A.I., FASHION DESIGN AND THE LAW

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Abstract

This essay deals with the exploration of Artificial Intelligence (hereafter AI) in fashion design by considering a three-dimensional space based on the following coordinates: [complexity]; [education and training]; [made in Italy]. They outline a very wide space in which different techne - Law, Artificial Intelligence and Design - address the challenges of contemporary society. They outline a thoughtful journey of reflection, including socio-economic and cultural aspects, to technical innovation. Specifically, when addressing issues of technical innovation, the emphasis is not on a simplistic notion of technique as a synonym for technology, alluding to mere technical processes and machines, but on techne as "the method of doing something according to art" (Maldonado, 2005, p.7).
In this context, the designer becomes an essential actor in democratic processes, serving as a co-regulator and participating as a rule-maker in the design of rules, algorithms and structures, even before the creation of imaginaries and forms, in the pursuit of convergence (or divergence) between artificial intelligences and human(wet) intelligences.

Keywords: *Complexity; AI; Metaverses; Education and Training; Made in Italy; Fashion Design; Law*

Introduction[1]

Our reflection begins with the concept of [Made in Italy], which is deeply intertwined with fashion design as a prominent manifestation of it (Pozzo, 2021).
The focus here is not on the legal aspects of country-of-origin labels, but rather on the broader corporate culture that influences both small and large Italian companies, guided by the economic policies of our Ministry of Enterprise and Made in Italy (MIMIT). Rooted in a commitment to quality and excellence, with an emphasis on design and tradition, this corporate cultural approach has positioned Made in Italy as a globally recognized brand identity. Designers, through their methodologies and practices, are the main vector of Made in Italy: they engage in processes that can foster a dialogue between artistic exploration and design application, paying particular attention to bodies, identities and our collective memory, rooted in our cultural heritage, landscape and knowledge of craftsmanship. At the same time, they seamlessly integrate technological innovation and industrial know-how (Vaccari & Franzo, 2022; Frisa, 2020). This synthesis of knowledge contributes to the appeal of the 100% Italian product.

1 This writing expands upon the reflections presented at the Conference Fashion, Artificial Intelligence, and Rights, organized by the University of Florence (November 13, 2023).

In connection with [Made in Italy], [Education and Training] highlights the importance of promoting an open dialogue between the educational institutions responsible for providing theoretical knowledge, practical skills and expertise to emerging designers - primarily universities - on the one hand, and the entities that make up the country's economic landscape, namely SMEs, on the other. Understanding the expectations of SMEs, which represent more than 90% of the Italian national economic framework, is of paramount importance for the university system in terms of anticipating the future of design graduates entering the workforce.

The third concept, [Complexity], represents a fundamental characteristic of our time and stands as a crucial epistemological issue that combines "certainty with doubt". It is embodied in the concept of faitiche, a mixture of fact and fetish as described by Bruno Latour, where the distinctions between the realities of facts and individual beliefs become blurred (Latour, 1996). Complexity[2] serves as a cornerstone for any discourse: on fashion design (Monti, 2022) as well as on artificial intelligence, whether simple or scientific. In the absence of an agreed definition (Ebers et al. 2021), we can conceptualize AI as an organic and structured system composed of interactive components, usually hardware and software. According to this broad concept, the overall behavior of the system cannot be directly reduced to that of its individual components, but depends on their interactions. Central to this complex system are the data used to train AI-where they come from, whether they refer to things or people, which are selected to be used and which are excluded, how they are interpreted, how they are communicated, and so on. Data are not inherently neutral or objective, but reflect existing social relations with embedded biases and inequalities (Sinni, 2023). As a result, it is suggested that the term data be replaced with

2 See the definition in Treccani dictionary, 2023. OA.

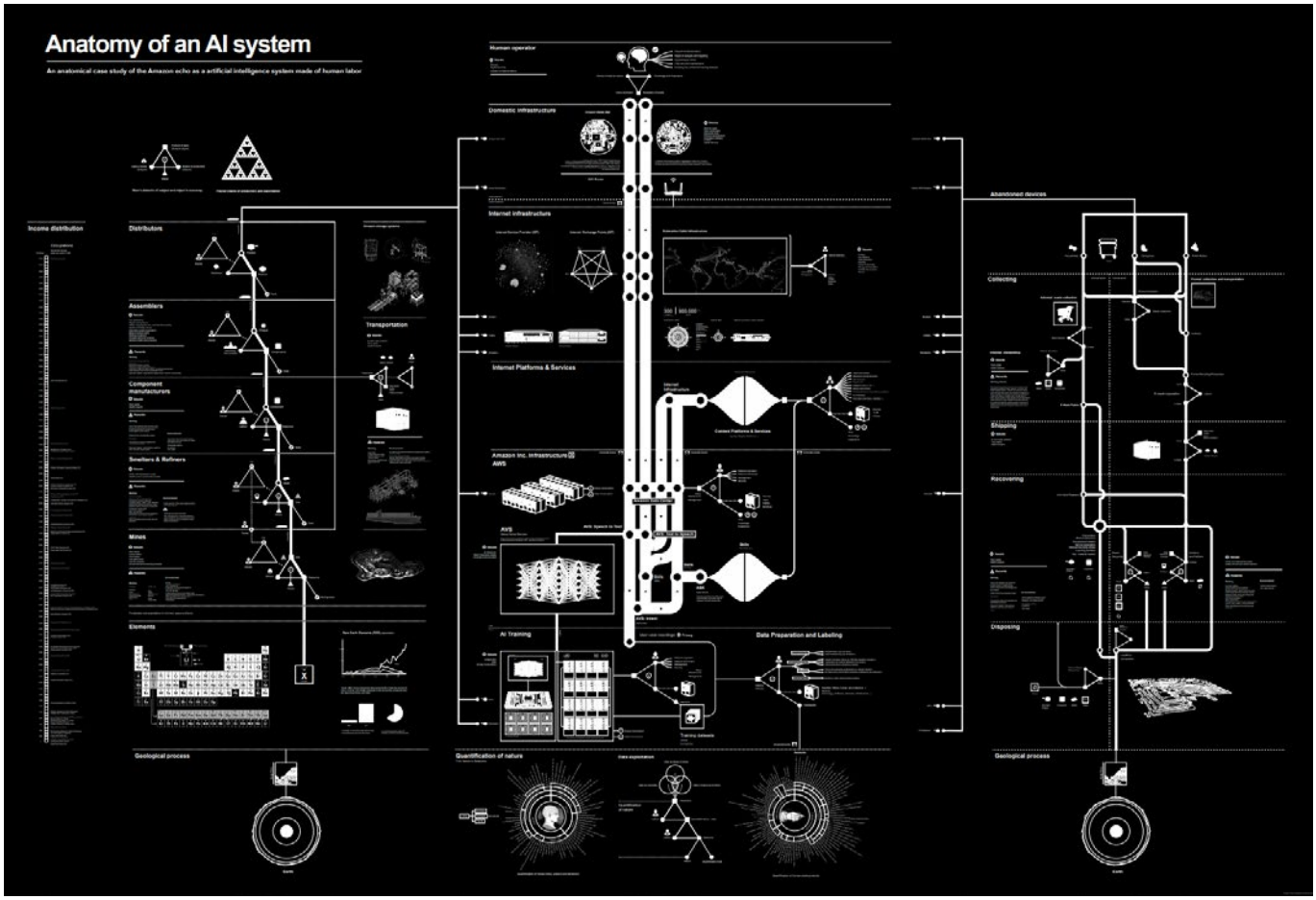

Fig. 1

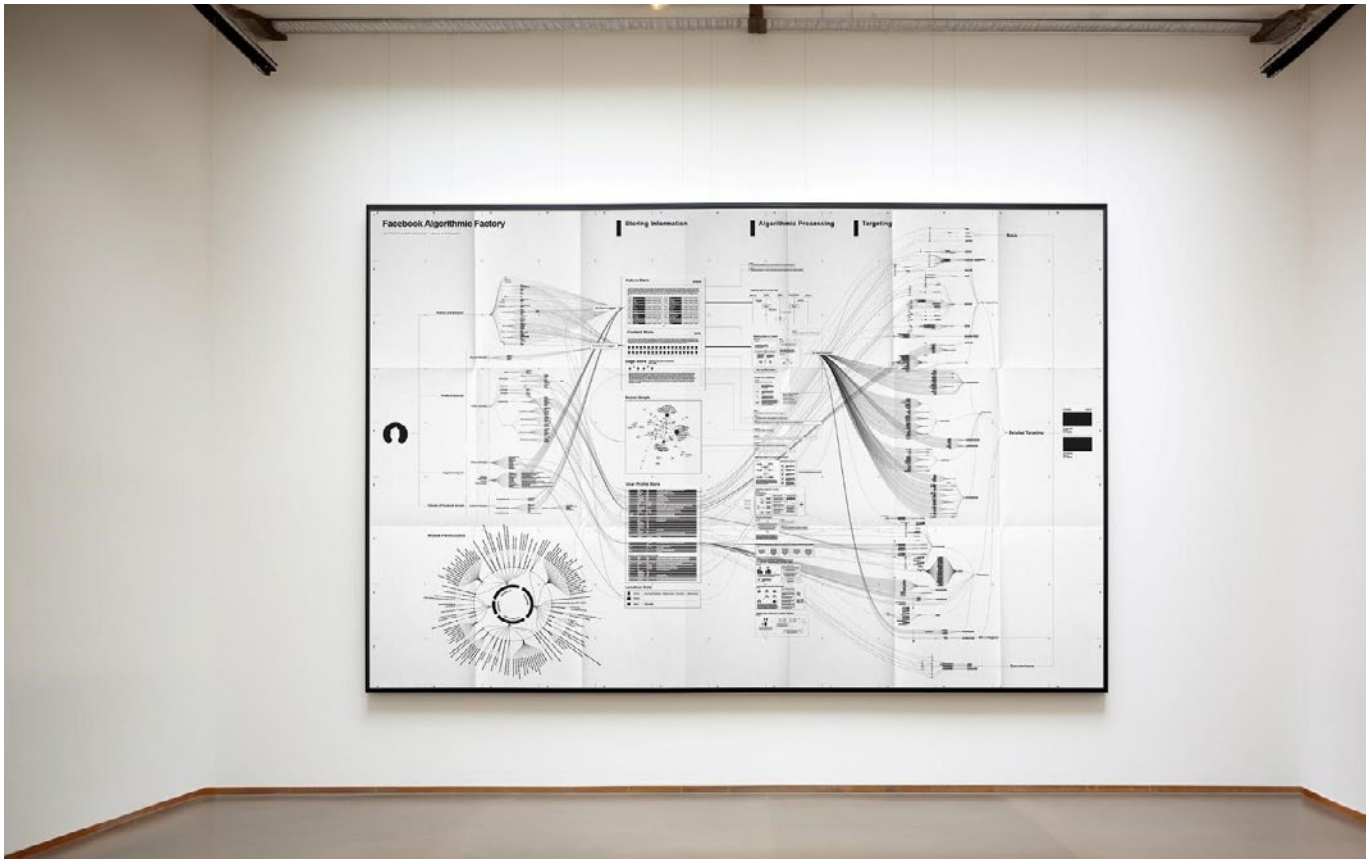

Fig. 2

capta, something that is taken (Drucker, 2019, pp. 122-123).

Visualizing complexity

Some works help in visualizing AI complexity: for example, through the *Anatomy of an AI System* [Fig. 01] and the *Black Box Cartography, A critical cartography of the Internet and beyond* [Fig. 02], our inadequacy and unpreparedness are palpable. Trying to understand how AI works by asking computer scientists or mathematicians would lead to rather complex explanations. Take Stable Diffusion (*infra*), for example; understanding its basic elements through a picture [Fig. 03] would still be a challenge, even with expert help.
But complexity is not just about AI. It's also about the world's legal systems, which are equally complex, as shown in the figure below [Fig. 04]. Admittedly, condensing a taxonomy such as that presented in [Fig. 04], which typically categorizes the world's two hundred or so legal systems using the notion of legal transplants (Watson, 1974) related to Western colonization, results in a highly compressed summary. What's more, this concise account does not provide further details and distinctions, such as the differences between civil law systems and Anglo-American common law systems, between customary rights and those rooted in religious beliefs, such as, for example, the law within the Islamic tradition. In other words, complexity qualifies legal knowledge. Moreover, the legal community is diverse, not a homogeneous, monolithic epistemic entity. Jurists and legal professionals, such as lawyers and judges, deal with different legal rules, including areas of law that are accessible to non-experts (such as constitutional law, think for instance to the freedom of expression) and very technical fields requiring a high level of expertise: take, for instance[3], the civil law concept of droit de la personalitè also known as 'personality rights', which protects dignity, privacy and integrity and is considered part of a person's fundamental human rights: e.g. right to image,

3 The purposeful selection of this example serves to discuss the legal category of 'personality rights', which will be further addressed in these notes

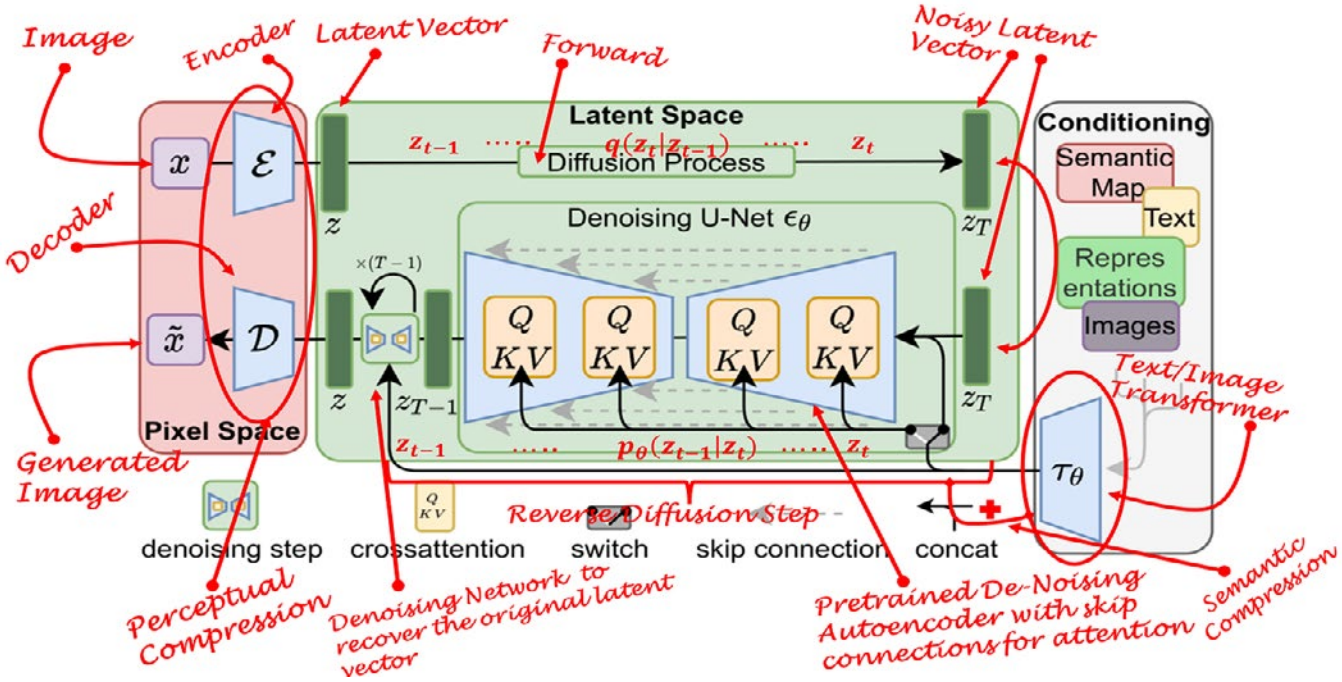

Fig. 3

name, reputation, honor, which in common law are encompassed by the so called 'right of publicity', the legal right of individuals to control the commercial use of their name, nickname, stage name, picture, likeness, image, identity, act, traits, walk, habits, style, reputation, etc., but they are also treated under the law of torts, e.g. defamation, invasion of privacy, etc. (Resta, 2011).

Lawyers are masters of other subjects that are fundamental to our discourse, from cybercrime to breach of contract and others. The following sections explore some legal challenges at the intersection of AI developments.

Education and Right to Work

"The Republic recognises the right of all citizens to work and promotes those conditions which render this right effective (Article 4, Italian Constitution)[4]."

News like the this is often read:

"Between 2024 and 2029, generative artificial intelligence will result in the loss of 14 million jobs"[5]*;*

"Companies would use A.I. to eliminate a quarter of all current work tasks in the United States and Europe."[6]

But there is also information of the opposite kind:

"Skills related to communication, problem-solving, creativity, and teamwork gained relative importance over time, as did complementary software-related and AI-specific competencies"[7];

"AI has huge potential to drive growth and create jobs".[8]

The information available on analog media and on the World Wide Web is often ambiguous, requiring the ability to understand uncertainty (Morin,

4 English version of the Italian Constitution https://www.prefettura.it/FILES/AllegatiPag/1187/Costituzione_ENG.pdf. OA.

5 World Economic Forum, Aprile 2023 https://initiatives.weforum.org/ai-governance-alliance/home. OA.

6 Goldman Sachs, "Global Economics Analyst: The Potentially Large Effects of Artificial Intelligence on Economic Growth" (Briggs/Kodnani) 26 March 2023. OA.

7 OECD Science, Technology and Industry Working Papers (2021), https://www.oecd-ilibrary.org/science-and-technology/demand-for-ai-skills-in-jobs_3ed32d94-en. OA.

8 "A pro-innovation approach to AI regulation" Updated 3 August 2023, Policy paper presented to Parliament by the Secretary of State for Science, Innovation and Technology by Command of His Majesty on 29 March 2023, cf par. 20, https://www.gov.uk/government/publications/ai-regulation-a-pro-innovation-approach/white-paper#fnref:12. OA.

2015), by interpreting different modalities of partial and progressive assertion, correction, and self-correction, falsification and revision (Lorusso, 2018). These pieces of information, easily found online, don't necessarily generate knowledge, but rather evoke sensations and emotions. They contribute to raw data expressed as opinions in social network communications and informal online texts, which are then subjected to text and data mining by AI systems. There is also the question of how to use data related to the emotional sphere, since a person's perception of what is positive or negative depends on many factors, such as their life experience, personality, etc. (Thelwall, Wilkinson, Uppal, 2009).

The quality of these datasets is an important concern, which is also addressed in the European Artificial Intelligence Act currently under approval[9]. Quality includes the production of technical documentation, compliance with EU copyright law, and the dissemination of detailed summaries of the content used for AI training. However, it is not easy to find first-hand sources for verifying the quality of data, and the very notion of a "source" becomes a challenge as it loses its effectiveness by fading into the murky opacity of the data used for AI training. Beyond the difficulty of obtaining official or authoritative sources, there remains the problem of defining the meaning of "authoritative" and its paradigmatic value for research in contemporary social sciences.

Complexity is inherent not only in the collection of data, but also in the communication phase, especially through media such as infographics and data visualization (Sinni, 2023). In infographics, designers selectively present only the information that is deemed important for communicating a particular concept. Data visualization involves the visual representation of both quantitative and qualitative information to facilitate dissemination, analysis, and exploration. While visualizations enhance the communicative value of data, they are susceptible to manipulation by less scrupulous, opaque, or outright deceptive techniques.

In practice, information is always subject to transformation (Kazakoff, 2022), while the critical levels of indeterminacy and uncertainty persist and must persist in the transformation process. According to the paradox of communication (Eco, 2016), indeed, the creation of space for the unexpected and uncertainty is essential for information to exist. This space allows for continuous exploration of details and unlimited search for additional information. The role of the information designer is to ensure this space and to explicitly communicate the degree of uncertainty affecting the data using perceptual aids and graphical techniques such as color, saturation, blurring, or resolution (Burgio, 2021). Effective design of data visualizations and infographics should rely heavily on visual storytelling as the most effective method of highlighting connections and guiding the reader to insights that may remain hidden in a mass of data. Unfortunately, this type of information design is not widespread, just as the public's ability to decode the meaning of complex images such as visualizations is limited and may even be lower than their comprehension of written text (Cairo, 2019).

A recent report by 2023, *The Future of Skills*

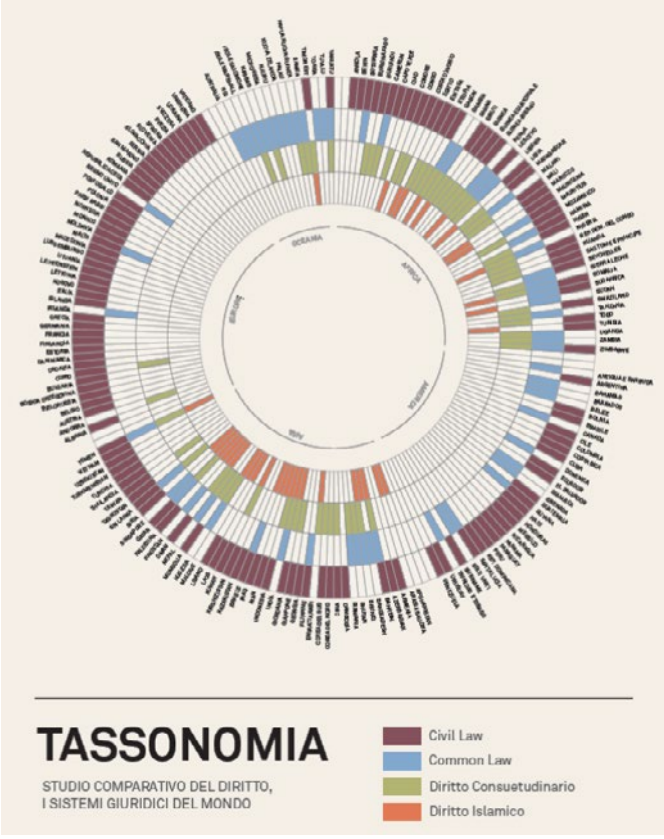

Fig. 4

9 A provisional agreement on the proposal of Regulation on harmonised rules on AI in Europe has been reached on the 9th, December 2023, a synthesis is available here: https://www.consilium.europa.eu/en/press/press-releases/2023/12/09/artificial-intelligence-act-council-and-parliament-strike-a-deal-on-the-first-worldwide-rules-for-ai/. OA.

in the Era of Artificial Intelligence[10], can shed light on these issues of data transparency and opacity. The study produced predictive models of job demand and skill-set transformation across various occupations using a complex algorithmic pipeline for data collection, categorization, and processing. Despite this, the datasets used by the AI to make predictions remain hidden, making their robustness and reliability unclear.

For example, industrial design graduates have a remarkably high mismatch index (98.9%)[11], suggesting that skill reorganization (such as the introduction/elimination of certain skills and their cross-fertilization) is an imperative change for labor market demands.

The study suggests an increase in skills mismatch for most occupational groups and programs compared to those demanded by the labor market, and implies a potential need for intervention in university curricula to align with evolving occupational skills. However, it also shows that the widespread use of AI and other technologies will have a disproportionate impact on lower-skilled occupational groups, reducing the demand for jobs by 2030, while intellectual occupations, especially in highly specialized creative fields[12], are expected to remain unaffected[13]. Ultimately, this may suggest a need for education and training reforms[14], but it is important to note that thorough fact-checking dispels claims that AI poses an "extinction risk"[15]. In fact, AI is currently "the shortcut" that almost everyone uses to create various types of content, including movies, books, avatars, and digital environments. Not by chance the term shortcut has been used by Virgil Abloh, founder of the Off-White brand in 2013 and art director/designer of the Louis Vuitton menswear collections from 2018 to 2021, to define his personal procedure as "in tune with the readymade, because to renew an object you only need to modify it by three percent (...)" (Albloh, 2018). Generative AI, in particular, can be seen as both a valuable tool and a threat[16].

Artificial Intelligence, Fashion Design, and the Law

As is well known, AI is a broad concept that encompasses a variety of tasks using techniques such as machine learning, deep learning, and rule-based systems. It involves the creation of computer systems or programs capable of performing activities that typically require human intelligence, such as learning, reasoning, problem solving, perception, language understanding, and decision making. AI can be broadly categorized into two types: narrow or weak AI, designed for specific tasks, and general or strong AI, which possesses human-like intelligence for a wide range of intellectual tasks.

Within AI, generative AI is a subset that focuses on content creation, using techniques such as Generative Adversarial Networks (GANs) and Variational Autoencoders (VAEs) to generate new data or content based on learned patterns from existing data sets. For example, Amber Jae Slooten's work uses GAN algorithms to process photographic images from Paris Fashion Week 2021.GANs are machine learning systems that use interacting neural networks to extract recurrent rules in shapes, colors, and combinations. These algorithms involve two digital models, one providing input data and the other estimating the probability of influence and checking for errors. For her 2018 Deep collection, Slooten collaborated with the Asimov Institute to develop a GAN that processed photos from Fashion Week. The surprising results were used to generate pixelated images that inspired the design of the collection's pieces (Ciammaichella, Monti, 2024).

10 EY, ManpowerGroup, Sanoma Italia, November 2023, available only upon request at the link https://www.ey.com/it_it/news/2023-press-releases/11/nuovo-studio-di-manpowergroup-ey-sanoma.

11 Table 6 on page 122, of the Report quoted in the previous footnote.

12 Cultural and Creative Industries (CCIs) have been defined by the European Commission as follows: "CCIs encompass a wide variety of sub-sectors. This includes architecture, archives, libraries and museums, artistic crafts, audiovisual (including film, television, video games and multimedia), tangible and intangible cultural heritage, design (including fashion design), festivals, music, literature, performing arts, (including theatre and dance), books and publishing, radio, and visual arts." https://single-market-economy.ec.europa.eu/sectors/cultural-and-creative-industries_en. OA.

13 Table 56, page 130, of the Report quoted in footnote 9.

14 As early as 2018, the European Parliament Resolution made Recommendations to the European Commission on Civil Law Rules on Robotics, and underlined the importance of appropriate education, training and skill strategies for matching the needs of the so called 'robot economy' (2018/C 252/25), OA.

15 Cf The Statement on AI Risk, May 2023, available at https://www.safe.ai/statement-on-ai-risk. OA.

16 Cf the https://alai-paris2023.org/en/questionnaire/. OA. ALAI 2023 Conference on Literary and artistic property through the prism of artificial intelligence. ALAI (Association Littéraire et Artistique Internationale) is an independent scholarly society dedicated to the study and discussion of legal problems arising from the protection of the interests of authors and other creatives.

Metaverses and fashion design

Generative AI plays a central role in metaverses, which are virtual, immersive, and interconnected digital spaces where users interact with computer-generated environments in real time. The idea of the metaverse, which originated in science fiction some thirty years ago, has gained considerable attention with technological advances because metaverses go beyond traditional two-dimensional online experiences. They provide a three-dimensional, interactive, communal, and increasingly decentralized space, often using VR and AR technologies. Generative AI helps designers rapidly build these virtual worlds and also enables users to actively participate by designing virtual spaces, creating digital objects, and developing interactive experiences within the metaverse (so-called user-generated content UGC). Prominent brands are increasingly using metaverse platforms to increase consumer engagement and loyalty by overcoming geographic limitations. Fashion brands in particular are actively participating in the digital space and collaborating on innovative projects.

In 2021, the realm of disruptive fashion in the digital space saw various ventures, including Nike's Nikeland on Roblox, Ralph Lauren's Winter Escape on Roblox, and Balenciaga's collaboration with Fortnite, which allows players to purchase in-game clothing (skins) as well as real-world apparel. Moncler also partnered with Fortnite to offer a collection of digitally responsive clothing, while Burberry launched its first in-game NFT collection in collaboration with Mythical Games. Dolce & Gabbana unveiled Collezione Genesi, the first luxury NFT collection designed exclusively for UNXD. Adidas engaged with the NFT community through partnerships with Bored Ape Yacht Club, Gmoney and Punks Comic, creating a metaverse character named Indigo Hertz. The *Into the Metaverse* collection included 30,000 NFTs priced at 0.2 ETH each. In 2022, Tommy Hilfiger streamed a New York Fashion Week show on Roblox, and Nike collaborated with RTFkT on the innovative AR Genesis Hoodie, featuring both physical and digital versions for avatars. Louis Vuitton's June 2023 announcement introduced phygital 'treasure trunks' that cost 39,000 euros each and give owners access to future products, experiences, and a community. In addition, the fashion industry has embraced computer-generated personas, including Prada's Candy, a computer-generated avatar, and virtual influencers such as Lu do Magalu and Lil Miquela, who gained popularity on Instagram as a California-based influencer, model, and singer. The user-friendly features of platforms like RED EYE, which include avatar creation with ReadyPlayerMe support and personalized room customization, have fueled the widespread adoption of virtual reality to communicate fashion content and themes. The Metaverse Fashion Week on Decentraland in March 2022 was a groundbreaking event, allowing users to virtually attend shows and participate in shopping experiences without restrictions. Platforms like Decentraland, a fully decentralized metaverse owned and governed by its users, allow users to create their own virtual worlds, providing a new realm for individual expression in the metaverse. Not all platforms have the same characteristics.

Some platforms are 'open', e.g. such as Opensea, the first decentralized NFT marketplace platform, or Rarible; some others are open but 'exclusive' - such as Foundation, which sells only a specific type of digital asset, digital art collectibles; others are more a mix of social media and NFT marketplace platforms - such as SuperRare, which provides innovative ways to appreciate, collect, and interact with digital art. Spatial is another notable open platform where content creators and visitors can design 3D spaces to showcase art, fashion projects, and other experimental endeavors within the metaverse.

In summary, metaverses share some basic characteristics in terms of social perception, economic model, and legal structure.

Metaverses are service platforms[17], characterized by their emphasis on social interaction, serving as an imaginative platform for self-expression and activities such as playing, socializing, and attending virtual events. The concept of status and luxury extends into the metaverse, creating a unique space for user engagement. Decentralization is a prominent feature in recent metaverse developments, in line with the Web3 paradigm based on blockchain technology. This challenges the dominance of big tech companies and introduces

17 The Digital service act package -the Digital Services Act (DSA) and the Digital Market Act (DMA)- came into force at the end of 2022, and it will apply to all platforms (even to online intermediaries established outside the European Union that offer their services in the single market) from 17 February 2024. See https://digital-strategy.ec.europa.eu/en/policies/digital-services-act-package. OA.

decentralized finance (DeFi) models through DApps, revolutionizing economic transactions in the metaverse. In fact, metaverses have their own economies that allow users to buy, sell and trade virtual assets: by adopting a freemium model (through which these platforms generate revenue by selling accessories and skins) and, more and more often, blockchain technology (used to secure transactions and authenticate ownership through non-fungible tokens NFTs), these digital spaces are establishing a decentralized economy.
In the fashion industry, blockchain can be used to validate rights, authorship, traceability, and manage intellectual property through smart contracts. As a digital ledger, blockchain technology is designed to record business transactions, allowing a fashion item to be traced from its design process to its purchase.
Metaverse also aligns with the growing sustainability demands of the fashion industry. Studies show that digital clothing, which exists solely in the virtual realm, is significantly more environmentally friendly than its physical counterpart, with a 97% reduction in CO2 emissions and a significant reduction in water consumption (Yan, 2022). Replacing physical samples with digital equivalents in the design and development phase of products has the potential to reduce the carbon footprint by up to 30% and directly address environmental concerns such as water consumption, pollution, landfill contamination and animal rights violations, thus reducing pollution in supply chain logistics. In addition, the use of digital apparel is proving beneficial in pre-production processes such as modeling, sampling and marketing, minimizing the overall environmental impact throughout the lifecycle of a fashion item prior to physical production. In this regard, metaverses and digital twin technology offer a solution to the challenges faced by fashion companies, such as allowing customers to virtually try on garments through their digital twins. Digital twins act as dynamic representations of physical things, capturing operational data that is analyzed by AI algorithms to provide valuable insights. With sensors relaying information and two-way Internet of Things (IoT) object connections, this technology can synchronize the digital environment with the physical world and vice versa. Any change or movement in the material world is reflected in the digital representation of the twin. In this case, the metaverse ingests, mines, and responds to masses of data almost instantaneously. This approach can reduce size-related returns, improve customer satisfaction, and create value for both fashion companies and the service platforms that support this technology. Embracing the metaverse is therefore essential for fashion brands that want to adopt sustainable practices (Periyasami & Periyasami, 2023).

Some legal issues

There are many issues of interest to legal experts in the context of generative AI and metaverses.
In open metaverses characterized by extensive user-generated content (UGC), users can modify the core elements of digital environments and introduce entirely new functionalities related to various content they create, such as virtual real estate, digital art, fashion and design objects, and others. Much of the content uploaded by users can qualify for copyright protection if it meets the criteria of being the Author's Own Intellectual Creation (AOIC), reflecting the author's personality and involving his or her free and creative choices - a standard known as the European AOIC test. However, in exchange for access to many of these metaverses, users are required to grant these platforms a broad license over the content they share, including text, video, and images.
This meant that users had to grant the platform significant rights to use and distribute their UCG. Often, Terms of Services (ToS) not only influence the commercial use of copyrighted user-generated content (UGC), but also affect users' freedom of expression online (Macmillan, 2020), as the platform's standard contractual rules governing the availability, accessibility, visibility, and removal of such content can significantly affect this fundamental freedom for users (Quintais, De Gregorio, Magalhães, 2023). In addition, users can create and manage multiple digital identities, each with unique characteristics and attributes. Protecting against avatars (when they are manipulated to commit fraud through malicious acts on behalf of the people behind them) and our avatars (which represent an extension of our digital identity) in metaverses can be a matter of great concern. This could not only be a threat to one's reputation, but also potentially result in real-world liability for the individual involved (Cheong, 2022). These digital embodiments go beyond static images and can also reflect our identity and personality through physical aspects, gestures, sounds, and movements. This is a complex issue that raises many legal concerns in terms of the protection

of personality rights (mentioned above), such as the right of publicity, to prevent one's image from being commercially exploited without permission or compensation, and also the right to privacy, to be left alone, and not to be publicly represented without permission.

Understanding the management of copyright and intellectual property rights in the context of digital reproductions presents other challenges, including: a) determining the usability of archival datasets, as many databases[18] lack clear policies on how their contents can be used for personal and/or commercial purposes; b) determining whether a work is out of copyright or in the public domain, given the lack of full harmonization of copyright law in Europe (Sganga, 2023; Rosati, 2023); [19], and especially within the Western legal tradition, including common law countries; c) understanding fair use policies in Anglo-American terms, which do not fully correspond to the European system of exceptions and limitations to copyright; d) defining when a work of art or design resulting from adaptations of an original work is considered a derivative work and requires the permission of the original author.

Even when works are in the public domain, obstacles arise due to the interplay between cultural heritage law and copyright law. Indeed, Articles 107-108 of the Italian Code of Cultural Heritage and Landscape grant the public authorities extensive control over the digital reproduction of cultural property[20], thus limiting access, in terms of reuse, to this material by individuals and collectives. Specifically, the Cultural Heritage and Landscape Code will be applied if I were to create a virtual space within these metaverses using digitized material of landmarks such as the Colosseum or the Leaning Tower of Pisa, Michelangelo's David, or Leonardo da Vinci's Vitruvian Man (Caso, 2023; Dore, Beltrame & Buunk, 2021). To put it simply, in Italy these are cultural objects and are protected by the above-mentioned code, while the concept of freedom of panorama[21] is essentially absent.

This intertwined and strict legal framework creates ambiguity as to whether cultural heritage or copyright law applies.

As noted above, in metaverses, users can create digital content that may be protected by copyright (if it passes the AOIC test), but copyright may conflict with intellectual property (IP) rights owned by others, such as trademarks, copyright-related rights such as photographers' rights, sui generis rights of database makers (those who take the initiative, risk, and investment in obtaining, verifying, or presenting database content).

And what if copyright is at odds with AI-produced works (Iaia, 2022)?

When the algorithm is fed with data (input phase), the processed data may refer to works (or parts of them) that are protected by copyright, or by specific protections such as those for databases, at least in the European Union: as we said above, we cannot 'open' a database and indiscriminately use everything it contains, or delete all the social platforms without thinking about the consequences.

There are copyright exceptions and limitations for what is called Text and Data Mining (TDM)[22] : for research and educational purposes, and for any "lawful access" to content that is "freely available to the public online", but it is uncertain whether the notion of "lawful access" includes content made available online without the consent of the rights holder (Margoni, Kretschmer, 2022). AI training does not automatically qualify as an "educational activity" (!) that we perform on the machine.

There are numerous ongoing cases, such as the well-known US District Court for the Northern District of California, 2023, in which some visual artists filed a copyright lawsuit against Stability AI, Midjourney, Dall-E, Devian Art and others for using their works to train generative AI[23]; or

18 Cf Directive 96/9 that protects databases by copyright and by the sui generis right; both can apply if the conditions of protection for each right are fulfilled. It has been transposed in Italy by Legislative Decree no. 169/1999.

19 Cf Directive 2019/790 on copyright and related rights, transposed in Italy through Legislative Decree no. 177/2021, that introduced amendments to Italian Copyright Law, no. 633/1941.

20 Cultural property is defined into Article 2 of Legislative Decree 42/2004 (Code of Cultural Heritage and Landscape), as amended.

21 Cf Directive 2001/29 on copyrights and related rights in the information society: Article 5, para. 3, h), that introduced the freedom of panorama (or panorama exception): that is the users' freedom to take photographs, make videos (also for creating derivative works in the digital realm) to buildings or monuments or other cultural objects, which are visible at public spaces, and are not private. In some jurisdictions (Germany), it also covers indoor spaces, such as public museums, public libraries, etc., and in almost all jurisdictions (for example, Germany and France) the reproduction of the work is not allowed if it is done for a commercial purpose. Italy did not implement the provision.

22 Cf Directive 2019/790, Articles 3-4 (and others EU acts).

23 See at https://tmsnrt.rs/46G3nBo. OA.

the Getty Images against Stability AI, some legal proceedings in the High Court of Justice in London and in the United States District Court in Delaware, 2023, for Getty copyrighted material was (mis) used to train AI models[24]. Similar lawsuits are also pending against Meta Platforms, Microsoft, GitHub and Google (Campus, 2023).

Therefore, the extent to which this input stage data (copyrighted images, text and video) can be used for training remains unclear, creating fascinating fair use battles (Frosio, 2023).

On the other hand, when the algorithm generates content (output phase), the problems are no less significant. Who owns the copyright to the artistic work or the patent rights to the invention generated by an AI system? As the DABUS dispute shows, where Mr. Thaler, owner and creator of the AI machine DABUS, claimed that AI can be the inventor[25], the machine, being non-human, currently lacks the basic requirement for recognizing authorship: an embodied human intelligence; however, there are no definitive answers. The United States Copyright Office, for example, has stated that only human creativity can be protected by copyright or patent; other offices, such as South Africa[26], have taken a different position, recognizing the "artificial inventor". Other interpretations propose copyright or patent protection based on the presumption of a "joint creative effort" between the machine and the author(s), which may be multiple. So far: the artificial intelligence system, the designer, the programmer, the user-content creator; or no one, but the collective (Rotolo, 2023; Riccio & Rotolo, 2021; Ajani, 2020; Gervais, 2020; Ginsburg 2018).

Enforcing copyright, patent, or trademark laws in the metaverse is one of the greatest challenges of our time, in part because it is not easy to identify and hold users accountable for violations. For example, users can share content semi-publicly: users can create "movie worlds", virtual spaces in the metaverse where embedded video players illegally stream copyrighted movies in real time. These spaces can be semi-public (publicly listed with access restrictions) making it difficult for copyright owners to monitor them.

Metaverses need to proactively prevent intellectual property (IP) infringement in real time, rather than dealing with it after it has occurred.

The use of blockchain technology increases the complexity of tracing individuals and holding them accountable for infringement, due to the privacy and pseudonymity that blockchain provides.

In particular, a significant portion of copyright infringement cases in the metaverse are related to non-fungible tokens (NFTs)[27]. NFTs, which are described as units of data stored on a digital ledger, typically a blockchain, are unique and designed to authenticate ownership of virtual assets and their provenance; they record the creation and ownership of an asset that could be a work of art or similar, but is not a work of art or similar. When we acquire an NFT, we gain exclusive access to and authority over the smart contract associated with the NFT, which is stored on the blockchain. This creates a record that identifies us as the "registered owner" of both the NFT and the associated artwork. NFTs do not automatically grant copyright; the buyer and the creator of the NFT can enter into an agreement to assign or license the copyright (Murray 2023). Typically, smart contracts[28] convey licensing terms in their code. In such cases, the blockchain will not only record the sale, but also all other contracts related to the work, providing greater certainty about the rights acquired. There are numerous legal aspects related to blockchain and smart contracts that we do not want to touch upon in these notes.

The convergence of intellectual property law and privacy and data protection law raises other concerns: about compliance with data protection

24 See https://www.thefashionlaw.com/stability-ai-cant-escape-getty-images-copyright-lawsuit-in-uk-court-says/, December 5, 2023. OA.

25 See European Patent Office (EPO), patent applications EP18275174 and EP18275163.

26 See The Patent Journal, July 2021, VOL 54 No. 07 at 255, URL: https://artificialinventor.com/patent/ OA.

27 Ethereum's blockchain, using its ERC-721 standard token, is commonly employed for NFTs. An NFT is non-fungible because it is unique and cannot be replaced by another token. In contrast, cryptocurrency are fungible tokens.

28 To name just one related to what a smart contract is, we can highlight that there are at least four different hypotheses: 1. it may refer to mere code and there is no contractual agreement behind it; 2. there may be an off-chain contract, i.e., outside the blockchain upstream that oversees the execution of the agreement; 3. there may be a legally binding declaration of will on-chain; or 4. there may even be an on-chain and off-chain contract. This again highlights the complexity. Cf ELI Principles on Blockchain Technology, Smart Contracts and Consumer Protection, Report of the European Law Institute, 2023. OA.

laws[29] as well as legal rules on open data and the reuse of public domain information[30], for both commercial and non-commercial purposes.
Most often, the concerns relate to personal data, previously defined as sensitive data (such as IP addresses, vehicle license plates, facial images, names, surnames, health-related data), which in Europe fall under the protection of the GDPR.
Sure, let's pause here. The intention was to reflect on the complexity of this fragmented regulatory framework, rather than to try to solve highly complex issues.

Summary and conclusions

Complexity permeates the 'behind the scenes' of generative AI and metaverses, revealing the intricacies of their construction.
Large Language Models (LLMs) are widely used in these digital ecosystems to generate content, such as OpenAI's various versions of ChatGPT, Google's Bard, Amazon's Bedrock, Baidu's Ernie Bit, Huawei's Pangu-Σ, Anthropic's Claude, Musk's xAI, Quora's Jais in Arabic, and DATABRICKS' open-source Dolly 2. 0, to Google DeepMind's recent Gemini: they can understand, operate on, and combine different types of information such as text, code, audio, images, and video. Also, 3D image and scene generation systems such as Stable Diffusion, Midjourney, Dall-e, or HOSNeRF based on Neural Radiance Fields (NeRF) technology, which generate 3D scenes or dynamic videos from 2D static images, are widely used and adopted by young designers. The list is growing. All models have one basic element in common: they are trained to follow instructions and provide detailed responses to prompts, much like powerful search engines that generate output based on training data and information gathered from the Internet. For now, natural intelligences query artificial intelligences, not the other way around.
So, to get to the fateful question: Is generative AI a means by which the human creative process is realized, like the camera, the brush, or the sculptor's chisel? AI can be seen as another tool, though not an ordinary tool, but one that "massages us much more than usual" (McLuhan, 1967) and, like other tools, is transformative. Taking a neutral perspective on this transformative effect of AI, we can say that it's a matter of contexts and perspectives, as illustrated by a scene from the film that is part of Western visual and material culture, 2001: A Space Odyssey by Stanley Kubrick. Consider the moment when the monkey throws a bone (which is also used as a tool to kill, as the following shots show) into space, and the bone turns into the spaceship... what does that mean? Tools change and become more powerful. From Homo faber to the techno infosphere, humans have always invented tools that allow them to go beyond the limits of their place and explore possible worlds.
From simple mechanical prosthetics (hammer, scissors, and chisel) to sensorial prosthetics (glasses, microscopes, telescopes) to intellectual prosthetics (language, writing, computers) to syncretic prosthetics, where different types of prosthetics converge in a functional aggregation, such as intelligent robots (Maldonado, 2005, 14). Until robots reach a state of absolute self-reference and self-sufficiency, guided by a self-designing and self-programming AI, they will remain our creation.
In conclusion, generative AI and metaverses highlight the need for a multidisciplinary skill set for future designers. Among the future professional figures, there will be a need for designers who can formulate appropriate prompts, work on language(s), and verify that their algorithmic translation makes sense; use generative AI to improve user interfaces and experiences for virtual and physical products, personalize digital content to ensure a tailored user experience, create immersive and engaging communication experiences within metaverses, create virtual prototypes of physical products to allow testing and refinement within metaverses; or present virtual product collections within metaverses, blending design and storytelling. In fashion design, for example, new professionals will specialize in designing virtual clothing and accessories within metaverses, creating digital textiles and patterns for virtual fashion items, exploring innovative materials and styles, curating virtual fashion collections and experiences within metaverses, and blending art and fashion.
It is essential that designers are deeply engaged

29 For instance, the General Data Protection Regulation (GDPR) in the European Union, the Health Insurance Portability and Accountability Act (HIPAA) in the USA, or the Children's Online Privacy Protection Act (COPPA) in the USA, and the Personal Information Protection and Electronic Documents Act (PIPEDA) in Canada.

30 Cf Directive 2019/1024 on open data and the reuse of public-sector information, the transposition of which came into the Italian Legislative Decree No. 36/2006 (recast).

in these transformations (Cianfanelli, 2019), fostering a bottom-up "AI by design". Generative AI and metaverses require cross-disciplinary teams where even a new language will be invented just to communicate with each other.

Captions

[fig. 01] Anatomy of an AI System: The Amazon Echo as an anatomical map of human labor, data and planetary resources, by Kate Crawford and Vladan Joler (2018)

[fig. 02] Black Box Cartography – A critical cartography of the Internet and beyond, by Vladan Joler, Francesco D'Abbraccio, Andrea Facchetti (2023)

[fig. 03] AI model. Stable Diffusion, by Michale Wu, How to protect your online art from being used to train AI Models (OA)

[fig. 04] a project by Carbone and Del Debbio, Course: Laws, Markets, and Globalization, led by Barbara Pasa. Bachelor's degree program in Design, University Iuav of Venice, 2018-19.

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Sitography

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