necessary to expand the integrity right on the personification dataset as a basis of human replication. The rule will prevent any intentional distortion, mutilation, or other modification of the personification dataset, leading to the unauthorised change of replicated person and its behaviour. Any external intervention into the personification dataset shall be prejudicially banned.

The third protective legal instrument is the incorporation of special terms, proposed in the article, in the non-exclusive license for the use of the

[54]The European Commission states that a coordinated use of fake accounts or other forms of inauthentic behavior to artificially boost content online is a clear indicator of the intention to use false or misleading information to cause harm. European Commission, Tackling COVID-19 disinformation – Getting the facts right (2020).

operating system of an artificial person. These conditions aim to minimise the risks of abuse of the dominant position by the owner of the tech platform. The terms intend to provide the highest possible legal sovereignty, self-sufficiency, and technological independence for a virtual person.

5. Conclusion

Marshall McLuhan coined the theory of the technological extension of humans in the middle of the last century.[55] In this context, Francis Fukuyama has famously described the threats originating from the prolongation of people's biological life.[56] In particular, he draws attention to the dangers of the planet's overpopulation, the aging of society, and other negative results. In relation to the present study, we have to remark that the risks defined by Fukuyama do not arise or significantly diminish if people would extend their living in incorporeal virtual form. And, nowadays, contemporary society implements these ideas in practice.

This study has analysed the interrelated questions of ethical sovereignty, legal independence, and technical autonomy of an artificial person. It has discussed the legal characterisation of the virtual human phenomenon. We have elaborated special provisions for licensing the backbone technology of emulated humans and we have substantiated the legal status of the personification dataset as a new type of copyrighted item. We have examined the interpretation of virtual identity as computer-generated work and placement of the entity to the public domain. We see the legal capability of virtual persons as the next step for research in this field. In the study, we made a first approximation to the observed problems. The products of this research may serve for ethical and legal harmonisation of coming forms of artificial life.

Disclosure statement

No potential conflict of interest was reported by the author(s).

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[55]MH McLuhan, *Understanding Media: The Extensions of Man* (McGraw-Hill, 1964).
[56]F Fukuyama, *Our Posthuman Future: Consequences of the Biotechnology Revolution* (Farrar, Straus, and Giroux, 1st edn 2002).