When Science and Technology Meet Art and Culture

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Abstract. The present contribution will focus on two recent trends impacting cultural sector: immersive environments and artificial intelligence. Both the technologies are tightly connected with the "new normal" associated to Digital Transition. Digital transition is a new global trend that was boosted by the pandemic, this "transition" is sometimes pushing "digitally divided" citizens to go digital. Artificial intelligence and immersive technologies had already their appearance on stage respectively in the 1980s and 1990s. Nowadays both technologies can be accessible in everyday-life and provide a real impact on society giving benefits but even some drawbacks.

Keywords: eCulture · Digital Transition · CCI · NeB · AI · ML · Immersivity

1 Digital Technology and the "New Normal"

The omnipresent digital technology was considered one of the building blocks of this "new global order" [1] even thanks to the relevant contribution that this technology provided on one of the recent crises: the pandemic. Hence, one of the main vectors of this change was associated to the so-called Digital transformation (DT). The incredibly rapid success of the "Internet", mainly due to e-commerce, information services, and social media, gave a boost to the globalization trend, a shift toward uniformity, jeopardizing diversities, broadcasting the vision of Cyber Majors [2]. Social media, global content providers are "training" young generations offering a *pensée unique* [pensée unique based on a single cultural model] approach, this will impact future generations and their cultural identity. We remember the first attempt to create a universal "Encyclopaedia" by Microsoft, this project faced rapidly a problem due to the diverse cultural models and backgrounds [the phone was invented by G. Bell, A. Meucci or A. Popov?], far later Wikipedia created "tailored by cultural model" description of entries.

Globalisation and the economic model carried out in the recent past show their limits [3]. Nowadays more often we consider de-globalisation [4] as a scenario and the re-discover of local "values" and "identities" [5]. We do not like anymore the same sandwich or merchandise all-over the world. In the western world there is an evident lack of values and beliefs [6], a clear feeling that there is something "wrong" so in such an uncertain environment without clear references young generations are looking for new "gurus" and beliefs. The "cancel culture" movement together with the "politically

correct" re-evaluation of history and facts in the light of today's trends and thoughts [7, 8] are some of the examples.

Digital transition can be associated with a progressive switch from traditional procedure and tools toward a cyber mediated set of activities and procedures.

Leveraging on laziness and relaxation citizens spend less time outside home, they have shopping online, they buy food and drinks directly delivered on their table, "meet" friends on Zoom or WhatsApp, interact with the "outer environment" though social media and video clips. These aspects are even more evident in young generations that add to the social media the gaming dimension.

If we focus on the cultural sector and cultural tourism, the recent pandemic, long term lockdowns imposed to find the way to reconnect with researchers, passionate visitors and, why not, attract newcomers. Cultural Institutions discovered the power of digital media especially on this unexpected event. Technological advances provided ever-improving information processing and communication infrastructures, big data analytics offers the opportunity to identify data patterns that, "invisible" to the humans, can significantly help to better planning and find solutions.

The need to reconnect with citizens, mainly thanks to digital technologies, forced museums and cultural institutions to make one more step forward the digital domain. Museums reacted to the lockdown creating virtual guided tours, virtual reality cultural experiences, thematic on-line lectures, webinars and more. These efforts to re-establish "Cultural enjoyment continuity [9]" contributed to re-thinking the way to interact with citizens and tourists. We can consider this like a turning point in museums' mission. Of course, we must carefully consider the benefits and drawbacks due to these changes both in citizens behaviour and the accomplishment of museums' mission. Now let's consider as an example online services.

2   Citizen's Expectations

Museums and more in general cultural institutions, after an initial phase of monitoring the effective trend, started to invest in web sites, mobile APPS, and online services to attract visitors and tourists. Very soon was quite clear that tourists embraced the opportunity to plan their tours online, choose their destination thanks to specific offers or purpose, select the most appropriate travel option, accommodation, meals, and visits. Customer remarks and evaluations together with social media were and still are the key toolkit for tourists. In addition, podcasts very often offer a valuable contribution to plan visits and engage tourists. Digital story telling based on videoclips and even audio story telling based on podcasts many times represent a relevant attractor to plan a visit and discover locations and artefacts [Nowadays private digital television channels offer the opportunity to watch videos on demand, so cultural channels as ARTE and Discovery Channel can provide advice on tourists and visitors]. The real enjoyment of an artefact or collection can be ignited by the historical contextualisation of the artefact or the narration of some events concerning the making of it. Consequently, apart from the promotion and online services provided by cultural institutions' social media, enriched narrative content, rating applications and other online information represent significant tools for museums. This is valid both to promote and valorise exhibits and collections but even to reroute over tourism fluxes.

Here it comes the potential role of the Metaverse. Since more than two decades we are wrapped in our personal cyber-sphere in a kind of symbiotic relation. Citizens experience the world thanks to a cyber device mediated approach; the "new reality" is the one delivered by devices. One of the potential drawbacks due to lives spent in cyber-bubbles is the increasing cyber-mediation of human relations.

After a long-term experimentation that started in the 1990s, recently Virtual Reality [https://www.museumnext.com/article/how-museums-are-using-virtual-reality/] become a relevant trend in museums and cultural institutions. The tech giants Apple, Microsoft, and Meta all betting big on "spatial computing". Recently some META [META Platforms Inc.] advertisements proposed the live interaction with ancient Romans or the ability to explore the Persian markets at the time of Kurus, these were the dreams of the initial age of virtual reality in the 1990s.

Citizens will collectively 'embody' aspects of the culture on display and react to it. This goes beyond physical interactivity, into the cultural dimension, which is the point where interdisciplinarity is imperative for the successful development of the experience. When an exhibit is physically interactive, the exhibited theme needs to be interactive too, to match the boldness of the exhibit. The exhibit project team must include both 'architects of physical interactivity' and 'architects of conceptual interactivity' to generate an integrated cultural experience, a "communicative experience". The recent revamp of immersive virtual reality "packed" as Metaverse and eXtended Reality generated a new trend in cultural heritage fruition, the art immersive experience as digital exhibits [The Atelier des Lumières opened in 2018 in Paris - https://www.atelier-lumieres.com/]: Van Gogh- The immersive experience [https://www.youtube.com/watch?v=dZkQSjZYsgchttps://www.youtube.com/watch?v=Lxmh5m8hm8g] [10], Uffizi Virtual Experience [https://www.youtube.com/watch?v=8pG4FLIEFBc], Galileo all'Inferno [https://www.youtube.com/watch?v=3ieZWM5-aK8 https://www.youtube.com/watch?v=rxan29oMB_U], or Virtual Zoo 7D [https://www.youtube.com/watch?v=noDLH7XzN7Y]. Advances in immersive technologies may represent competitive advantage to the media industry (e.g., eXtended Reality [Virtual reality (VR) in Europe https://www.statista.com/topics/3295/virtual-reality-vr-in-europe/]) and are an important driver for the experience economy, enhancing breadth, depth and intensity of artistic performances or the visitors' experience at arts and cultural institutions.

Metaverse [11] and virtual reality are inter-twined, but they are not the same. Digital technology till now has mainly acted as a human insolation technology, computer mediated human relations or even a "loneliness relation" with your terminal, a smart phone, gaming console or laptop. It happens that friends sitting around a table at breakfast or lunch do not interact among them but watch their smartphones sending messages or browsing the web sites. It is time to develop digital technology improving socialisation, taking citizens out from their apartments joining the variety of agora, public spaces in city squares, museums, theatres, stadiums.

The Metaverse today offers a simplified representation of the "reality" as conceived by programmers. Accordingly with the actual perspective the Metaverse will progressively create a clone of our environment, but it will not be limited to this goal, creativity will extend this universe without limits apart from imagination. In the 1990s interactive

virtual reality (IVR) often proposed "impossible" universes, offering a tour outside the galaxy or reversing the rules of physics.

Cyber-loneliness, one of the foreseeable risks is a kind of addiction to this "parallel life" training users to shift from Real- to Meta-life blurring the border between them, this may happen as much as the number of services and duties will be transferred on the other side of the Alice's mirror. Meta-life can propose a new normal that once accepted in the Meta-life might be accepted in the real life (e.g. restriction of human rights). The same of course is valid for mainstream information and opinion dynamics, especially if perceived as real and trustable."

In addition, we observe the massive decrease in the level of critical thinking and the emergence of waves of information epidemics, both at the national and global level (mainstream communication, limited contraposition, censorship, and fake news).

3   Cultural Creative Industries and the New European Bauhaus

Some years ago, the European Commission identified a new potential economic sector, the Creative Community Industries (CCI), sometimes overlapping another EC creature, the New European Bauhaus (NEB). They voted the Regulation of the European Parliament and of the Council establishing the Creative Europe programme (2021 to 2027) and repealing Regulation (EU) No 1295/2013 [12]. Following the definition of "Cultural and creative sectors are comprised of all sectors whose activities are based on cultural values, or other artistic individual or collective creative expressions and are defined in the legal basis of the Creative Europe Programme [https://culture.ec.europa.eu/cultural-and-creative-sectors/cultural-and-creative-sectors]."

The two initiatives promote the idea to fulfil the European Green Deal and improve the value of European Creative Industries (CCIs). "It calls on all Europeans to imagine and build together a sustainable and inclusive future that is beautiful for our eyes, minds, and souls. "[https://new-european-bauhaus.europa.eu/about/about-initiative_en]

However, the cultural and creative sectors are facing several challenges:

First, the cultural and creative sectors in Europe must face increased competition from new and strong global players such as search engines and web based social platforms. This has led to the need to develop new business models and realise the potential for growth by taking advantage of digital technologies to be competitive in a global market.

Second, the digital shift is bringing about a change in paradigm, having a massive impact on how cultural goods are created, managed, disseminated, accessed, consumed and monetised, changing the value propositions which prevailed in the analogue era. Digitisation has facilitated the distribution of cultural and creative content and services, but it has also intensified competition of content across borders on a global scale.

Third, there is a highly fragmented market for cultural and creative works stemming largely from Europe's cultural and linguistic diversity, which results in the cultural and creative sectors being essentially fragmented along national and linguistic lines and lacking critical mass. This diversity is part of Europe's cultural richness. At the same time, the transnational circulation of works remains limited. It is therefore important to stimulate the transnational circulation and co-production of works across borders and to develop more effective solutions to reach audiences across borders.

Fourth, market concentration is a growing concern. In certain cultural and creative fields, a trend is emerging where a limited number of major players account for a large part of global sales.

Fifth, Europe's audiovisual industry is internationally recognised but it is not competitive enough within the Digital Single Market. 80% of European films are national productions but co-productions travel better than national films. In some countries, audio-visual professionals need to strengthen their capacity to operate.

Finally, there is a growing phenomenon of disinformation. Content industries, particularly the news media sector, are at the core of the fight to maintain a culture of healthy democratic debate. Artistic freedom and diverse and free media environment are central to conveying diverging opinions and perspectives. They contribute to pluralistic societies where citizens can make informed choices, including in the context of political elections.

Nowadays there are, among the others, a couple of technological domains supporting creativity, the first enables a different and more inclusive experience of art and culture, the second is actively contributing to generate "experiences" or "creative" content.

The first branch creates immersive interactive environments, the second is based on LMM and machine learning to generate text, pictures, and much more.

4 Immersive Environment and Key Issues

The use of virtual reality in museum environments has been rapidly gaining popularity for several different applications, ranging from the conservation and restoration of artistic heritage and the support as a story-teller tool for real visits to the replacement of real-life visits with virtual experiences of portions of or the entire museum. What started initially with the "white cube" model which is the traditional museum space focusing on the collections, in the current scenario the museums have adopted new strategies to engage users and offer more attractive modes of presenting the collections.

Viewing the exhibition space as an interrelationship between the visitor, the artefact, the gallery space, and the museum [13], the postmodern approach emerges as an opposition against the white cube ideal. Although the exact origin of immersion's conceptualization is not known, Murray [14] described the concept as: Immersion is a metaphorical term derived from the physical experience of being submerged in water. We seek the same feeling from a psychologically immersive experience that we do from a plunge in the ocean or swimming pool: the sensation of being surrounded by a completely other reality, as different as water is from air, that takes over all our attention, our whole perceptual apparatus. In the context of exhibition spaces and museums this virtual reality is created by interior settings. They can range from floor-to-ceiling wall displays, interactive screens, moving images, lighting, and sounds. When placed in an exhibition design, they provide an informative context that allows visitors to be active in the sense of understanding, interpreting and being emotionally involved in the displayed artworks [15].

We need to specify the meaning of "immersion", does it mean "emotionally involved", "blurring reality with virtuality"? There are different experiences that can be labelled "immersive", reading a book, watching a movie, attending a concert or opera,

experiencing wild nature, spiritual experiences and more. The ability to feel "immersed" differs from person to person some people are unable to feel immersed even if they experience the most "immersive" situation, they keep the two environments separated [16, 17].

The description of the immersion can also be explained as, "a state of deep mental involvement in which the subject will feel disassociated from the physical world due to a shift in their attentional state. Immersion is one of the terms which have gained prominence and established their dominance in the vocabulary. It is often equated to realism, naturalness, presence, and the sense of being surrounded, which has made immersion an "excessively vague, all-inclusive concept". It is evident that the immersive display system allows interaction and supports cognitive capabilities with sensory stimulation, hence evoking unusual experiences and perceptions in the art space. Under those circumstances, the idea of a neutral exhibition space is slowly fading away and the white cube model is regarded as inefficient for maintaining audience engagement.

The key assumption is that immersion needs to be triggered not only in a circumscribed space where visitors have to come but throughout the digital network between institutions and people using different platforms, not only within their own "bubble" but together, not only with dedicated equipment but also using capturing sensors for a minimally-invasive collective and social experience either in the public space or remotely to gather the citizens and to cope with potential confinement and distant cultural access. This immersion paradigm shift – in which passers-by, visitors, or internauts take part – will improve the institutional flexibility and cultural offering, stimulate cultural consumption, increase revenue, and enhance social impact. This will require arts and cultural institutions to establish corresponding business models and foster new cultural consumption patterns to meet the upcoming needs (remote 3D interaction,) of the public digital usage.

5 Immersive Experiences

There are already, scattered around the world, several public spaces that are suitable for such cultural offer think, for instance, to airports and malls, people use to spend time in such facilities and why not enjoy some cultural experiences even related to local assets?

In a previous project we developed the concept of a modular "Exhibit Machine" to be placed in such public spaces, fully based on digital technology, offering different experiences over the day ranging between educational content to cultural exhibits and scientific ones.

Yet, advanced immersive solutions are usually neither readily available nor broadly accessible:

(a) they require specific developments that can hardly be carried out by most institutions.
(b) they are usually confined into a virtual or actual close space where conditions, either human or environmental, can be fully mastered;
(c) they are usually limited to cinematic experience in which bystanders play little or no role;
(d) the inherent affordance of immersive propositions, which sometimes rely on complex software interfaces and expensive equipment, is questioned by the currently evolving world health situation.

A relevant step forward can be due to the exploitation of large interactive virtual reality theatres in public spaces, where citizens can experience both media companies' products and creatives' artefacts. In such public spaces citizens can interact with the application even in connection with other citizens located in public spaces pertaining different countries and cultures. Some of early experiences in this field of remote cooperation among artists were experienced on the Ars Electronica Festival [https://ars.electronica.art/news/de/] many years ago, or by Art+Com [https://artcom.de] and more recently on the pandemic especially in the field of music and performing arts in general.

6   Nowadays Issues

There is a need to create a global framework for Cultural Creativity, by designing and developing efficient, cost-effective software and hardware (projectors, computers, cameras, and detectors), multi-user, multi-site, multi-platform non-invasive immersive and interactive users' experiences, sorry for the long list of buzzwords identifying the key characteristics. Both software and hardware need to be optimised to offer users a hassle-free, less costly sustainable and enhanced immersive experience to favour the approach to culture as an emotionally engaging "communicative experience" in public spaces [One of the early examples was the reengineered version of immersive experiences in Disney Quest (Orlando) the first theme park adopting IVR. The shift from lab versions to mass use imposed relevant changes even due to the sanitization of devices.].

This is exactly the aim of the project "Artcast4D: unleashing creativity", a 36-month project coordinated by Politecnico di Milano and developed by ten domain-skilled partners [Politecnico Di Milano (IT), Exus (GR), Md Lite (FR), The Battleground (BE), Universite Paris-Sanclay (FE), CERTH (GR), Culturalink (SP), Societe D'economie Mixte Issy-Media (FR), Watermans* (UK) IFAAR* (CH) – (*) Since Switzerland is currently a Third Country, IFAAR can no longer participate as a Beneficiary and is now an Associated Partner.] from seven European Countries, merging research, technological, creative, and cultural background. In 2022 the project "Artcast4D: unleashing creativity" has been awarded by the European Commission in the framework of Horizon Europe Cultural Creative Industries [Artcast4D has been funded by under Grant Agreement 101061163].

Concurrently following academic and industrial approaches, it relies on theoretical and experimental research, open-source software, and hardware development together with challenging case studies and onsite beta testing implementations [Citizens Engagement (Issy-les-Moulineaux, France, Art in Public Spaces (Hounslow, UK), Innovation in Art and Experience (Valencia, Spain), Wisdom Tourism (Athens, Greece)].

To ensure both easy maintenance and wider impact, such applications / SDK will also have an easy customisation interface, allowing for the development of extension modules.

7   Key Challenges

All the above already represent an ambitious goal, but there are several challenges to be considered; first, the all-in-one immersive solution should be easy to install and calibrate, work indoors and even outdoors [The standard equipment works in dim light, but there

is a full daylight option]; it should be non-invasive, avoid information distraction and overload, and finally, support and blend with the networked social activities.

These platforms must be ready to be used both by creatives without specific cyber knowledge or to be enhanced by developers and augmented by third parties' contributions.

To better tune the solution with on the field implementations some pilots will showcase the potential of immersive experiences to boost creativity as a driver of innovation and competitiveness using impact assessment and measurement techniques. Furthermore, pilots will provide evidence on the role of the cultural and creative actors as drivers of innovation in other economic sectors such as citizen's engagement, art & creativity, innovation in art and experience, and why not tourism and advertising of cultural events like a global social sculpture. Minorities, in the different areas of the world, can take full advantage from these technologies to express their own culture and history thanks to this technology that will enable participants to feel immersed in the specific environment. The aim of a similar project is to fulfil the scope of creating an opensource environment that enabled network connected public spaces immersivity with limited use of wearable devices. The key objectives are described in the following paragraph.

8   Objectives

The interactive immersive production field is heterogeneous and made up of several organisations, companies and independents that work with a variety of software and hardware solutions, for the most part in museums and curatorial cultural contexts [18]. Works are often exhibited for a restricted audience in confined spaces or systems. In the last few years there has been a significant increase of the demand for bringing interactive immersive works into public spaces. This trend is especially strong in Europe, where the demand by cities, of medium and small sizes, for projection-mapping and digital street art events is constantly growing. However, large-scale multi-user interactivity is still in its infancy with a clear technological bottleneck. As it was already outlined in the 1990s and later by the increasing interests in the field of digital preservation, we must carefully consider preservation of digital artefacts [Digital preservation EU https://digital-strategy.ec.europa.eu/en/news/european-competence-centre-digital-preservation-and-conservation-cultural-heritage-and-projects, Collaborative Cloud for Europe's cultural heritage : https://ec.europa.eu/commission/presscorner/detail/en/ip_22_3855] and performances together with their developments. One of the key aspects is the preservation of intangible heritage especially when it is related to performing arts and rituals, immersive virtual reality theatres may help in doing this.

Objective 1: is to produce a global framework for Cultural Creative Industries for designing and developing efficient, cost-effective, multi-site, multi-platform non-invasive immersive and interactive users' experiences designed as global social sculptures.

Objective 2: aim at providing advanced understanding and global business solutions on Artcast4D setups to enhance both bottom-line performance and social impact of small and medium-sized cultural heritage sites and arts centres. Thanks to the high versatility and the easy tuning of the envisioned platform, a time-sharing approach enabling

multiple communication experiences within a day will be promoted (e.g., with educational contents in the morning, scientific or cultural grounds in the afternoon, artistic propositions at night).

Objective 3: to set a reference open innovation environment with a robust commercialisation plan that largely supports the adoption, deployment, upscaling, and exchange of immersive and interactive technologies by the creative communities not limited to Europe.

Objective 4: to promote the implementation of the technology technically and financially outside the cultural/artistic institutions – in the heart of the city or in more remote places – for educational, informational, entertaining, or marketing purposes, bringing together creative actors and industrial partners with civil society and public stakeholders.

9 Enhanced Interaction Design

The Artcast4D project initially focus on the exploration of the potential of immersive technologies through an original comparative study, through desk research, and will result in the collection of the actual needs of the CCIs regarding. the immersive technologies to further undertake both business and technical feasibility analysis. Through the development of a new immersion framework working on the multi-user interaction techniques in open immersive spaces through Computer Vision, 3D body tracking methods and conversational AI bot. The outcomes of the development of a new immersive framework will be integrated to propose easy installation, calibration, maintenance, and update of the Artcast4D solution. Guidelines will be established for basic interactive immersive installations, engaging all pilot partners. In the implementation of the different pilots, the new technological solution will be deployed and validated in four different immersive environments (Issy-les-Moulineaux, Hounslow, Valencia, and Athens) in terms of public spaces, types, contents, and functions, located in four different countries. Based on the analysis of the pilots' results, appropriate business model(s) and requirements for entry into market and the outcomes of the project research and development will be translated into policy briefs about how to strengthen the competitiveness and innovation potential of CCIs on national levels, in the EU and on the international markets.

10 Creativity: Human v/s Machines?

There are some key events that have characterised the recent period one of these is the so-called digital transformation considered the natural evolution of the current society in the light of a pervasive technology like digital technology. Within this transformation the "AI & ML" sector seems to have, currently, the most relevant impact on large part of society involving privacy, freedom, labour, security, lifestyle, and more.

Recently it appeared that Microsoft basically acquihired OpenAI, former OpenAI leaders Sam Altman and Greg Brockman are now working at MSFT. This acquisition multiplies the investments in such technologies extending their use in different scenarios. Open AI recently released a new ML solution that performs far better than previous ones, so developers switched to this product considering their own achievements already obsolete. Today Artificial Intelligence (AI) is growing at a phenomenal speed. Mind

boggling events like introduction of CHAT GPT-4 represent unprecedented challenges. Hence, regulation of Artificial Intelligence (AI) including Generative AI becomes of crucial and critical importance for all stakeholders in AI ecosystem. Mayor part of technological key players is investing relevant resources to lead the sector, China is it is not an outsider in this challenge.

The impact of AI powered technology on human autonomy is huge. AI-enhanced nudges reinforce the ability to achieve the designer goals using cognitive biases, emotional impulses, and other human behavioural mechanisms both intentionally and unintentionally.

Artificial Intelligence will increasingly pervade applications and devices. Few days ago, on June 2024, Sam Altman announced the integration of an Open AI chat GPT based AI assistant on iPhone. More recently a Chinese AI platform appeared on the market trying to turn the table upside-down, DeepSeek [https://www.deepseek.com], will this newcomer revolutionize the sector of AI? This trend will expand soon involving both everyday "tools" and high-end applications and services.

Nowadays we talk with our "buddies" "*Hi Google: Set temperature to 24C*", "*Hello Mercedes play Disco music*" or even closer to science fiction Alexa taking full control of our daily life.

Several services are already managed by artificial intelligence as well as decisions, and even critical decisions, are assigned to Artificial Intelligence, many times Narrow AI.

Artificial intelligence, expert systems and fuzzy logic were some of the keywords in the 1980s, at that time A.I. advances captured the interest of journalists being considered the seed of the "Big Brother" or the ignition of the progressive slavery of men ruled by machines.

General artificial intelligence design and Generative AI will improve itself to overcame human intelligence [Science fiction movies already proposed similar scenarios e.g. Wargames (1983 American techno-thriller film directed by John Badham) or Eagle Eye (2008 American action-thriller film directed by D. J. Caruso)]? Are we going to face what happened in the science fiction movie "2001: A space Odyssey" due to HAL.

The concern was: "artificial intelligence design will improve itself to think faster and deeper, then the improved version would improve itself, and so on, exponentially."

Why were citizens particularly concerned about AI? One of the possible reasons is due to the term "artificial intelligence" that ignited the understanding that there were two "intelligences" one human and anther artificial potentially competing to rule the world, as some Sci Fi movies use to depict. Early in the 1980s Japanese stock exchange market pioneered in AI potential drawbacks, the intelligent algorithm designed to automatise the market entered a loop causing the collapse of the market. More recently due to the lack of redundancy and the malfunction of a sensor the intelligent application controlling the pitching of Boeing 373 Max aircraft caused the crash of two planes.

Some years ago, to promote awareness and stakeholders' cooperation the International Telecommunication Union created an event named "AI for Good [https://aiforgood.itu.int/]". After several meetings and workshops aimed to discuss about specific uses of AI in different fields offering the opportunity to connect from remote and attend some live presentation of AI applications. On May 2024 in Geneve, AI for Good general

conference and exhibit provided an interesting insight on the state of the art of this set of technologies applied in a wide range of sectors.

One of the most appealing topics was the growing interest in AI regulations, this interest is equally shared between citizens and AI developers.

On the regulatory side overall aim is to cover all AI, including traditional symbolic AI, Machine learning, as well as hybrid systems. In such specific field EU Regulations adopt a risk-based approach to regulation. AI should be as neutral as possible to cover techniques that are not yet known/developed. Different international organisations and governments are working on regulations. More in detail UNESCO launched the AI Initiative and published different reports on these topics including UNESCO Generative AI, UNESCO Generative Ai in Education, and more.

IEEE published Ethically Aligned Design, a vision for prioritizing human well-being with autonomous and intelligent systems. Similar initiatives were due to GPAI The Global Partnership on Artificial Intelligence, OECD Artificial Intelligence and Robotics, and UNICRI United Nations Interregional Crime and Justice Research publication "Toolkit for Responsible AI Innovation in Law Enforcement" or "AI for Safer Children". Lastly the European Commission released the first edition of the EU AI ACT, the EU vision on AI can be summarised as "beyond making our lives easier, AI is helping us to solve some of the world's biggest challenges: from treating chronic diseases or reducing fatality rates in traffic accidents to fighting climate change or anticipating cybersecurity threats. [Artificial Intelligence for Europe]"

AI for Good can perform different added value activities as an example: Autonomous Systems, Cyber Security, Criminal Investigations identifying Suspects and Criminals using Predictive Analytic Tools, Crime Prediction like the fiction movie Minority Report, Counterterrorism, Cyberwar, and more.

AI for Good found its counterpart in AI for Bad as some participants termed the "dark side of AI"

What about AI for Good v/s AI for Bad – Malicious uses of AI, the fight between AI created fakes and AI detected ones? Reduction of human rights and surveillance of citizens (e.g. like the fiction movie Minority Report) [19].

One of the recurrent topics on AI for Good conference was about AI for Good v/s AI for Bad – Malicious uses of AI [20], the fight between AI generated fakes and AI debunked ones? [21]. If AI can transform an engineer in a "super engineer" or a medical doctor in a "super medical doctor" we are ready to face "super criminals".

So, in the field of crime we will find probably Super Criminal boosted by AI. AI can be used maliciously affecting cybersecurity, physical security, political security. Malicious use of AI in cybersecurity can include AI powered cyber-attacks, human-like Denial of Service, AI powered malware, detect attack targets based on behavioural data.

Automated social engineering attacks via impersonation of thrusted users, automated phishing. Automated vulnerability discovery will be faster and harder to be discovered.

Soon your face can become a trigger for the execution of malware, or even ransomware activated when target found. There is a huge set of cyberware related use of AI including lethal autonomous weapons recently banned by the Pope. Deep fake of voice or video to persuade disclose critical information.

Extending the view on impacts, opinion formation is a complex and dynamic process mediated by interactions among individuals both offline and online. Social media have drastically changed the way opinion dynamics evolve. Social media has become a battlefield on which opinions are exchanged, often violently. The progress of AI has allowed the development of much more powerful nudge mechanisms thanks to the effectiveness of statistical and inferential AI systems.

Post-reality is changing the value system with the "new normality". The new ethics calls into question personal free will and freedom of choice; traditional cultural regulators of social relationships and processes are being replaced by automated social algorithms. Post-truth in its heyday, public perception is shaped more by addressing predetermined feelings and opinions rather than facts, with fakes, click baits, hypes and other tools introduced to form post-reality in the political and media culture.

On WSIS High Level Event 2024 different panels and workshops were held exploring the impact of digital transition on our lives and behaviours. The panel "New Normal: are we ready for it?" considered the global impact of digital transition and related side effects on society including creativity, art and culture. The panel "AI and Global Challenges: Ethical Development and Responsible Deployment" outlined the potential drawbacks due to a massive use of bots mainly trained by western content suggesting the idea to localise AI services in different cultural communities to offer a tailored outcome and preserve differences. The potential impact of digital transition on society suggested to organise a panel of experts entitled "WSIS+20 Visioning Challenge - WSIS towards the Summit of the Future/GDC and beyond" to depict and evaluate the potential future scenarios.

11   AI Dilemmas: Ethical and Fair AI

While AI will benefit citizens, businesses, and public interests it will create risks to fundamental rights. AI poses some concerns mainly regarding the field of ethics [22]. A short list of key dilemmas of AI ethics can start from AI bias (e.g. gender, culture, etc.), automated non supervised decisions, autonomous vehicles behaviours (land, air, water) in case of crisis and related responsibilities, impacts of general artificial intelligence, ethical data sourcing use, analytics and reuse, this to do not mention again malicious use of AI to exploit resources, leverage on deep fakes and nudging, influence opinion dynamics and perform high-end social engineering.

More in detail, a potential ethical concern could be the idea to solve serious ethical dilemmas simply referring to an AI proxy to receive suggestions on how to behave and feel released from a personal ethical analysis and related responsibilities e.g. in the health sector.

Safety and security standards for such devices are not set actually; another typical ethical dilemma refers to how will two cars behave in case of imminent collision. The algorithm must decide which one of the two can be sacrificed the one with a baby or the other with a grandfather? which will be the decision of the algorithm and what about the implemented logic? There might be a "creative" solution due to human mind? How much technology and A.I. overlap moral and ethical aspects? This example depicts even the potentially different "*logics*" due to different cultural models (eastern / western).

More at practical level GPT can support businessman creating an almost perfect contract but this will be generated accordingly with the US regulations.

12 Global AI or Local AI

We feed ML systems mainly with big data from western countries this can lead, as happens in case of minoritized languages, to the disappearance of other "intelligences", how to remove biases in machine learning models that could potentially discriminate against under-represented groups. Citizens are increasingly using AI "bots" to carry out different activities ranging from writing a poem to creating a deep fake. If spell and grammar checkers have already created new dialects/languages, e.g. MS-English, AI is now generating one or, may be, multiple "*creativities*" accordingly with data that fed the system.

On AI for Good international event the UNESCO session dealing with this problem proposed to create several AI systems fed with different cultural models to ensure equal opportunities to different cultures. This aspect it is not far from the potential bias due to the "mainstream content" delivered online throughout the world via the Internet. Such training of young generations could have the potential side effect to *jeopardise* cultural identities.

One of the potential scenarios in the near future is to face the geometric proliferation of document due to this "ghost author". How can we identify a human "product" from a machine product? Is AI to be considered as a co-author? Lawyers are already animating the debate together with other stakeholders. "Local content" will be soon generated by "local" bots? These requests many times create potential conflicts on the side of IPR, do we need to include the BOT as an author, as it is?

Publishers and event organisers are asking the contributors to sign a declaration about the use or not use of AI based content (text, images, movies, etc), is this simply an integration of paternity (human + cyber), or is it a release of responsibility related to IPRs or other?

Some researchers suggest issuing a regulation to impose the insertion of an invisible watermarking in each AI generated output.

13 Conclusions

On one side immersive installations in open public spaces can reverse the cyber trend toward the encapsulation of citizens in cyber bubbles, increasing the insolation and the loneliness.

The emerging concept of metaverse, if misinterpreted, can elicit the will to live in a meta universe increasing the distance from reality, some more citizens wearing headphones concentrated on the smart phone screen or desktop console. The concept beyond the project is to reopen the cyber domain to public spaces, social interaction, and dialogue.

On the technological side the project aims to reconnect and further develop the concept of virtuality identified by the pioneers in this sector and hibernated mainly due to the technological context of that time. In the 1990s virtuality was available to a limited

number of citizens, enjoyable by single users, incredibly expensive. Nowadays powerful technology is cheaper and already in the pocket or on the tablets of citizens, the digital communication infrastructure offers enough bandwidth and looks for killer applications. The pandemic accelerated the transition to digital and citizens explored remote working and interaction. So why not re-enable social interaction thanks to immersive multiple users' environments.

In the last thirty years we experienced different emerging technologies and many times we considered benefits and far less the drawbacks on the social and ethical side our recommendation is to adequately consider such aspects and keep humans in the loop. In the age of digital transition benefits and drawbacks under the storm of de-globalisation it is important to recover some of the key aspects of social life and physical interpersonal relations counterbalancing the insolation and "parallel" reality generated by cyber technology as it was and is conceived and interpreted nowadays [23]. The aim is to explore a different evolutionary path minimising the impact of cyber biases.

This is not a complete overview on the key aspects and trends that appeared in recent times, off course taking into consideration each single technology and trend there are not specific concerns and technology seems simply to ease our daily life but getting much more in depth of each single innovation or putting together all the visible "tiles" of the "new normal" mosaic we can be concerned. If on one side the whole architecture is based on cyber tech, with all the potential risks it implies, on the other side cyber-world rules have can express a power that no one of the "rules" in history had, information and big data are the assets to be analysed, influenced, reused. Some authors call them "the new oil" but this type of "oil" can be used, abused, and misused many times.

Furthermore, more recently we started to discuss about the Global Digital Compact, this was one of the key topics on the WSIS Forum 2023 together with AI tools and their developments. "The Global Digital Compact that would set out principles, objectives and actions for advancing an open, free, secure and human-centred digital future, one that is anchored in universal human rights and that enables the attainment of the Sustainable Development Goals."

The aim of the debate is to shape a shared vision on digital cooperation by providing an inclusive global framework for a sustainable digital future. We hope that the outcome of this debate will fully represent what is expressed in the statement above. The real impact of some of the emerging technologies such as machine learning and artificial intelligence are often emphasized by media, we must wait a little bit longer to assess the real impact of such technologies on society in specific fields such as employment or professional profiles [24].

The challenges for the upcoming years are the ways to sustain the human's role and the inviolable right to freedom and personal privacy in an era of unlimited information gathering [25]. Once again, the need to find a proper balance between humanities and technologies is omnipresent. Social sciences and humanities must establish a tight cooperation in designing or co-creation of cyber technologies always keeping humans in the focus.

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