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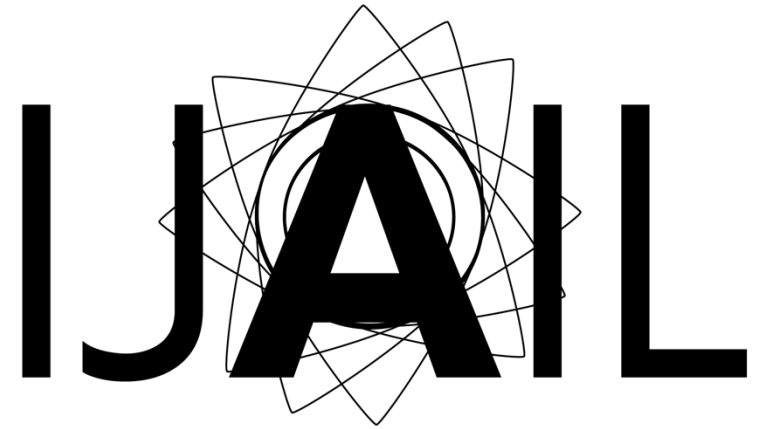

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Preface

The Indian Journal of Artificial Intelligence and Law is a biannual law journal covering technology law in a combination of theoretical and practical approaches. It also provides coverage of the relationship between law and artificial intelligence in businesses, education, research and innovation practices. The journal publishes 2 issues per year in due frequency. This journal is supported by Indian Society of Artificial Intelligence and Law.

I would like to express my deepest of gratitude to our esteemed Managing Editors and the Associate Editors for their contribution towards the Journal and its efforts.

Abhivardhan
Editor-in-Chief
Indian Journal of Artificial Intelligence and Law.

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Technical Articles

1 Cognitive Dysphoria: Evaluating the Paradigm Shift of Artificial Intelligence Technology in Digital Colonialism

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Abstract. Empires have extended their influence in the past by controlling key properties, from trading routes to seas, railways to precious metals. Presently in the future, we have technological empires, say that of U.S (Apple, Google, Amazon, Netflix, Facebook or FANGs) or Europe (Mimecast, Juria, Spotify) and China (Tik Tok, Alibaba) that govern the planet through data and computing resources. Digital colonialism refers to this modern expansion of a 'quasi-imperial control' exercised through technological innovations over a large number of people, manifested by a power of vast supremacy without their explicit approval in laws, designs, languages, and cultures. Some of these Big Tech companies control the computer-mediated interactions of users and thereby have direct leverage over political, financial and cultural spheres of life by manipulating the digital ecosystems. Thus, building a framework of corporate capitalism of surveillance that threatens the righteousness of privacy and concentrates economical control in the hands of technology corporations. Intelligence services of developed countries, thereby become a hallmark of surveillance capitalism, are working in the developing world with their own companies for mass and targeted surveillance – which enhances colonial state surveillance.

Artificial intelligence is a trendy topic of research and concern for human rights defenders in many parts of the world. Much of the research done in recent years has been to achieve an ideal set of AI standards, including requirements for openness and accountability. At the same time, a significant number of players are seeking to ensure the development of machine learning

and automated decision-making systems, with the idea that they are a core component of the current and future digital economy. Artificial knowledge, particularly machine learning and natural language processing, enables companies to synthesize thousands of data points more efficiently and to make inferences about users. Five American companies (FANGs as described above) and three Chinese companies (Baidu, Tencent, and Alibaba) lead market applications as well as a significant portion of the research being conducted on AI. This is increasing the role of AI in digital colonialism.

The ethical implications and social consequences of artificial intelligence in data colonialism have thus become subjects of strong interest for business, academic researchers and the public. Recent research shows that technologies powered by AI have a tendency of deepening social divisions and exacerbate social inequality, particularly among traditionally marginalized groups. It is increasingly evident that rapid developments in algorithms linked to artificial intelligence – like machine learning, smart infrastructure, the Internet-of-Things – will pose challenging governance and policy challenges in multiple sectors. Such technologies are increasingly used in almost all modern domains to implement order, hierarchize needs, disperse capital and impact on richness and opportunity distribution. Actually, algorithmic systems interact so closely with human choices and actions that they affect many facets of everyday life. Further, the threats of labour market polarization, growing inequality (both, social and economic), structural unemployment and the development of new undesired industrial systems due to AI are also alarming. This gives rise to a feeling of dissatisfaction or resentment in humans, known-to-be-opposite of euphoria-called cognitive dysphoria.

The aim of this research article is to examine the role of artificial intelligence in digital colonialism and the cognitive dysphoria effects of the same on humans. The research shall initially discuss the terms such as colonialism, digital colonialism and cognitive dysphoria. Thereafter, it shall highlight and examine the role of AI in digital colonialism. Furthermore, the research shall highlight the impact of this on humans in terms of cognitive dysphoria.

Introduction: What is Digital Colonialism?

The colonizers from Europe and the Anglo-Saxon dispossessed native populations of their country under classical *colonialism*, took advantage of their work, exercised extraterritorial governance and sustained dependence and pillage through strategic underdevelopment. This has been pivotal in companies such as the East India Company. Europeans

have taken possession and ownership of vital infrastructure such as ports, waterways and railways in their search of profit and influence. (Kwet, 2019)

The indigenous people were used to harvest raw materials returned to Europe for production. The colonies would then flood European excess goods, which would undermine the capacity of the indigenous people to improve their local industries. This infrastructural dominance was implemented by the colonial authorities in their expansive empire. (Kwet, 2019)

Similar to the technical architecture of classical colonialism, the creation of the technological ecosystem for benefit and pillaging is rooted in digital colonialism. If railways and shipping routes were then "open veins" for the colonies, today digital infrastructure plays the same role: big technology firms spy on, process data and spit back fabricated services for data feuds using proprietary apps, corporate clouds and centralized Internet services. (Kwet, 2019)

Digital Colonialism or E-colonialism was first coined by Herbert Shiller in 1976 in his text titled *Communication and Cultural Domination.* (Electronic Colonialism: Outsourcing as Discontent of Media Globalization, 2011) In this work, Shiller expounded upon the advent of a new technological era, one that positioned dominant countries atop poorer global regions and, given the necessary "importation of communication equipment and foreign-produced software," subjugated developing country, impoverished nations to the will of the regnant world powers, such as the United States, Japan, and Germany. (Electronic Colonialism: The Future of International Broadcasting and Communication, Thomas McPhail, Beverley Hills, Sage, 1981. Media Made in California: Hollywood, Politics, and the News, Jeremy Tunstall and David Walker, Oxford, Oxford University Press, 1983) This theory delineates the economic, political, and psychological impact of the mass-media messaging influx, which, with regards to the psychological lens (the most prominent of the theory's strains), is willingly yet unconsciously absorbed by hundreds of millions of people through seemingly harmless forms of entertainment.

According to McPhail Thomas, in their work "Ecocolonialism theory: How Trends are Changing the World", the Information Revolution marked the beginning of a new age of socialization and urged digital conglomerates (empires) to treat the millennial audience (territories) as obtainable colonies, much as historically colonial. Electronic colonialism is a relationship between the poorer regions and post-industrial nations that is induced and developed by imports of communications equipment and software from abroad, along with engineers, technicians and related information protocols. (McPhail, 2014)

Alphabet, Facebook and New Digital Colonialism

Companies such as Alphabet and Facebook are leading-edge, because of their scale, data access, expertise and data science infrastructure. In less robust companies and marketers, data collection can be challenging because "the abundance of information generated from various sources makes it a monumental task to locate and unify relevant insights." The inherent technological difficulties of converting massive data stores into valuable currency means that Companies like Alphabet and Facebook have an excellent place to conquer major new markets by synthesising the information into useful information that effectively controls the market using their highly equipped platforms and resources. (LAFRANCE, 2016)

Artificial intelligence, particularly machine learning and processing of natural languages, enables companies to synthesize billions of data points better and to draw information about users. This data is used to deduce personal information such as personal history, faith and religion, political opinions, sexual orientation and gender identity, social links, health care, race, income levels, educational achievement, marital status, family membership, financial stability and creditworthiness, all of which are not given explicitly by the consumer. (Digital Colonialism: The 21st Century Scramble for Africa through the Extraction and Control of User Data and the Limitations of Data Protection Laws , 2019) It is more disturbing that a handful of technology firms like Alphabet and Facebook have been able, by 'using data, statistical algorithms and master learning technology, to detect

the probability of future outcomes based on historical data,' to use artificial intelligence in predictive analysis. The aim is to know what happens and to decide best how users are to act in the future. While in many industries, for example, the health sector, predictive analytics can have positive results, they distorted the privacy line when dealing with personalized human behaviour, especially with a handful of companies with information. This breakdown between new data sources and the position of data centres led to allegations of 'data colonisation' and 'digital colonization' from countries such as India. (Solon, 2017)

The uncanny ability of Facebook to foresee these potential infusion of core concepts of privacy can be seen when a person is inspired to do so, when a person feels emotional attitude like feeling down, and when the connection between a couple ends—all before the user can even understand it themselves. Predictive analytics enables a handful of businesses to consider and forecast how it affects future behaviour. This knowledge is very valuable for businesses worldwide. It may affect the world economy, growth of the workforce, small and large investments, allocation of resources, publicity, elections in the presidency and capitalism.

The concern is that this new material, often emphasizing on English language, will cause displacement, rejection, alteration or disregard of indigenous or native practices, home messages or cultural and historical traditions. Poor regions are now as worried of electronic colonialism, maybe even more, than they feared the merchant colonialism of the 18th and 19th centuries. (McPhail, 2014)

Spurred by 'the end of communism' and market globalization and rapid innovation in the communications field, the electronic colonialist theory presents a contemporary neo-imperial reign; one focused on the capture of the spirit and consumer preferences of the target-demographic; which is building a psychological empire, and not the expansion of military acquisition.

Digital Colonialism and Furore of TikTok (SACKS, 2019)
As TikTok has grown to market supremacy on the social media site that has improved the art of video short-term communication, it also understands its potential geopolitical challenge. It has over 500 million active users and was the app store most downloaded in the first quarter of 2019, launched three years ago only. The fear is that TikTok is a vessel which expands Beijing's power and influence beyond China. This is an interest that is valid. TikTok could be the first Chinese software export to reshape the world internet.
TikTok is not only for overseas Chinese consumers, nor is it focusing on developing economies, unlike Alibaba and Tencent. Young people in democracy in Europe and India, South Korea and Australia flock to the app to film 15 second video clips of singing and dancing by themselves. Most likely, they do not know that their communications may be limited by Peking, since TikTok is a Chinese business. The special censorship and monitoring issues have been repressed by TikTok. US should work to help protect the privacy, secure data and control online content through regulation and developing standards.

Basic Assessment of AI

Artificial intelligence (Copeland, 1998) is best described from an anthropological perspective as a "techno social framework," that is to say, that the technological aspects of AI are intrinsically and intimately linked to their social aspects. The way we interpret, design and use the AI and tell our expectations, hopes and fears of these technologies, shape social values and assumptions. The way we visualize technology is a subtle way in which technology and culture are woven together. (Global AI Ethics: A Review of the Social Impacts and Ethical Implications of AI) How do we build technology and embrace, dismiss and use technologies around us? What are the expectations and concerns behind the technologies we develop? Technologies evolve from a world view of culture and emerging technologies are generating new ways of imagining the future. When a company creates technology, this is because they have learned technical know-how, but also because they have stories that inform the creators' imaginations.

AI is an integral part in the social environment in which it develops. People invent engineering systems, architecture and programming. (The role of artificial intelligence in achieving the Sustainable Development Goals, 2020) Dramatic issues and failings have most frequently alerted the public to the social implications of AI architecture. But social values and cultural assumptions are often integrated in their architecture, even if AI systems work as expected. Persons from many parts of the world are excluded from involvement in the design and production of AI technologies through an ongoing global digital division. For instance, people in many places do not have the educational opportunities to acquire advanced AI skills.

JAPAN'S CAREGIVER ROBOTS

Despite efforts to adopt robots as caregivers of the aged population in Japan, most families are reluctant to use robots, since the human emotion is preferred. So, we can see the role of cultural creativity in the relationship between technology and society – but this is not always predictable. The unforeseen swings and influences in cultural categories retained in collective imagination can be emphasized by ethnographic study. (Global AI Ethics: A Review of the Social Impacts and Ethical Implications of AI)

The closely connected social-technological relationship informs how AI is designed. Technology is rarely used by people with the same demographic profile or in laboratory conditions as those who developed it or tested it. (Global AI Ethics: A Review of the Social Impacts and Ethical Implications of AI) Technologies join a world already in existence which is historically constructed and formed by economic and political systems. Also, the most equitable and precise systems can still be used to violate the fundamental freedoms of citizens. The most thoughtfully developed systems will function in ways that are not simple because they are used with all their imperfections and problems in the real world.

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In the wild, in a dynamic and imperfect environment, innovations are used. They may have unintentional implications and unforeseen effects. They can be used creatively, morally free, unfairly and repressively.

What exactly is Cognitive Dysphoria and Uncanny Valley of Mind?

Cognitive dysphoria is medically recognised as a cognitive and emotional condition in which a person has extreme sense of unhappiness and in some cases indifference towards the world around themselves. It is, semantically, the opposite of euphoria. The severity of these emotions will differ according to the dose and sensitivity of the user to mental instability. Dysphoria is a consequence, however, but is also commonly used to describe a condition of general melancholic discontent, often coupled with a strong sense of discomfort and uneasiness. (Behavioral and Psychological Symptoms of Dementia, 2012)

In aesthetics, a hypothetical correlation is the uncanny valley between the degree of a human object's probability and the emotional reaction to a human being. The definition implies that humanoid objects that imperfectly mimic real human beings induce observer emotions of eerie, or oddly, familiar skepticism. 'Valley' refers to a dip in the affinity of the man with the replica, a connection that increases with the human appearance of the replica. With the proliferation of virtual reality, the 'valley' approaches irreparability. (Venturing into the uncanny valley of mind—The influence of mind attribution on the acceptance of human-like characters in a virtual reality setting, 2017)

Basically, 'the uncanny valley' hypothesizes that robot liability rises as human-like as it reaches a point where the sensation of weirdness, revulsion and even fear easily becomes our emotional reaction. (Kageki, 2012) Uncanny valley is concerned principally with the physical and aesthetic presence of robots, and we may fall into a separate valley with rapid developments of artificial intelligence that is potentially much deeper. (Østergaard, 2019)
An experimental study shows much more about uncanny valleys — the uncanny valley of the mind — which rely on the attribution to non-human entities of emotions and social cognition.
The experiment showed that people respond much more negatively to avatars if they are artificial intelligences that can decide themselves and react themselves. Avatars viewed as regulated by humans were considered much less disturbing, though their conduct was similar to that of the suspected AI avatars. (Boyle, 2020)

The uncanny valley is characterized by addictive mechanisms, the emotional exoskeleton that attracts people like fireflies to the computer — one of the many hive mind metaphors that describe human behaviour. This gargantuan, unconscious valley emerges, taking all those qualities into account, as redevelopments of frontierism, the sole purpose of which is to attract ever more publicity. (Venturing into the uncanny valley of mind—The influence of mind attribution on the acceptance of human-like characters in a virtual reality setting, 2017)

AI, COMPASSION, ADVERTISING, AND UNCANNY VALLEY OF MIND

Artificial intelligence (AI) is more humane for advertisers but has its challenges. Advertisers can now create a much more accurate image of each person who watches the advertisements using contextual details – as well as the context in which they view them. The most advanced ads are used to predict a person's needs and provide the solution with contextual data such as place, weather and time. Although it cannot be adapted in real time by a human advertiser, we can use AI to do so for us. (Boyle, 2020)

This theory, which comes from the field of robotics, holds that the emotional reaction of man to robots becomes more and more optimistic, because robots are more humane but unexpectedly dips into them as robots seem to be almost but not completely human with "uncanny" similarities. The same theory can be used to describe human reactions to AI and our reaction to advertisements that are poorly targeted. Thus, there might be an exclusion of people, since there is a fault in the systems behind these ads, which target the wrong audience, for eg, ads about the hotel we decide not to book.

Role of AI in Digital Colonialism

Technology is impartial or objective; it is a representation of social racism, discrimination and oppression in general.

Data and AI tend to provide rapid solutions to complex social issues and that's precisely where the problems arise. AI technologies around the world are increasingly incorporated into decision-making processes in fields such as insurance, mobile banking, healthcare and services of education. There are many start-ups worldwide. They collect as much data as possible to evaluate, infer and deduce "user" behaviour. (Electronic Colonialism: Outsourcing as Discontent of Media Globalization, 2011)

In certain respects, AI already competes with human intelligence. The 'brains' of the most sophisticated computers and robots are capable of doing things that make a lot of us feel awkward. When robots and machines begin to imitate characteristics and skills, which we once considered to be solely human, we start to feel uncomfortable – characteristics like social awareness, emotion and empathy. It only threatens our human uniqueness, but also evokes our latent fears of elimination, substitution and destruction. (Østergaard, 2019)

FACEBOOK'S FREEBASICS

Facebook was forced to cancel the "free basics" initiative, which had gigantic power over the Internet on cell phones for the social media. Indians opposed the deepening of the monopoly control of Facebook and subjected it to censorship and oversight. However, in most

countries, including India, Facebook is expanding and Free Basics is active in over 60 countries. (Solon, 2017)

According to the works of Danielle Coleman, artificial intelligence, in particular machine learning and processing of natural languages, helps businesses to better synthesize trillions of data points and make user inferences. The details may be used to infer personal data such as origins, religions and beliefs, political opinions, sexual orientation and gender identity, social links, health, ethnicity, income levels, educational achievement, marital status, family structure, financial stability and reputation, without clear user information. He says that a handful of tech companies, like Alphabet and Facebook, are able to use artificial intelligence for predictive analytics, which is "the use of data, statistical algorithms and machine learning techniques to identify the likelihood of future outcomes based on historical data. (Digital Colonialism: The 21st Century Scramble for Africa through the Extraction and Control of User Data and the Limitations of Data Protection Laws , 2019) While in many industries, including the health sector, predictive analytics can have a positive impact, they can also distort privacy lines when it comes to personal human actions, especially when this knowledge only comes to a handful of companies. AI, although an enormous boon, presents a real risk, particularly your privacy, and can be a potential violation of basic human rights says Jori Hamilton. AI and face recognition are today used in the production, mining and identification of sensitive personal data information.
According to Micheal Kwet, by controlling the digital ecosystem, Big Tech corporations control computer-mediated experiences, giving them direct power over political, economic and cultural domains of life – *imperial control.* (Digital Colonialism: US Empire and the New Imperialism in the Global South, 2019) The centrepiece of surveillance capitalism, Big Data, violates the sanctity of privacy and concentrates economic power in the hands of US corporations – a system of *global surveillance capitalism.*

HUAWEI SPIES ON AFRICAN GOVERNMENT'S POLITICAL OPPONENTS

African markets are dominated by Huawei Technologies Co., a world's leading telecoms firm, where security tools used by government for digital surveillance and censorship have been marketed. Senior safety officers operating directly with Huawei's employees in these countries have been personally aided in at least two cases by Chinese powerhouse technicians to Spy on their opponents' political activities, including the interception of their encrypted and social media and the use of cell data to track their whereabouts. (Parkinson, 2019)
Others, including the US tech giants Amazon, Google and Facebook, and China's Huawei, are in the fight to conquer Africa's digital economy. Their stated objective is to provide Africans with digital connectivity by providing greater access to those people who had no or very limited access to the Internet in the past. (Schwikowski, 2019)

While massive efficiencies and fantastic new developments can be realized, AI's impact on the job markets is a widely debated risk, particularly for advanced economies, which means a huge number of white-collar workers are rendered jobless. Such critical perspectives are increasingly used to elucidate potential ethical and social ramifications of AI and technology generally, with much research now available that exposes concerns of bias and injustice in algorithmic systems. (Global AI Ethics: A Review of the Social Impacts and Ethical Implications of AI)

Many experts also anticipate the deployment of highly disruptive AI capabilities — systems that will spark conflict directly or indirectly, enable oppression or ignite tensions and generate various far-reaching global governance challenges. (Sahbaz, 2019)These challenges involve large labour displacements and inequality, strengthened surveillance capacities for the authoritarian countries, increasingly scalable cyberwarfare capacities, an oligopoly or merchandising market structure dominated by some of the leading AI companies and managers, disruptive shifts in national power balance or the relative competitiveness of the industry. (Sahbaz, 2019)

In the sense of interactions between algorithms across societies, the term algorithmic coloniality builds on data colonialism which affects allocation of resources, human socio-cultural and political conduct and current structures that render discrimination. (Mustafa, 2020)
Algorithms manipulate the forms in which, in an unequal or unethical manner to support asymmetrical industries, institutional entities or industries surrounded by algorithmic instruments benefit disadvantaged individuals.
Algorithmic Dispossession defines the centralisation of authority, assets or rights in the hands of a minority through some regulatory policies in the digital economy developing by disempowering the authority, rights and power of the majority. (Mustafa, 2020)

FACIAL RECOGNITION AND POLICING IN BRAZIL (Global AI Ethics: A Review of the Social Impacts and Ethical Implications of AI)
In discussions of AI ethics "fairness" is a big ideal. The use of AI in court and police sentence has gained wide critical attention in the sense of the United States for prejudice and unfairness. These innovations are less pre-accurate for those they most likely affect: African Americans, as is defined in research by ProPublica and Georgetown Law Centre. Fairness and prejudice research on AI systems in the United States poses troubling concerns about how this technology moves. From now on, studies on the social impacts of such developments outside the United States has been little comprehensive, and we can only guess.
However, from what we know in the US, we need to take AI technology and current social prejudices very seriously when it comes to police and sentencing. A case at issue: In January 2019, the ultra-conservative Social Liberal Party (PSL) of President Jair Bolsonaro launched a bill to allow security cameras in public spaces with integrated face recognition technology for police purposes. That same month a delegation of government visited China to purchase technologies for recognition of the face.

AI AS YOUR HIRING MANAGER-ATS AND RACIAL DISCRIMINATION

An ATS is the software through which CV is uploaded when requesting a job. Compliance with ATS ensures that most of the ATS systems have a right parsing of the CV, and that the contents are properly assigned to it. This software can also have some inherent defects of Racial Bias.

Power imbalances in the global AI governance debate cover but also reach beyond the issues of data disparity and the autonomy of data infrastructure. The AI guidelines global landscape analysis highlighted the underrepresentation by the AI ethics discussion of geographical areas like Africa, Central and South America and Asia. The study finds a power gap in which 'more economically developed countries shape this debate rather than other countries, which raises concerns that local awareness, cultural pluralism and global justice are being neglected.' (Mustafa, 2020)

In social matters, the use of technology also focuses on punitive activities either deliberately and inadvertently, whether it is to foresee who will commit the next crime or who will not pay for the mortgage. Constructive and rehabilitative questions are almost never asked, such as why people are mostly crimes committed or what can be done to rehabilitate and help people who have left jail. In order to introduce 'security' and 'order,' technical advances are also constructed and implemented to punish, not rehabilitate. Such technology often inevitably entails certain inhumane, barbaric and racist activities. (Birhane, 2019)

Examples of this are the inhuman treatment of the Uighurs in China and the unjust handicap of the poor. Like the use of facial recognition technology in cities like Johannesburg and Kampala, unfair discrimination and the excessive supervision of minority groups are unavoidable. The core goal of commercial IT firms, whether expressly understood or not, is not general bias correction, but deduce the flaws and weaknesses of individual 'users' as if individuals existed only as manipulable artifacts. These companies consider that, since they are able to acquire such "data," this data naturally belongs to them. (Birhane, 2019)

The talk about 'data mining' and a 'continent rich in data' — popular language within South Asia's technical scene — demonstrates the magnitude of their reactions to the person behind each data point. This debate of data "mining" reminds us of the mindset of the colonizer, who declares people to be free of raw material. In handling social issues through automated profit-driven systems by businesses, we not only let corporate incentives (profit) determine our social problems, we also give the corporate sector a complex moral query.

Behavioral 'personalisation'—in simple terms, extracting, simplifying and instrumentalizing human experience for capitalist purposes, as seen in The Age of Surveillance Capitalism by Shoshana Zuboff—can seem banal compared to threats to science fiction which can be correlated with AI at times. It nevertheless is the basis for the sovereignty and production of people as mere raw data. The inferences made by algorithmic models of action are no reflection of the neutral state of the world and do not provide any deep causal explanations.

GOOGLE 'SIPHONS' DATA

Google siphons user data from a number of sources – Google Search, Maps, News, Android Location Services, Gmail – to deliver one of the richest information collections on the planet. They ensure that the world flows data into their corporate cloud through the Open Handset Alliance and the proprietary control of their 'killer apps.' The data for customers and business services is then analyzed. Tech companies have spread their goods globally and extracted data and profits from users worldwide while concentrated power and capital in one country, the US (with China a growing competitor). (Digital Colonialism: US Empire and the New Imperialism in the Global South, 2019)

Feeling of Cognitive Dysphoria in AI-related Digital Colonialism

Digital Colonialism refers to a new form of colonialism in which big technology firms extract, analyze and own consumer information to support the data source for the nominal benefit of their own profit and market control. Centred on altruism, large-scale tech corporations can access the untapped data in the continent through their power and

money. Western tech firms open the door for data use to be a benefit and plenty of applications, from forecasting analysis, to poor data security legislation and infrastructure ownership. One may think it would be an obstacle to digital colonialism to improve data protection laws. However, there are limitations to data privacy regulations. (Digital Colonialism: The 21st Century Scramble for Africa through the Extraction and Control of User Data and the Limitations of Data Protection Laws , 2019) The large-scale documented activities of technology firms exemplify how these limitations provide many loopholes for the continued colonialism of the digital system including past infringements of data protection laws; sanctions limitations; uncontrolled mass data concentration, lack of competition regulation, uninformed consent and limits to the national data protection laws. According to the theory the multimedia hegemonic control will continue to grow, as the world increasingly depends on streams of 21st-century communication and lives are intertwined with cyberspace and the Internet of Things (IoT) inextricably. (Digital Colonialism: The 21st Century Scramble for Africa through the Extraction and Control of User Data and the Limitations of Data Protection Laws , 2019)

In addition, because of rapid advances in the fields of artificial intelligence and affective computing, cognitive researchers proposed a possiblity of 'Uncanny Valley of Mind'. Therefore, if they find highly advanced, emotionalized technology, people may feel strongly aversion. Among the potential reasons for this phenomenon, contemporary research discusses both a perceived lack of human singularity and expectations about direct physical damage. (Venturing into the uncanny valley of mind—The influence of mind attribution on the acceptance of human-like characters in a virtual reality setting, 2017)

GENDER-(NOT) NEUTRAL GOOGLE TRANSLATE (Kayser-Bril, 2019) The phrase "vier Historikerinnen und Historiker" (four male and female historians) is rendered as "cuatro historiadores" (four male historians) in Spanish, with similar results in Italian, French and Polish. Female historians are simply removed from the text. In many

cases, Google changed the gender of the word in a grossly stereotypical way. "Die Präsidentin" (the female president) is rendered to "il presidente" in Italian, although the correct translation is "la presidente". "Der Krankenpfleger" (the male nurse in German) becomes "l'infirmière" (the female nurse) in French. Similar gender biases are also seen in various tribal languages of India.
Stereotypes are translated since Google optimizes English translations. The translation of language pairs involves large amounts of bilingual data often not available for all language pairs. By using a technique called 'bridging' the way to enable these translations. Translation bridging of language means that a third language (E) based on bilingual data to convert X to E is added to translate X to Y, and subsequently E to Y. English is the most often used language for bridges. In English, the majority of nouns are gender neutral: thus, gender is lost when the female words are converted from a sexual language into English.

Accordingly, people might experience strong feelings of aversion if they encounter highly advanced, emotion-sensitive technology. Among the possible explanations for this phenomenon, both a perceived loss of human uniqueness and expectations of immediate physical harm are discussed by contemporary research (Venturing into the uncanny valley of mind—The influence of mind attribution on the acceptance of human-like characters in a virtual reality setting, 2017). AI is making progress quickly. In a growing variety of matters, non-human entities take autonomous decisions with tangible moral implications for people. Empirical research has also recently centered on the moral sentiments of people with respect to algorithm-based moral dilemmas; attitudes towards sex robots, autonomous vehicles and even the mind upload technology. This research has provided insights into how people feel about the results of non-human entities' moral actions and their effect on human well-being. (Moral Uncanny Valley: A Robot's Appearance Moderates How its Decisions are Judged, 2021)

GOOGLE CLASSROOM AND MICROSOFT LEARNING
For example, Microsoft and Google are investing in the Global South classroom software through Microsoft Learning and Google Classroom programs. This hangs young people in their early-aged goods and leads Global South tech developers into their ecosystems. Big tech firms also build their own server farms abroad to catch new markets and transfer them to Silicon Valley's centralized cloud business model.

The effect of AI on communities can be far-reaching, since the combination of data quality and algorithmic biases have shown us cases of racial profiling, surveillance, discrimination and injustice. Digital spaces – which are created by the Internet and by the increasingly connected systems and appliances we use – are digital areas that, like physical spaces, appear to be places that can be mined and manipulated. In digital structures, the coloniality of power is seen in the context of socio-cultural imaginations, ways of creating and using technology based on persistent processes, institutions.

WHITENESS OF AI (Ledford, 2019)
A popular algorithm used in US hospitals for patients' health care systemically discriminated against blacks, according to a thorough study. This kind of study is unusual since researchers are often unable to access proprietary algorithms and the vast amounts of confidential health information necessary for complete testing. But more limited research, anecdotal accounts, and algorithms in all aspects of crime justice, education and healthcare have reported unequal and partial decision-making. The scientists speculate that the result is institutional bias, which goes from mistrust of the health system to overt ethnic discrimination. This limited access to treatment. However, this AI is also being applied to counter racism and hate speech against black people. (Ghaffary, 2019)

The digitalization of diverse resources impacts the most marginalized communities overwhelmingly. However, many of the ethical concepts used in AI are strongly useful. What they think about is "the greatest

happiness for the largest number of people," meaning that solutions never seek in the middle of minorities. Even though algorithmic decisions – for example by finding that the entry of women in the technology sector has been systematically excluded – are emphasised, minority groups have been forced to inhumane treatment and systemic predictive police services have been unfairly disempowered. (Birhane, 2019)

Freedom from Digital Colonialism

If a device is configured for use and regulation, it must be modified. Railways are fine, but it must not bypassing colonial influence local villages. We have to upgrade these systems if you want to avoid operation and surveillance. (Digital Colonialism: US Empire and the New Imperialism in the Global South, 2019)

This is exactly what effort is being made to merge open-source software with resources to decentralize the Internet. Free Software is a software which converts computers into personal servers which provide the technology necessary to operate cloud services without the control of an intermediate.

The FreedomBox project includes important contributions from Sunil Adapa and Joseph Nuthalapati, core developers. They have partnered with NGO Swecha to introduce FreedomBoxes in twelve Indian villages successfully over the past couple of months. The project uses old devices to provide villagers with Wi-Fi access while offering decentralized services and monitoring. The FreedomBox project expands to other villages and is open-sourced and constructed worldwide for replication. (Kwet, 2019)

FreedomBox in India should be built and expanded. The decentralization of the Internet is technically feasible. Certainly, there are difficulties.

REPLACING GOOGLE PLAY WITH INDIA'S OWN BHARAT APP STORE? (Varshney, 2020)

Ever since Google revealed the latest billing policies of the Google Play Store—wherein Software developers are asked to use the

embedded payment method of Play to sell digital service Google has declared Google's move in India, where it commanded much of the country's market share in smartphones with Android, software enterprises, tech-majors and Indian start-ups, to name it "monopoly conduct" and "digital colonization of India," and to call upon India to set up its own home-grown Bharat AppStore, as the alternative of Google Play. They stress that Indian app developers cannot be mandated by the tech giant to use his billing scheme.

Development is underfunded and millions of people can find it difficult to use new services, but it cannot and its costs far outweigh its advantages. The free and open-source technology can be developed interoperable and decentralized, so that no institution can own or regulate it anywhere in the world. This will alleviate many territorial competence issues. In order to supplement a digital ecosystem revision, new legislative instruments will further reinforce digital rights. Combating digital colonialism is critical not just from a privacy and user rights point of view. We cannot continue concentrating richness and power at a time when the global divide threatens the world, which in turn threatens our very existence. (Kwet, 2019)

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2 Private International Law and Artificial Intelligence: A Critical Analysis of Jurisdictional Claims and Governance

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Abstract. There are countless news stories and scientific publications illustrating how artificial intelligence (AI) will change the world. As far as law is concerned, discussions largely center around how AI systems such as IBM's Watson will cause disruption in the legal industry. However, little attention has been directed at how AI might prove beneficial for the field of private international law.

Private international law has always been a complex discipline, and its application in the online environment has been particularly challenging, with both jurisdictional overreach and jurisdictional gaps. Primarily, this is due to the fact that the near-global reach of a person's online activities will so easily expose that person to the jurisdiction and laws of a large number of countries. Thus, online users ranging from individuals to the largest online companies are subject to unpredictable legal consequences when using the Internet. It also places stress on courts and regulators as jurisdictional claims frequently exceed relevant enforcement capabilities. Indeed, broad jurisdictional claims may force regulators to be selective in terms of targets to pursue, which will arguably undermine the rule of law principle that all are treated equally before the law. Despite intensive work by some of the world's brightest legal minds, we are seemingly still far from solutions to these difficult situations (Svantesson, 2019).

This article discusses some of the solutions proposed in this field and presents the real conflicts of legal principles present when it comes to application of international law to AI especially in terms of jurisdictional claims.

Literature Review

The interaction of the field of AI and Private International Law has rather missed the scope of study due to the restricted stature of multilateralism that is allowed to the cyberspace by the states. This approach follows from the conventional approach to administrative and legal sovereignty whereby cross boundary and transboundary transactions are either not allowed or highly regulated. But with the misfortune of global lockdown the situation has reversed and many authors have predicted the to be future of AI and Private International Law using various models of study. Some of the limited number of studies available are reproduced herein.

Professor Svantesson in his paper titled "***A Vision for the Future of Private International Law and the Internet – Can Artificial Intelligence Succeed Where Humans Have Failed?"*** (Svantesson, 2019) suggests the various methods available for determination for jurisdiction and solving the problem of conflict of laws in case of application of private international law to activities carried with the aid of AI on the Internet. A suggestive theory of ***Modular Argumentation*** is proposed whereby the online activity of the individual is divided into different modules and then the applicable law for each module is determined which then answer to those specific queries of the module. However, it poses an issue with respect to the recognition and enforcement of such judgments of one country by other countries. This leads to a situation which is termed as ***hyperregulation*** which has the following identified obstacles: (i)the complexity of a party's contextual legal system amounts to an insurmountable obstacle to legal compliance; and (ii)the potential for legal enforcement of (at least parts of) the laws that make up the contextual legal system is more than a theoretical possibility.

The author goes further to say that in such an instance of hyperregulation a system of ***contextual legal system*** which can have a web of conflicting legal norms with no set norms of determining the prevailing norm and the applicable norm. In which case the concept of conflict of laws especially as available in the International competition

law regime can be of great aid, which would need compilation of multiple legal systems of the nations of the works, a work possible for an AI only by predictive analysis and value-consistency methods. In this regard the approach of the author is to determine which is the applicable individual norm of a nation based on the three-fold test of substantial connection, legitimate interest and interests balancing.

The solution suggested by the author is using AI to compare and cross-match the conflict of laws of various nations which would need digitization of all law, overcoming language barriers and proper interpretation of the laws. This AI technology the author suggests will help in preventing legal clashes and predicting legal risks in the contextual legal system of the person charged in the scenario.

Mireille Hildebrandt in his paper titled in "***Extraterritorial Jurisdiction To Enforce In Cyberspace? Bodin, Schmitt, Grotius In Cyberspace***" (Hildebrandt, 2013 pp. 196-224) analyses the concept of extraterritorial jurisdiction in cases of acts within the cyberspace, which in turn bypasses the concepts of exclusive jurisdiction proposed by Bodin and Schmidt in their traditional international law theologies. The author relies on the theory of "***Mare liberum",*** a term used by Grotius to explain the nature of high seas as a common goods or space with no exclusive sovereignty. Based on the same, the author has proposed a concept of "***Cyberspace liberum***". The author relied on the findings of John Perry Berlow on his published "cyberspace manifesto" to say that cyberspace inherently resist any legal regulations because it is beyond the territorial sovereignty of countries and therefore has an inherent feature of de-regulation. The author wishes to characterise cyberspace as real spaces where the ordinary rules of behaviour are transformed or suspended, a heterotopia, which highlights the embodied spatiality of cyberspace users to be situated at both spaces at once, a theory proposed by Julie Cohen in her paper of "Cyberspace as/and Space".

A further interesting analysis is done by the author in terms of the two theses of territory proposed by Richard Ford especially the theory that jurisdiction is practically exercised over an empty space which is abstractly and homogenously conceived by cartographic maps and therefore an empty vessel for the provision of exercise of governmental

power. Therefore the placing of cyberspace within such cartographical markings is not possible but drawing an analogy even cyberspace can be regulated by basing regulation on the individual irrespective of their status in terms of society and sovereignty.

Thereafter the author explains the mare liberum regime established by Grotius for the high seas which is treated as a res communis or res publica where natural law applies and no sovereign law of any nation applies. Natural law rules and basic private rights of self-preservation and the need for formation of a society which existed before the formation of a social contract are the guiding principles in a mare liberum. Drawing analogy to this, the author has argued the concept of cyberspace liberum and the possibility of whether the cyberspace can be left unregulated. However, the approach of US Court to reproach cyber-crimes. The author on that note concludes that Cyberspace can be territorialized, but only by redefining territory in a way that defies the original connection of the notion of territory to the land, to the earth. Part of Grotius's scheme may work; namely, where we view cyberspace - in analogy to the high seas - as a passage that affords international trade, communication at a distance, and the proliferation of information and of the techniques to transform information into knowledge. This would entail that we see cyberspace as a global common.

On analysis therefore, it's a continuous territory and it is the substantial interest test which plays an important role when it comes to PrIL and a res communis for purposes of PIL. However, a High Seas like regime with landmark jurisprudential cases like the SS Lotus case can hold promise in future for the working of this model in private international law.

Nicholas D. Wright in his edited report titled "**Artificial Intelligence, China, Russia, and the Global Order**" (Wright) deals with the Russia model of regulation by law as a tool for internet and cyberspace regulation which has global ramifications. Though the paper does not deal with the correlation between PrIL and AI, still the Russian Model based on ISPs and corporate capture which is presented can be both a threat and a boon for the PrIL correlation and hence requires analysis. The author puts forth the Russian model where the ISPs are made the

central tool of regulation who have to follow a robust regulation for speech and expression laws as well as install SORM Compliant technologies which allow the ministry and law enforcement officials to track and adjudicate on data without intervention from the ISPs. This can be termed as the "**ISP Model of Regulation"** which is often followed by other nations too and can be used as a central tool for invoking jurisdiction whereby often a singular party may face multiple charges across nations for the same crime committed in different forms under different laws. This is one of the menaces of the contextual legal system nature of PrIL which has been discussed above. The author also highlights the approach of Russia in UNGA where they have time and again forced for an international code of conduct for information security which bypasses the collateral jurisdictions of PrIL and forces for rigorous domestic information spaces. Such a model requires study for the extreme end of the spectrum as models governing jurisdiction and approaches to solve the jurisdictional problem in cyberspace.

Jeffrey B. Ritter in his remarks in the proceedings of ASIL, which was later published titled "**Mapping the Law: Building and Using Visual Mind Maps for International Law: Summary of Jeffrey B. Ritter's Remarks**" (Mapping the Law: Building and Using Visual Mind Maps for International Law: Summary of Jeffrey B. Ritter's Remarks, Proceedings of the Annual Meeting, 2019 pp. 19-20) like the first author provides how AI can be used to solve the jurisdictional problem. The author suggests the use of visual mind maps for the tracking and encoding of transnational cross border rule changes and storing them for easy comparison and comprehension. The author such the use of these mind maps to know the rule changes and also furthering the extent of knowledge of law and free access to legal information, which are important practical tenets for furthering the cause of multiple jurisdiction in PrIL for proceedings based on or due to AI.

Besides, such models there are a few other studies which deal with information and data ownership. Such studies can reveal how such ownership models can lead to the development of a claim of jurisdiction. An example of such a study is that of Hogan and Shepherd in the paper titled "***Information Ownership and Materiality in an***

Age of Big Data Surveillance. Journal of Information Policy" (Hogan, et al., 2019 pp. 6-31). The author gives instance of cloud data storage whereby the location of the storage facilities become material in determining the core of legislative regulation. For example, taking explicit and proactive measures, Brazilian President Dilma Rousseff pushed in 2013 for "new legislation that would seek to force Google, Facebook and other Internet companies to store locally gathered data inside Brazil." Such examples demonstrate that the space, place, and materials of communication constitute an important part of the regulatory debate about surveillance in a highly interconnected global network. Though the author deals with the query of mass surveillance by intelligence agencies however the development of agency and ownership relationships in an information economy can be sources to develop the concept of jurisdiction for the PrIL regulation of AI.

Analysis of literature review

The literature review suggests that while there exist various models of determining jurisdiction in private international law for activities conducted using AI in the cyberspace and the activities conducted by AI in cyberspace. However, all of them lack the basic characteristics of uniformity of opinion, practicality of approach and judicial recognition and enforcement mechanisms which are often the major concerns in private international law. However, a few studies also deal with the query of how to overcome the lack of accessibility of legal knowledge in private international law, by the use of AI. However, such models encompass the use of comparative law tactics and the modular argumentation tactic, which would be of aid but would not be of much aid in solving the jurisdictional issue in private international law for cyberspace activities.

Conjunction of AI and Private International Law

The development of AI and Private International Law as reflected from the case studies has been limited to much of speculative use of AI and the cyberspace and cybertools like cross-border transaction of cryptocurrency and online transactions of foreign exchange currency, and mostly based on acts committed in the internet which have had international repercussions. The study can lead to the two ways in which AI and Private International law can correlated:

1. Instances where AI poses private international law issues
2. Instances where AI is being used to solve private international law issues.

However, keeping with the scope of the paper being limited to jurisdictional aspects of AI and Private International Law, we will restrict the scope of the study to the former point only and the various components of adjudication- namely jurisdiction, applicable law and enforcement, the three golden questions of PrIL will be discussed therein.

Instances where AI poses private international law issues

In a recent symposium by the American Journal of International Law, the leading issues posed by AI upon Private international law were highlighted upon as the fields of focussed study which include – Human rights law and AI, Transnational law enforcement and cooperation issues where the cases use AI algorithms thereby making them susceptible to be reviewed or rejected, adjusting AI to the existent treaty regime and developing the treaty regime according to the growing AI driven tools, automated decision making tools in international negotiation and adjudication etc. (Deeks, 2020 pp. 138-140) While the symposium dealt with issues of public international law too but referring to the scope of the paper it is essential to limit the impacts or conjunction of AI and PrIL to the following:

1. *Jurisdictional Issues* for acts committed in the cyberspace and acts including AI,
2. *Determination of applicable law* due to the inherent multilateral nature and impact of AI driven technology,
3. *Enforcement and Cooperation issues* where decisions are inspired or are based on the AI driven technologies.

While one may argue that jurisdiction, applicable law and enforcement are the three classical issues always attached to private international law and therefore the effect of AI is not much of substance, it would be wrong to say so. This is purely because the concepts of jurisdiction like forum conveniens, concurrent jurisdiction; of applicable law like cause of action, nationality, place of business and of enforcement like national

public policy, reasoned judicial decision, judicial defect, etc. are being challenged itself due to the development of AI driven technologies. The challenges are discussed as follows:

Jurisdictional Issues

In *private international law* jurisdictional issues remain an enigma to be solved whereby we have the well-developed concept of forum convenes alongside the extra-territorial jurisdiction of courts of equity like UK Supreme Court which has been statutorily granted (UK Government, 2020). The two-broad aspect of this issue is determining the existence of jurisdiction and that of exercising of jurisdiction (Fentiman, 2017). The doctrine of ***forum non conveniens*** is one of the most important principle often used in solving this issue of existence of jurisdiction. The doctrine may either be a precondition for the exercise of jurisdiction, directed at whether the court seized is an appropriate forum, or a means of allocating proceedings between courts, directed at determining which court is the most appropriate forum (Fentiman, 2017). Here the most important considerations are:

- Access to justice rights of the parties
- Devising the most efficient way of resolving inter-party disputes
- Issues of enforcement
- Existence of any prejudice to the rights of the parties.

However, these considerations often become very blurred to study with regard to disputes involved in the cyberspace. In an example let's say that a person X in USA posts a social media post on a Canadian social media site which contains derogatory remarks against a person Y situated in Germany and the person X has social media friends list in 100 different countries. In such cases the public interest cannot be pinpointed to one singular location or a singular nation and the rights of access to justice of Y requires recognition of any judgment and their enforcement in those 100 different states for defamation issues. Such cases of social media cases cannot be even solved by exemplary costs granted in one nation because the standards of protection given to defamation varies from nation to nation.

In such complex cases a practical approach of modular argumentation is suggested (Svantesson, 2019) which is a model suggested by *Phan Minh Dung and Giovanni Sartor* (Dung, et al., 2011 pp. 233-261) which requires division of the case into various modules wherein each module prioritises a particular issue and in those concerned issues the relevant priority legal norm and the ensuing conflict is recognised and solved. However a problem with such a model is the role of this modular segmentation that has to be done and by which court it is to be done. At the most basic level, the assessment of claims of jurisdiction, as well as the questions of which norms apply and how clashes between applicable norms are addressed should be guided by the following three criteria that may be seen as the jurisprudential core of the concept of jurisdiction, namely:

- Substantial connection – is there a substantial connection between, on the one hand, the matter and, on the other hand, the given state seeking to exercise jurisdiction and the norms it seeks to apply;
- Legitimate interests – does the given state seeking to exercise jurisdiction and apply some of its norms have a legitimate interest in the matter; and
- Interests balancing – is the exercise of jurisdiction and application of those norms reasonable given the balance between the state's legitimate interests and other interests?

The modeling must take all of this into account.
It is important to note that even the acceptance or denial of jurisdiction by a court (Government of India, 1908) is subjected to judicial review by courts of other nations before granting recognition to such form of modular argumentation. Further the applicability of such models becomes difficult due to the different approaches to the same rule of forum non conveniens recognised by various nations. For instance, in USA, the public and private interests both are recognised and considered (Blair, 1929; 1947), while in UK a greater preference is given to the overarching private and joint interests rather than public interests (1987). Such differing approaches often lead to a difficulty in execution of this model of study.

The problem would be further complicated where AI tools and algorithms automatically generate media and content in the Big Data cyberspace, wherein even nationality or domicile cannot be located or even the claimant's choice of jurisdiction becomes difficult to choose.
While the problems are varied, but in commercial transactions involving AI, often the answer lies in Bilateral Investment Treaties referring such issues by default to arbitration and negotiation. But when it involves personal rights issues, crimes and civil acts often the most important consideration should be the point of enforcement and regulation. A concept of ISP Regulation developed by Russia (Wright) where the ISPs are made the central point of regulation and adjudication. The benefit of such regulation is that even though a jurisdiction is not existent but still the ISPs located in different nations can act as a filtering agency of data which can also impose stay proceedings or restoration proceedings to retract the data from the local networks. Therefore, the ISP which is responsible for propagation of the alleged data can be the locating factor for jurisdiction considering private and public interests concerned.

Determination of applicable law

Determination of applicable law is often a part of the jurisdictional issues concerned; however, the questions of nationality, domicile and place of business becomes important factors as to determine which law should be applicable.
In the regime of AI, the question of applicable law becomes complicated when AI driven technologies and automated technologies perform acts which become liable to civil or criminal acts. In this case not only the nationality or place of origin cannot be determined because of the AI being located in the cyberspace but also because the laws which are to be applicable often conflict with each other. This question is suggested to be solved by the concept of contextual legal system (Svantesson, 2019). Each contextual legal system is made up of norms from multiple states' legal systems – norms that typically are neither coordinated nor harmonized. Thus, unsurprisingly, a contextual legal system to which a person is exposed may contain clashing norms; that is, the norms of one state may demand performance of actions that the norms of another state forbid, or the

norms of one state may outline duties that directly contradict rights provided for by the norms of another state (Svantesson, 2019). Therefore the context of the act is considered and then the conflict of laws rules are applied to determine a harmonised way of adjudication so that the ultimate judgment can be effectively enforced in the nations concerned.

An artificially intelligent entity is a legal person governed by national law that 'houses' an artificial intelligence. Shawn Bayern first came up with the idea to establish a limited liability company under current United States law, i.e. the law as it stands now, and put an artificial intelligence (or, synonymously, an autonomous system, a smart algorithm, a software agent, etc.) wholly and solely in charge of it (Bayern, 2016 p. 297). Bayern explained in detail how this construction works and showed that it has the effect of bestowing legal personality on an artificial intelligence. If the same can be done then it will open doors to state's obligation of recognising such entities as well as ease of determination of applicable law based on tests of incorporation and domicile.

In addition, States have to review their international legal obligations. One State may go forward and enable the creation of artificially intelligent entities; other States may be bound by treaty law to recognise the legal personality of such entities (LoPucki, 2017 p. 76). Within the European Union's internal market, measures against artificially intelligent entities will be lawful, if the measures specifically target uncontrolled entities with a view to ensuring that a natural person can be held criminally liable when entities have been involved in crimes (Burri, 2018). But outside the Union, in international law, the adoption of such measures may only be lawful after mutual recognition treaties have been changed. If this proves to be the case (and if such measures are desirable), treaty amendment procedures will have to be triggered as soon as possible (Burri, 2017).

If such a legal regime of AI entities and legal personhood can be created then the private law concepts of domicile and citizenship and nationality can be utilised to determine jurisdiction and the applicable law.

Another approach is the development of natural law principles which is suggested by authors who wish to contextualise the cyberspace as a res communis or res publica like the high seas or the outer space or the regime of Antarctica (Hildebrandt, 2013). Such regimes are often governed by the common interest of human kind and natural law principles rather than the domestic legal system of each nation as the jurisdictional interest of each nation is involved in such regimes. It gives a public international law approach to the acts committed by AI, but which involve the risk of harmonisation and uniformization which is often a difficult objective to achieve due to the domestic legal sovereignty expectations of nations (School of Advanced Study, University of London, 2008).

However, it often becomes a necessary evil and if AI issues are to be solved without declaring cyberspace as a res communis, it is necessary to harmonise the laws governing cyberspace or at least develop a separate branch of law in every nation for regulations of cyberspace. Since contextualisation is more of a procedure rather than a solution, it is often harmonisation or at least development of a separate branch of law for cyberspace in each nation which is essential to solve the jurisdictional issues in PrIL and AI.

Enforcement and Cooperation Issues

Enforcement of foreign judgments and national cooperation are often the most important part of private international law which becomes a problem for private parties due to the varying national policies and judicial adjudication processes. The most difficult query is whether the judgment is compliant to public policy of the nation or not. Whether a judgment involving AI issues or algorithms be compliant to a nation's policy or not depends upon their approach to AI which in turn depends on steps taken towards harmonisation. Cybercrime is one sector where the UNODC has played an important role in this harmonisation process. The harmonization of substantive provisions of cybercrime laws not only prevents cybercrime safe havens, but also reduces cybercrime penalty safe havens. Moreover in early 2015, United Nations Interregional Crime and Justice Research Institute (UNICRI) established a center on AI and robotics to "help focus expertise on Artificial Intelligence (AI) throughout the UN in a single

agency." (Future of Life Institute, 2021) This Centre is focused on "understanding and addressing the risks and benefits of AI and robotics from the perspective of crime and security through awareness-raising, education, exchange of information, and harmonization of stakeholders." Therefore, undoubtedly harmonisation becomes an important consideration to foresee the possibility of enforcement of private international law judgments involving AI algorithms and tools and such AI driven technology.

Conclusion

While it is needless to reiterate that AI has in store of it complex private international law issues for domestic national courts in the upcoming years, it is important to note that often harmonisation of national approach to AI or at least having a regulatory regime for AI with proper soft law or hard law regulations can play an important factor to resolve jurisdictional and applicable law dilemmas. If for instance like cybercrime issues, nations can opt for uniformization too then the issue of enforcement and cooperation can be solved too. The other alternative to this is declaring the cyberspace as a res communis which is reasonable too as it would help in devising an unified system of regulation with an unified adjudication process. It is needless to reiterate to conclude that it would require a common intended negotiation on the part of states to resolves these private international law issues related to Artificial Intelligence.

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3 Integrated Circuit Layout Designs and Artificial Intelligence

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Abstract. The Indian IP Regime has been able to react to developments in technology effectively, but at a slow pace. With the increasing role of social media and Online services in commercial activities, the government launched several guidelines such as the Information Technology (Intermediary Guidelines) that incentivized internet service providers to action against content that was infringing on the intellectual property or other proprietary rights of Individuals or companies. The courts have upheld that the existing IPR laws of the country should be and can be exercised to the extent possible to protect the rights of individuals irrespective of the international nature of the internet (Satyam Infoway Ltd vs Sifynet Solutions Pvt Ltd 2003).
While these steps are definitely in the right direction, India still lacks when it comes to adapting the IP regime to suit the modern day.
As progress is made in this realm, there is a question that arises that is already being debated under different realms of intellectual property, like who receives the rights to works created by AIs, etc. (Guadamuz 2017; Grossman 2006)
The objectives of this article are as follows:
- How is Artificial Intelligence being used to generate Layout Designs?
- How are layout designs protected in India?
- Is the existing law on Layout Design Protection conducive to Artificial Intelligence?

What are Integrated Circuits?

It is an electric device which is made up of small parts that are all fabricated together as a single unit. The base of this material is some semiconductor material, usually silicon, that is mounted with devices

like capacitors, transistors, and more. Integrated Circuits are usually small in size (can go down to mm^2 sizes). The entire piece (Circuit and base and all) is often referred to as a 'chip'. Individual components may be microscopic in size.

In 1947, William Shockley and team discovered that under the right conditions certain crystals could form a layer of electrons on top of them, this layer could be manipulated by directing or stopping the flow of electrons, which would then guide the flow of electricity. This could help scientists carry out functions like signal amplification, etc. This was previously being done by vacuum tubes, which were large and expensive. The device developed from this discovery was named the transistor. Similar processes were formed in order to develop other components of electronics.

These devices were smaller in size, less susceptible to breakage and sturdier. These components came to be known as Solid State Devices. (Saint, Saint 2020)

The only large parts that remained were the wires that connected these things. Until 1958 Jack Kilby and Robert Noyce independently created a system to deliver electric charge between components without the use of wires. This was done by laying down lines of metal or other conductive material within the board on which the components were mounted. These paths served the purpose of wires. This is how Integrated Circuits came to be and as time has progressed, ICs have continued to improve.

In 1965, the Co-founder of Intel, Gordon Moore, gave the observation that the number of electric components like transistors on a single chip of semiconductor material kept doubling every year, this is because the parts were getting smaller, and more heat and energy efficient. This observation came to be known as Moore's law. (*Moore's Law* 2019) However, as time has progressed, Moore's law has slowed down. The rate at which the number of components doubled went from one year to two years in 1975, and has dropped ever since. Over time, Moore's law went from an observation to a goal and guiding principle. Today Chip designers aim to hold Moore's Law true. This is because the smaller we can make a chip without sacrificing the processing power it bears, the better it will be, because smaller chips:

- use less energy,
- cost less to produce,
- are easier to embed into technology,
- and even benefit the speed at which computers work.

Smaller chips also bring us closer to a future of 'ubiquitous computing', i.e., a future in which everything in the world is interconnected, allowing technology to anticipate our needs, provide us solutions proactively and improve our lives.
The benefits of smaller chips are thus quite clear, and thus it goes without saying that any designer or producer that is able to produce a smaller chip will be able leverage their intellectual efforts and earn off of them, this can be done because the Layout-design of a chip can be protected through Intellectual Property Rights.

Layout Designs
Layout Designs refer to an integrated circuit's layout, or three-dimensional organization. The creation of these layout designs requires an immense amount of time and money because layout designs require the fulfilment of certain rules and criteria to make the chip smaller, without sacrificing efficiency. Integrated Circuits are now a part of our everyday lives, everything from our smartphones and laptops to our elevators and vehicles have Integrated Circuits in them, which makes gaining access to an Integrated Circuit and thus the design of it extremely easy. An individual could simply dismantle an electronic device and replicate the design of a chip, thus robbing the original investors and designers of their returns. (Atul 2005)
In order to prevent such conditions from arising, layout designs are protected by law as intellectual property. In India this protection is rendered by the *Semiconductor Integrated Circuits Layout Design Act, 2000*. This act allows chip designers and producers to prevent the unauthorised duplication and distribution of their layout designs.
The reason we have a *Sui Generis* system for Layout Designs is because:

- They could not be copyrighted due to them not being artistic works, and while copyright could apply to the designs and plans for such designs, their applicability on the actual final product was questionable
- They could not be patented as there is more re-arrangement and organisation as compared to an inventive step
- They could not be protected under Industrial Designs as they did not determine the outside appearance of an IC (Kumar 2003)

Artificial Intelligence and Integrated Circuits

Artificial Intelligence refers to any computer application that allows the computer to carry out intellectual activities that are similar to humans. For example, an application that can learn from different sources and then give an answer to some different output. This particular application is called 'Machine Learning'. Artificial Intelligence is now being used around the world in different sectors and fields to deal assist humans in activities like making hiring decisions, grading examinations, suggesting content to users – like on Spotify and Netflix, etc. Chip design is one such field in which the power of AI is being used to pave the way for smaller, more efficient chips. (Andersen 2019)

It is somewhat a matter of pride that our technological capabilities have reached a stage at which even our smallest chips leave something to be desired in the context of our newest technological developments – especially in the realm of Artificial Intelligence (AI). Unlike human intellect, AI does not fatigue, AI can be upgraded immediately, AI does not require revision of things learnt and most importantly, AI can solve complex problems that humans can – but at a much faster rate. For the proper functioning of AI, it needs to draw upon and access a large amount of information, the processing of this information is done by ICs. To improve the functioning and efficiency of AI, in order to develop it further, we need smaller chips. This hinges on the layout

design of the chips. Interestingly, in order to optimize the Chips for AI, developers are using AI themselves (Andersen 2019).

AI Created Layout Designs

AI in the design process – Electronic Design Automation

Initially, circuit designs were drafted and assembled by hand, this was a skill that required a high amount of precision and expertise, and was incredibly time consuming. The entire process of conceptualising, designing, fabricating and testing semiconductor design had to be done in an analogous manner, this was incredibly costly and time consuming, it was also a high-risk endeavour as limited resources could be used with little to no guarantee of a viable design being created. The 1960s saw the birth of *Hardware Description Languages* or HDLs. HDLs were computer languages that enables designers to produce a precise, formal description of an electronic circuit that allows for the analysis and simulation of an electronic circuit by a computer program in a virtual environment. It also became a tool for generating a netlist (a specification of physical electronic components and how they are connected together), which can then be placed and routed to produce the set of layers that an IC is created with.

All these tools that are employed in order to design, test and produce Integrated Circuits are collectively called 'Electronic Design Automation' (EDA) systems. They cut costs significantly, allowing testing and simulation without fabrication and assembly, this opens up researchers to engage in exploratory behaviour, tweak and tune small variations to test better models, etc. (Lienig, Scheible 2020) However, the usage of these EDAs was still quite time consuming, as it were humans that had to generate the concepts and actions of the chip, and also write in the HDL to get the EDA to work.

In early 2021, researchers at Google published an article which reported on an easier way to plan and generate layout designs using reinforcement learning models. The model specifically excels in optimising the chips 'floorplan' i.e., how and where the electronic components on the chip are placed, while meeting certain rules and criteria, this is the most difficult and time-consuming process within

the chip designing, Google's model has reduced the time to 6 hours. (Goldie, Mirhoseini, Google Research Brain Team 2020)
While the incorporation of AI was already taking place in EDA systems, it was largely related to the fabrication and assembly process, this is the most significant improvement that has arisen till date in the pre-fabrication realm, essentially Google has created an AI that can design layout designs with minimal human effort, that are equal in quality to those generated by Humans.
It can be expected that the number of AI models being developed and incorporated into chip design will increase and become more effective soon, thus raising the pertinent questions related to layout-design ownership, and whether the question of such a design being protected even arises.

The Indian IP regime on layout designs

In India, layout designs are protected under the *Semiconductor Integrated Circuits Layout Design Act, 2000* (Layout Design Act). More than 15 years after the first legislation of the kind was passed in the United States of America in 1984. In the wake of this, several other countries like Japan and members of the EU also passed similar legislations, these efforts culminated in the formulation of the 1989 treaty on Intellectual Property in Respect of Integrated Circuits, which was later included into the Trade Related Aspects of Intellectual Property Agreement (TRIPS) of the World Trade Organisation (WTO) (*Patent Expert Issues: Layout Designs (Topographies) of Integrated Circuits* no date) . India, being a member of the TRIPS and also seeing a growth of it's technology industry at home incorporated the provisions within these two treaties and generated the domestic legislation.
The act provides protection to the registered-proprietors of a registered layout-design. It is explicitly mentioned in the act that only layout designs that are registered under the act will be able to illicit the protection of the act, an unregistered layout design will not be given protection. The requirements for registration are given in Section 7 of the layout design act, and are as follows:

a) which is not 'original'; or
b) which has been commercially exploited anywhere in India or in a convention country; or
c) which is not inherently distinctive; or
d) which is not inherently capable of being distinguishable from any other registered layout design,

A question that arises here is: if a method like Google's were applied in India, would it be considered as 'intellectual effort'. If a chip design is not deemed to be a result of the creator's own intellectual effort, then it will not be eligible for registration, and thus ineligible for protection under the act. (*Semiconductor Integrated Circuits-Layout Design Act* 2000)

The existence of "intellectual effort"

In order for a layout design to be eligible for protection it must be original. When dealing with an object such as an Integrated Circuit, there is very little scope and focus on inventing something new, while research and development are a big part of their working, they prioritise making existing technologies and models more efficient by rearranging and modifying them to fulfil certain criteria and goals. Thus, the meaning of originality in the context of integrated circuits is as follows:

In order to be original, a layout design must:

- *Be the result of its* ***creator's own intellectual efforts*** *and*
- *not be commonly known to the creators of layout-designs and manufacturers of semiconductor integrated circuits at the time of its creation*

This is given in Section 7 (2) of the Layout Designs Act.

As to the meaning of 'commonly known', in the case of (*Ocular Sciences Ltd v Aspect Vision Care Ltd* 1996) in the patents court of England and Wales tried to define the meaning of 'Commonplace'. Justice Laddie endorsed the counsel's submission that a design which is: '***trite, trivial, common-or-garden, hackneyed or of the type which would***

excite no particular attention in those in the relevant art is likely to be commonplace' however, the justice also remarked that something created through the amalgamation of a number of these qualities could still be original and unique. Thus, deciding that the originality requirement is stronger than the originality required under the Copyright Act, but weaker than the novelty requirement in the Patents Act.

The question of intellectual effort is one which is discussed in most intellectual property right matters that offer proprietary rights to creators. There are certain doctrines on the basis of which it is decided that a certain work is original or not. These doctrines operate under the assumption that a truly novel creation is extremely hard to come by, and that most ideas are reiterations of older, existing ideas, thus these doctrines are suitable to be applied in the context of layout designs as well .

1. **Sweat of the Brow Doctrine**

- According to this doctrine, an author gains rights through simple diligence during the creation of a work. Substantial creativity or "originality" is not required. The creator is entitled to such rights on account of efforts and expense put in by him in the creation of such a work.
    - E.g., the creator of a telephone directory or a database must have a copyright over the product not because such a compilation of data showcases any creativity, or the author has expressed anything original, but merely because of the effort, time and money invested by the creator to collect and organise all the data in a specific manner.
- This relies on the skill and labour of the author, rendering the requirement of 'creativity' on a work redundant.
- *Walter v Lane*

- Oral speech was reproduced verbatim in a newspaper report and the question was whether such verbatim reproduction would give rise to copyright in the work. The Court said yes

- *Uni of London Press v Uni Tutorial Press*

  - The Court held that the Copyright Act does not require that expression be in an original or novel form.

  - It does require that the work not be copied from another work. It must originate from the author.

  - The court held that merely because similar questions have been asked by other examiners, the plaintiff shall not be denied copyright.

  - The Court held that the Copyright Act does not require that expression be in an original or novel form. It does, however, require that the work not be copied from another work

- *Ladbroke (Football) Ltd. v. William Hill (Football) Ltd*

  - The Court said that it is immaterial whether work is wise or foolish, accurate or inaccurate, or whether it has or does not any literary merit.

  - The case reiterated the requirement **of 'labour, skill and judgement'** and the requirement of originality is limited to the extent that the work originated from the author.

2. **Modicum of Creativity**

- In *Feist Publications, Inc. v. Rural telephone Service Co.* case, the US Supreme Court totally negated the Sweat of the brow doctrine and held that in order to be original, a work must not only have been the product of independent creation, but it must also exhibit a "modicum of creativity".
    - This doctrine stipulates that originality subsists in a work where a sufficient amount of intellectual creativity and judgment has gone into the creation of that work.
    - The standard of creativity need not be high but a minimum level of creativity should be there for copyright protection.
- *Bleistein* v. *Donaldson Lithographing Co*
    - decided in 1903, the United States Supreme Court revisited the questions of originality with respect to copyright and rejected the notion that originality should be decided with reference to the artistic merits of the work.
    - The court did not consider the novelty or creativity of the work, but rather the presence or absence of the putative artist's personal expression.
    - If the item exhibits a "distinguishable variation" from another work, the law presumes that such a variation bears the imprint of the author's person, thereby entitling the work to copyright protection
    - Came to be known as the *Bleistein Test*

3. **Doctrine of Merger**

- In *Eastern Book Company v. D.B. Modak*, where the Supreme Court discarded the 'Sweat of the Brow' doctrine and shifted to a 'Modicum of creativity' approach as followed in the US.
    - The notion of **"flavour of minimum requirement of creativity**" was introduced in this case. It was held that to establish copyright, the creativity standard applied is not that something must be novel or non-obvious, but some amount of creativity in the work to claim a copyright is required.
    - The Court held that inputs made by the editors of SCC can be given copyright protection, even though the judgements being published could not, because such tasks require the use of legal knowledge, skill and judgement of the editor. Thus, this exercise and creation thereof has a flavour of minimum amount of creativity and enjoy the copyright protection. (Madhu Noonia 2019)

Intellectual Effort and Layout designs

Google's report stated that they trained their AI Model by feeding it the designs of 10,000 different semiconductor layout designs. The model was then given certain parameters and goals and was run. Each time the model returned an output which was more in line with the set parameters, it was given a 'reward' and each time it gave an output which was moving away from the goals, it was given a 'penalty'. Finally, after 6 hours an output was reached which fulfilled the parameters provided. (Mirhoseini et al. 2021)
At a cursory glance the visibility of an intellectual effort in the creation of this layout design is done only by the AI. However, on delving deeper the following instances of the creator's intellectual effort come into view:

- The setting of parameters according to which the outcome was generated
- The assessment of final and intermediate outcomes
- The creation of the reward and penalty policy according to which the program worked
- The systematic modification and alteration of the model in case of errors

Would this creation thus be original?

By the Sweat of the Brow Doctrine: This doctrine states that a creation is considered original if the labour and skill of the creator is involved.

In the situation given above the skill, labour and knowledge of the creators is involved. It is their ability which allows them to identify and set parameters, modify and rectify the model in case of algorithms also to validate the findings of the model itself.

By the Modicum of Creativity and Merger Doctrines: These doctrines states that there should be some amount of 'creativity' or a distinguishable variation from other existing works to render a creation original.

In the situation given above, if the output is of such a nature that it is not replicating the creation of a work that already existed, then it will pass the test of this doctrine. This doctrine also lines up with the other requirement for registration under this act, i.e., that the layout design must not be common place.

The generation of parameters and modification of goals is unique to the companies and creators themselves. For example, AMD and Intel are two of the largest companies in the Computer Semiconductor industry and although they both make similar products (CPUs) the internal designs and working (architecture) of their products is often different.

Suggestions and recommendations

As mentioned above, the current state of AI in Layout designs does not eliminate the need for human intervention and direction, and thus allows for the satisfaction for the doctrines mentioned above –

allowing protection under the Layout Designs Act. However, in the future this may change, because of the complex nature and the vast amount of existing data in relation to the design and production of Layout Designs, this area is extremely attractive for the implementation of Artificial Intelligence and Machine Learning models. Imagine a model which can monitor the performance of existing chips in devices and generate, suggest and output novel layout designs itself, thus eliminating the need for human labour or skill.

In such cases the questions of ownership become pertinent. At present, the global community is much in agreement that intellectual property rights can only be granted to humans. In 2011, a photographer set up his camera in a jungle in Indonesia, this led to a monkey approaching the camera and taking a selfie with it. The Photographer received multiple accolades for the same, including having the picture featured on the covers of a popular nature magazine. In 2015 an Animal Rights group (PETA) sued the photographer for infringing on the Monkey's intellectual property. While the case was initially dismissed by the court as animals did not have legal standing in the court, PETA appealed the decision, after which an out-of-court settlement was reached. (*Can the monkey selfie case teach us anything about copyright law?* no date). **The main take away from this case is that an IPR can only be granted to an individual or group of individuals that bear a legal personality.** This raises the question whether AI systems can and should be recognized as persons in the future.

In (Willick 1985) the author notes that over time the title of a 'legal' person has not remained exclusively with people, but also been given to corporations, groups, and other non-persons. The rationale behind this was that those non-persons had the sufficient ability to display and behave like a legal person – i.e., the entity could make decisions similar to what the law assumes of a reasonable man. The paper then displays that there are increasing instances in which computers are performing human activities. A similar argument has been raised in (Bayern 2016), where the author demonstrates how an algorithm can emulate the functions of an employee under an agreement. The literature clearly displays that there exists a possibility of computers embodying the

duties of persons, the question arises if they are, who is to be held accountable in the case of a duty omitted or performed incorrectly.
In the context of Intellectual Property Rights, the concerns emerge as follows:

- If the work generated by an AI is infringed upon, then who has the power to sue?
- Conversely, if the AI generates a work which infringes upon someone else's intellectual property, who is the right holder to sue?
- Considering machine learning models such as the *Next Rembrandt*, which works by analysing old paintings and creating new ones in similar styles, would this be considered an infringement of the original paintings that were analysed?

Below are the author's recommendations in the context of Integrated Circuits:

1. **Setting up a mechanism for ethical sharing -** In (Brownsword 2018), the author hints at a mechanism that may be considered here, developers, companies, designers and more may volunteer to share their protected layout designs to be studied and analysed by AI systems. This can be done through an agreement between the AI operator and the contributors. The contributors may volunteer to 'donate' their designs and in return gain access to the whole library to be utilised internally. As a part of this the contributors may also be required to agree to not take action against another library user if similarity exists and is below a certain specified threshold.

2. **The notions of 'commonly known' and 'original' should be further elucidated on and made inclusive for creation by non-human actors -** While the application of doctrines held to a certain extent, there is a need for revision and elucidation in order to facilitate better regulation in the event that an AI system succeeds to produce an output without human intervention or

provocation. A more direct provision will prevent ununiform application across different courts and jurisdictions.

3. **Setting up safeguards for humans -** The notion that AI models may eventually replace the need for human actors is undesirable and can put the humans employed in this realm at risk of unemployment. To mitigate this risk and also to improve the quality of the model itself, the existing processes must add 'pause points' for human intervention through potential errors can be rectified and parameters can be tweaked as per need.

4. **Investing in Layout design and Artificial Intelligence Research and development -** The lack of a strong knowledge base will lead to incompetent legislation. In order to set up effective regulations and safeguards, the potential and impact needs to be accurately gauged, and this cannot be done without diligence. The development of a regional knowledge infrastructure that can study and contextualise the implications of such technologies in the Indian Context needs to be carried out.

5. **Setting up clear guidelines for ownership of AI Generated Layout Designs -** A provision similar to that given in Section 7 (3) of the Layout designs act should be implemented with respect to the usage of AI models and EDA applications at large. The author suggests that the rights be assigned to the entity who deploys the system (or to the entity under who's employment such deployment has taken place) be given the rights to the layout designs generated. This is because:
   - Establishes a clear legal entity that can be held accountable in case of wrongdoings
   - Establishes a clear legal entity that has the power to take decisions regarding licensing, transferring, assignment, etc
   - Establishes a competent legal entity that can pursue action against other parties

- Establishes a party that can benefit off of the revenue earned off of such a right

Conclusions

As Moore's law slows down further, and computer networks become a fundamental part of how the world around us functions, there is a high reason and incentive for Artificial Intelligence and other more efficient technologies to rise up around us. With this emerge many situations in which our lives will be disrupted and changed. The incorporation of Artificial Intelligence into layout design creation will not only improve the ability for computers to process data more efficiently, but also to unlock new capabilities for Artificial Intelligence to function.

Under the current Indian IP Regime and the current state of Semiconductor design by AI, AI models are only being used as a tool for assistance, and not individual creators and thus the question of ownership being held by AI systems has not arisen in this field yet. However, it may in the future, and in such a case there is a need safe-guards and better knowledge resources.

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4 Aesthetics and Ethics of Artificial Intelligence: A Critical Review

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Abstract. This is a formerly submitted discussion paper by Advyay Goyal approved by the Indian Society of Artificial Intelligence and Law's Research Team.

Introduction

Aesthetics is the branch of philosophy devoted to conceptual and theoretical inquiry into art and aesthetic. It is closely related to philosophy of art, which is concerned with nature of art and concepts in terms of which individual works of art are interpretated and evaluated. Aesthetics is broader in scope than the philosophy of art which constitutes a species of the former. However, modern aesthetics pertain to the realm of the "beautiful" and modern aesthetics is aimed at understanding the philosophical elements which underpin the concept of "beauty"(Scruton, 2020).

Aron Katsenelinboigen defined "aesthetics" to be a meta concept that deals with formation of beauty and aesthetics methods. She defined beauty as "explicit evaluation of pre-disposition of a certain state of system to its further development" and aesthetic method as "procedure of transformation of state of a system, the state represented as predisposition". She suggests that in eighteenth century, aesthetics was separated from philosophy and became tightly connected to art. However, in the present time, aesthetics is a self-sustained discipline

separated from art and treated as a general category which pervades every field. For example, a mathematician may talk about the "aesthetics" of a mathematical equation or chemist may talk about "beauty" of a molecule (Katsenelinboigen, 1997).

One of the first theoretician of architecture, Vitruvius, argued that architecture must satisfy three requirements that is strength, utility and beauty or aesthetics. Modern sociological research has emphasized that aesthetics plays an important role in daily life (Towards the study of aesthetics in Information Technology, 2004). Katsenelinboigen proposes that humans can make a measurement of beauty and that such measurement is not completely objective but it exists. She proposed a three-layered analysis for the formation of the beauty i.e., primary (logical), secondary and tertiary layer. The primary layer is to determine the essential and positional parameters of an object as independent variables along with conjugated variable and includes different objects created for one's pragmatic needs. The secondary layer is to delineate a layer formed by artistic devices whose structure is isomorphic to the primary layer and it normally includes the world of art i.e., to affect the influence of one's cognition and feelings. The third layer is establishment of mutual relationship between the primary and secondary layer and between these two layers and perception. Therefore, it is the joining of these two layers which is the main principle of applied art. The relationship between the first layer and the second layer is "whimsical" that is to say objects in first layer can be considered from the point of view of the second layer. What Katsenelinboigen explains is that "scientific creative process may be considered as a chain which artistic methodology can be included as an intermediate stage" (Katsenelinboigen, 1997). For example, engineers combine art and aesthetics in creating products which attract customers for their artistic forms employed. Tractinsky underlined the importance of "aesthetic" study in information technology systems which he believes has focused more on utilitarian aspects rather than aesthetics. He emphasizes that with utilitarian objectives achieved, aesthetics has a great role to play about the technology in question (Towards the study of aesthetics in Information Technology, 2004).

Measuring Aesthetics

As noted, aesthetics is a general discipline and pervades every field of interest. Consequently, there are various approaches to study of aesthetics. In art, psychology or industrial design the subjective nature of the viewer due to his personal, cultural and societal background influences the theory of aesthetics. On other hand, analytical aesthetics is concerned with is based on logical and mathematical nature of aesthetics. In information age, computers have a growing interplay with aesthetics and therefore the digital nature of computers has influenced and developed the field of analytical aesthetics.

The first attempt at measuring aesthetics was made by Birkhoff. Birkhoff's theory was inspired by his interest in structural aspects of aesthetic perceptions while listening to music. The early model attempted to define the measure in terms of the effort the object demands of the perceiver (complexity), and the pleasing or displeasing features which can be recognized in the object (order). According to Birkhoff, aesthetic experience consists of three consecutive stages: "(1) preliminary effort of attention, which is necessary for perception, and increases in proportion to what is called the complexity (C), (2) the aesthetic measure (M) which rewards this effort and (3) a realization that the object is characterized by a certain harmony, symmetry or order (O) which seems subtly necessary to the aesthetic effect". Birkhoff postulated that the aesthetic measure is the ratio of these two quantities, more complex objects require a higher order whereas less complex objects require a smaller value of order for the same aesthetic effect. The same can be characterized by the simple mathematical formula M=O/C. Birkhoff applied his "aesthetic measure" in general settings irrespective of the mode of perception or the type of object.

Birkhoff's work has been studied extensively from different perceptions and results have been modified, enhanced or changed completely. For example, Abraham Moles, studied the relationship between the theory of information and aesthetics with focus on relationship between theory of perception and psychology. He consequently modified Birkhoff theory which was "object" based to a theory of information and perception and proposed the formula M=O x C. Birkhoff's work opened a pandora box of research in the field of "informational

aesthetics" which looks foe theoretical underpinning of aesthetics, viewed from the perspective of information and quality contained in an object. As Douchova notes, research into the computational method of aesthetic continues with many papers referring to Birkhoff's work giving various functions and methods for computation of aesthetic measure of an object especially his work being widely researched in the field of computer-aided design and also Artificial Intelligence applications as discussed in the paper later (Birkhoff's Aesthetic Mesaure, 2015).

Filonik and Baur in their paper observed that "intuitive interpretation and frequent reoccurrence in other works show that Birkhoff's work is very appealing" and the major focus in information visualization is determining as to what constitutes order and complexity in Birkhoff's equation. They consequently discussed work undertaken by Klinger and Salingaros who proposed a "pattern measure" which is based rectangular square arrays of elements and can be applied to roster of pixels. The cognitive process is the underlying principle in their proposal. Similar to Birkhoff, it is asserted that viewer identifies coherent units and notices frequency of appearance of identical units with simple patterns being easy to notice compared to complex ones. Their pattern measure combines hierarchy with information measures to estimate the complexity and order of a pattern. Filonik and Baur also described aesthetic visualization approaches which is colloquially referred as "algorithmic art" and has applications in Artificial Intelligence as well as will be discussed under. The first field they described was "Exact Aesthetics" which deals with the "reconstruction of methods of design and criticism on algorithmic basis". They assert that goal of "Exact Aesthetics" is to integrate a computer into process of artistic creation and aesthetic evaluation and therefore "aesthetic measure" is an important starting point for the development of such algorithms. The second field discussed was "Genetic Algorithms" which are inspired by evolutionary process in nature and have a large field of application ranging from living ecosystems to computer vision research. In, Genetic Algorithms there is a pool or population of possible solutions to a given problem. These solutions undergo genetic processes like recombination and mutation producing children with the goal of finding an

optimal solution. Each candidate solution is ascribed a fitness score (based on objective function value) with fitter individuals having a better chance of mating. It was noted by Filonik and Baur the Genetic Algorithms are being increasingly used by artists for generating art and music. (Mesauring aesthetics for information visualization, 2009).

AI and Aesthetics: Developments

Convergence of Art and Aesthetics with Artificial Intelligence give birth to two fields namely Computational Aesthetics and Aesthetic Computing. The former was created to assess beauty in domains of human creative expression such as music, visual art, poetry, and chess problems. The goal of computational aesthetics is to develop fully independent systems that have the same aesthetic "sensitivity" and objectivity as human experts. On other hand, Aesthetic Computing is concerned with use of traditional art theories in developing aesthetically pleasing technological products. It is however Computational Aesthetics which has predominantly captured the imagination of researchers in Artificial Intelligence and which pervades discussions about Artificial Intelligence and Aesthetics. Bo et.al. in their paper titled "Computational Aesthetics and applications" focused on two main themes is Computational Aesthetics namely aesthetic measurement and generative art. In the former, they reviewed existing parameters and criteria currently used in the aesthetic measurement. In the later, they focused on design generation with use of "fractal art" and "abstract paintings". Combining both the elements of Computational Aesthetics, the proposed a design generation framework. The design framework involves a two-step process: aesthetic feature evaluation and decision. Their proposal has been condensed in the following steps for a brief understanding:

- **Information Elicitation**: Collection of design information and requirements including sample design images.
- **Rule Specification**: Based on information collected, designers using their knowledge and experience may specify rules for design creation such as spatial and logical relationship between objects. In the second stage, rules might be adjusted

through automated machine learning process which can be refined through human intervention.

- **Design Generation**: Based on rules and instructions through supervised learning, designs can be generated with application of pre-coded set of aesthetic rules. It was proposed the deep learning algorithms can extract styles from design samples such as distortion or texturing. This ensures design principles and uniqueness which is enhanced by use of deep learning to enrich extracted designs.
- **Design Selection**: This step envisages traditional design selection processes.
- **Rules Learning and Modification**: Images produced may be discarded by the creators of the system on basis of some unmentioned constraints. The authors therefore contemplated use of Artificial Intelligence tools to elicit the constraints used by designer and deep learning tools. Deep learning tools like Convolutional Neural Networks (CNN) and Deep Belief Networks ('DBN') could detect shapes and contours from samples and could help in formation of new elements. According to new elements, more concrete rules can be learned.

Therefore, Bo et.al, proposed a design generation system which may generate aesthetic designs based automatically or semi-automatically. By combining judgement of the human designer and automated approach, the system can lead to design optimization (Computational aesthetics and applications, 2018).

A similar concept was envisaged by Wang et.al. earlier in 2016. They observed that existing research then had mostly focused on constructing "hand-crafted features" like the ones used in photography or psychology that are empirically related to aesthetics. It was noted that the existing studies though having divergent results were successful in identifying core mechanisms involved in "aesthetic preferences". However, the dearth of work providing synergy between the neuro-aesthetics and advances in learning based aesthetic models. As a result, Wang et.al. developed a deep-learning based image assessment model called Brain-Inspired Deep Network (BDN) which was inspired by the

visual neuroscience model developed by Chatterjee. The following observation in Chatterjee's model of neuro-aesthetics inspired BDN-

- The human brain works as a multi-level system.
- For visual sensory input, a variety of relevant feature dimensions are first targeted.
- A set of parallel pathways abstract visual input. Each pathway processes the input into an attribute on a specific dimension.
- These association transform into an aesthetics decision.

According to Wang et.al., BDN makes innovative progress over conventional technology to develop a more sophisticated brain-type model in two ways. First, BDN processes the information in a "multi-phase" hierarchy in a fashion similar to complex neural mechanism of the human brain. Secondly, BDN is the first to introduce a design of independent feature dimension as parallel pathways (unlike the then existing state of art technologies), followed by fusion of a "prediction score". In sum, BDN exploits the process of neuro-aesthetic wisdom, a part of which was earlier employed in an over-simplified way by the then existing technologies and integrates such system with power of deep-networks (Wang, 2016).

Aesthetics and AI: Applications

The most extensive work on Artificial Intelligence and Aesthetics is carried on by Lev Manovich. His work focusses on the "cultural Artificial Intelligence" wherein he notes that "Artificial Intelligence plays a crucial role in culture, increasingly influencing our choices, behaviors and imaginations". Manovich emphasizes that AI plays an important role in our cultural lives and behaviors, increasingly automating the process of aesthetic creation and aesthetic choices (Manovich, 2018).

Manovich divided application of Artificial Intelligence in Aesthetics in two categories namely (a) Artificial Intelligence for selection from existing and (b) Artificial Intelligence for creation of new art. In the previous, application of Artificial Intelligence is used for selecting from existing content. For example, Instagram's explore recommends images and videos to each user based on a combination of many factors.

One important application of Artificial Intelligence in this category has been for ascribing aesthetic scores to user photos. Hillen reported that Huawei ran a photo contest wherein submitted photos were judged by Artificial Intelligence. Huawei's software was trained using 40 lakh images which were taken by professional photographers and was developed to ascribe a personalized Artificial Intelligence score based on pre-determined parameters such as focus, jitter, deflection, color, and composition (Hillen, 2018). Forbes reported other similar projects like Google's NIMA (Neural-Image Assessment), an Artificial Intelligence system that can predict which images will be rated positively and Parallel Dots, which created an Artificial Intelligence based system that developers can use to recognize an image's aesthetic score after being trained on a given data set. Similarly, Pics Art, a photo editing company uses a mix of human intervention and Convolutional Neural Network ('CNN') for ascribing an aesthetic score to all images uploaded on their software and feature the best ones in their home page (Avoyan, 2018). EyeEm developed a system to classify images using mathematical indicators and used supervised machine learning for aesthetic assessment which was trained on a set of pre-classified images. Further, used of CNN was considered for automatically determining relevant features directly from training data set. Thereafter, EyeEm uses a ranking system based on their trained aesthetic model to promote photographs in their feed and highlight aesthetically pleasing content in the search option (Shaji, 2016).

Artificial Intelligence is also used for creation of art or "generative art". With emergence and development of computational aesthetics, advanced Artificial Intelligence technologies have been used for generation of unique artworks. For example, Huawei Mate 10 uses Artificial Intelligence to analyze what it sees. Thereafter, the content is classified into one of the several screen types and selects appropriate parameters for capturing a given scene. Deniz Kurt studied the "creativity of Artificial Intelligence" and attempted an answer to the question whether Artificial Intelligence can be considered "creative". In this process, he applied Boden's and Sawyer's of theory of creativity and presented examples for different types of creativity as espoused by

Boden. These examples are reproduced below for a better understanding of the "creative Artificial Intelligence" (Kurt, 2018)-

- **Combinational Creativity:** Combinational creativity is defined as "making unfamiliar combination of familiar ideas". This happens to be the most favored application of Artificial Intelligence in Arts. In these systems, Artificial Intelligence systems use pre-fed data to generate unique combinations. For example, poem.exe is a poetry generator bot that uses thousands of existing data to generate unique poems on the Japanese poetry style "Haiku" and post them on twitter. Kurtz further elaborated on the use of Artificial Intelligence in prose. He illustrated the use of Artificial Intelligence system called "Benjamin" which wrote the opening lines of the science fiction film "Sunspring". Benjamin is a LSTM recurrent neural network which has application in text-recognition. Benjamin was trained with scripts of different science fiction movies which finally produced a script of a "dystopian futuristic science fiction" and the script was directed by Oscar Sharp. Manovich discussed the concept of Artificial Intelligence as a "cultural theorist" wherein he states that Artificial Intelligence systems, especially "deep learning" will lead to automation of cultural production. For example, in creation of the trailer for the film "Morgan", a computer was given 100 horror movies with scenes tagged with a bank of different emotion. Based on its understanding of the film, the computer curated appropriate scenes for the creation of a trailer (Manovich, 2018).
- **Exploratory Creativity:** According to Boden, exploratory creativity "takes place within a certain space, that is, within a certain style" i.e., when someone comes up with a novel idea within a certain creative style. Nils Johnson from Stanford University argues that there are parallels between animal and machine learning and that Machine Learning is a field of Artificial Intelligence which is concerned with the question of creating system which improve with experience. Exploratory creativity in Artificial Intelligence is portrayed by "Aaron", a computer program developed by Harold Cohen who himself was an accomplished painter and had an abstract style of painting. "Aaron" which was trained in abstract

style used by Harold Cohen draws and paints stylized still life and portraits of human figures out of its programmed imagination without any additional input. In fact, American Association on Artificial Intelligence had described "Aaron" as one of the "most creative" existing systems [then] (Anderson, 2001).

- **Transformational Creativity**: Boden considers this to be the highest form of creativity wherein there is transformation of certain dimensions of a conceptual space. It is often postulated that computer systems cannot achieve 'transformative creation'. However, Boden acknowledged that the difference between "exploratory" and "transformational" creativity is blurred. Thus, the question is the significance of the change produced by the system and in this backdrop, it can be considered that Artificial Intelligence can achieve "transformational creativity" as artificial systems have the capability of introducing radical change within existing systems. For example, Google's Deep Dream is a computer vision program which uses a CNN to enhance the images and therefore creates dreamy art that can be considered as unique and authentic. Deep Dream visualizes the patterns learned by a neural network and over-interprets and enhances the patterns it sees in an image. It is done using forwarding an image through a neural network, the calculating the gradient of the image with respect to activations in a particular layer. The image is then modified to increase these activations, enhancing the pattern and resulting in a dream like image (Wasilewska).

Bo et.al in their paper on Computational Aesthetics also discussed the application of Artificial Intelligence in generative art. The classified the systems in four categories based on the level of human intervention needed in generating new art works. They described the following levels which are briefly discussed hereunder (Computational aesthetics and applications, 2018):

- **Level 1**: These systems require full human participation using an existing painting software or platform.
- **Level 2**: These systems generate results based on mathematical formulas parameterized with certain degrees of

randomness. Example of the same can be fractal art which is based on geometric concepts.

- **Level 3**: These systems are often "heuristics-based using knowledge-based machine intelligence". The same was divided in two i.e., generative, and transformational. The previous makes use of rules and algorithms to generate artwork whereas the latter is concerned with transforming digital images into abstract images using image processing techniques.
- **Level 4**: These systems are Artificial Intelligence powered and promising in generating highly creative artworks and design forms. These systems are capable of automatically detecting underlying patterns in an image and ascribe an aesthetic score or create artworks based on the cultural preferences of the users.

The use of technology in creation and evaluation of aesthetic art works posits many questions. On such question is whether use of technological aid in artistic creation influences the "aesthetic quality" of the same. Don Ritter enumerated the various factors which effect the "aesthetic judgement" which includes "limits of perception, context, familiarity, personal motivation, persuasion and personal knowledge". He notes that personal knowledge plays an important role on "aesthetic judgements" based on the potential of fulfilment of an individual's "aesthetic criteria". For example, a person having knowledge of video editing software may prefer certain formats over others, which a person having no knowledge about the same may not respond to in his "aesthetic criteria" (Ritter, 2008). Hantula et al. investigated the question whether use of technological aid in creation of art results in palpable aesthetic difference through use of the case of Dutch painter Vermeer who had been accused of using "camera obscura" in the 17th Century to create his paintings. They observed that the participants in their study who were young students were not affected in their aesthetic judgements using technological aid for art creation. In fact, some of the participants rated painting created through use of "camera obscura" as more aesthetic. The researchers therefore concluded that their participants were "art appreciators" unlike "art critics" whose

judgements can be affected using technology for art creation. They contemplate, the reason for such an outcome could be non-understanding of implications of "camera obscura" as an innovative technology in 16th century or perhaps the participants were acceptive of technology and did not find it relevant to detract from their aesthetic judgements. They however highlight the need of more research in the same (Technological effects on aesthetic evaluation: vermeer and camera obscura , 2009). Therefore, in my understanding, it can be said that technology does have a role to play in "aesthetic judgements" of an individual, however, the effect of technology aided or generated art has to be understood in individualized context since "aesthetic judgements" are also affected by other factors like value systems and understanding.

(Ritter, 2008) observed that "aesthetic judgements" of art function as mechanisms for promoting specific "personal, conceptual and social entities". Entities can be abstract concepts, an ethical value or a person, business, or cultural association. By understanding the ethical consequences of compositional decisions and aesthetic judgements, artists and audiences have "increased responsibility for propagation of ethical values, the concepts which dictate what behaviors are appropriate and what behaviors are not". Apropos, it becomes important to study the ethical effects of "aesthetic judgements' made by machines or "art" created through use of Artificial Intelligence. Lev Manovich raised a similar question with regard to effect of increased use of Artificial Intelligence in field of Arts on "aesthetic diversity". He enumerates two possible scenarios namely reduction in "aesthetic diversity" due to increased use of recommendation algorithms or 'image enhancement software" or increase in "aesthetic diversity" due to increased choices being offered (e.g., settings in an image editing software) or diverse nature of algorithms being used in different software. Whatever, soon, Artificial Intelligence will play an enhanced role in affecting "aesthetic diversity" even though the role might not be significant as of date due to technological inhibitions (Manovich, 2018).

Study of Artificial Intelligence as "Aesthetics"

In the previous sections, we had a look on the application of Artificial Intelligence in the field of "Aesthetics" which was broadly understood to be as Arts, that is to say, how Arts and "Aesthetics" are being affected by technological process. However, Hyon Chu in his article viewed Artificial Intelligence from a completely different and unique angle. He posited that Artificial Intelligence is an "Aesthetic Movement". Hyon posits that primary goal of Artificial Intelligence research is to mimic human behavior rather than to produce "thinking" and has recourse to the "Turing Test" to illustrate his point. He asserts that progress of Artificial Intelligence research is measured by "gradual increase in perceived approximation" of criteria of appearing human and since the success of Artificial Intelligence systems are judged on the metric of "humanness" after passing through layers of evaluation, Artificial Intelligence must be viewed as an "aesthetic movement".

He makes certain arguments to present his point. Firstly, it is posited that Artificial Intelligence research is judged on two dimensions that is success of tasks and the appearance of tasks to be "human like". If the first dimension as used as the primary indicator, then Artificial intelligence can be said to 'technological achievement" whereas if later is made the pre-dominant metric of success, then it can be considered as an "aesthetic movement". The success of art lies predominantly in the "subject" and not the "object" unlike technology. Since, Artificial Intelligence research appeals to intuitions that are activated when we see a form of art, it can be said that Artificial Intelligence is an imitative art form open to "aesthetic critique". Secondly, Hyon with recourse to Plato's idea about "imitation" in "The Republic", posits that Artificial Intelligence in its current form is neither in ideal form of human intelligence nor a particular from of intelligence but is an imitation of particular "statistically derived probabilistic representation of a population". Thirdly, he discusses about the need "aesthetic objects' in our daily life and asserts that "intelligence does not lie in the machine but in our collective representation which cannot be fully verbalized or comprehended, but are forced to use subjective terms to which we may

employ the representations". It is contended by him that by calling "Artificial Intelligence" as "Intelligent", we ascribe it a special status which it does not have but we wish to see in it and invokes Kasparov's defeat's at DeepBlue's hand as a case in point wherein he asserts that DeepBlue defeated Kasparov due to fast and efficient calculations and not "intelligence". Possibly, Kasparov called DeepBlue intelligent for filling the gap between mechanics and his beliefs for he had no explanation for the same (Chu, 2020).

Conclusion

"Aesthetics" in its modern sense is closely related to the "philosophy of art" and study of underlying notions in the concept of "beauty". However, "aesthetics" studies pervade every field of study. Aesthetics has an important role to play an important role in Information Technology services (like user interface) and therefore quantizing aesthetic measures has attracted a lot of interest. Artificial Intelligence is no exception and 'aesthetics' understood in the traditional sense is playing an important role in applications of Artificial Intelligence. Artificial Intelligence is employed primordially in two ways namely modifications to exiting art and creation of new artworks. Application of Artificial Intelligence in "aesthetics" include ascribing an "aesthetic score' to generate new artworks with use of supervised and unsupervised learning. Increasing use of Artificial Intelligence in "aesthetics" posits important questions with regard to "creativeness" of Artificial Intelligence generated artwork, the effect of technology aided artwork on its perceived "aesthetics" in the viewer, societal implications of Artificial Intelligence generated art and effect of Artificial Intelligence on "aesthetic diversity". These questions need increased academic attention in light of fast paced development of Artificial Intelligence application is field of "aesthetics". This discussed, "Artificial Intelligence" can itself be viewed as a subject to "aesthetic evaluations" for the Artificial Intelligence is judged on the metric of resemblance to 'humanness". This calls for a more nuanced appreciation of the term "Artificial Intelligence" with deeper understanding of its content as (Chu, 2020) put it.

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5 Artificial Intelligence and Knowledge Management: Assessing Disruptive Impact on Copyright Issues

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Abstract. In the current age of the Fourth technological revolution, the digital world includes a wealth of information, like Internet of Things information, cybersecurity information, mobile information, business information, social media information, health information, etc. To showing intelligence analyse this information and develop the corresponding good and automatic applications, the data of computing (AI), notably, machine learning (ML) is that the key. This paper is is purely a legal and policy analysis. The research article is restricted to Intellectual Property law, which is stemming its idea from knowledge management.

Introduction

Rapid advancements in artificial intelligence have far-reaching ramifications for the business and society. These developments have the potential to have a direct impact on the production and qualities of a wide range of products and services, with significant consequences for productivity, employment, and competition. However, as significant as these impacts are expected to be, artificial intelligence has the capacity to transform the innovation process itself, with equally deep implications that may grow to outweigh the direct effect over time. Artificial intelligence (AI) is increasingly influencing the digital economy. A big

part of artificial intelligence (AI) is viewed as a general-purpose technology that permeates the whole economy and society. A proper legal framework for AI is essential to fully realize its promise for boosting innovation and well-being.

European and global policymakers have raised the issue of how AI interacts with IP law on a couple of iterations. It is necessary, however, to conduct a full assessment of the current IP system before any policy or law-making initiatives may be taken in this area. Recently, the focus has largely been on AI-aided and AI-generated output, but a more holistic view that takes into consideration the role of IP law throughout the AI innovation cycle would be helpful. In addition to that, brief portrayal of bias as to the algorithms used in artificial intelligence is discussed.

Algorithmic Bias

Algorithm depending on who develops them, how they're developed and how they're used, can be biased in one way or another. Algorithmic bias is the term used to describe this. System bias can be difficult to detect, especially since algorithms are often hidden in a corporate black box. In most cases, we don't know how an artificial intelligence or algorithm was designed, what data was used to create it, or even how it works in real life. Algorithm bias can occur when AI is used to tackle global problems. This can lead to unintended inconveniences, negative implications, and damages.

Are there sexist algorithms? The question may seem a bit strange at first. Despite being coded by humans, the algorithms used by artificial intelligence contain several stereotypical assumptions about the world. But while they can incite sexist or racist prejudices, they can also be used to advance the cause of equality for women and men. *L'Intelligence artificielle, pas sans ells* which simply means, "Artificial intelligence, not without women!", by Aude Bernheim and Flora Vincent demonstrates this in their book *"We must educate algorithms".* The lack of gender diversity in scientific research teams may have an impact on science and technology products. For example, on job applications, salary proposals, and even medical diagnoses, stereotypes embedded in algorithms can have an adverse

impact on how they are screened (by excluding women from technical positions).

An algorithm is also responsible for every Facebook ad, Twitter feed, and YouTube recommendation. One's preferences are tracked by clicking and hovering, then a steady stream of content tailored to their preferences is delivered. While the algorithm improves as time goes by, people are more likely to fall down rabbit holes.

It's true that some of these excursions are harmless. Others, on the other hand, can have far-reaching consequences. Search engines and suggested hyperlinks steer web surfers toward political or unscientific propaganda, abusive content, and conspiracy theories—the same ideas that appear to have motivated the perpetrators in several mass shootings in the United States.

Trying to point to a single video, article, or blog and say it caused a real-world hate crime would be an oversimplification. But social media, news sites, and online forums have given ideas in the past that led to extreme violence via a powerful platform. Recommended algorithms have made macabre more accessible than ever before. There is no doubt that these cryptic lines of code contribute to the spread of hate and misinformation.

There are no distinctions made by these algorithms. When they cross the line, they don't know it because there is no conscience to guide them. When it comes to content, their top priority is the same as that of their parent companies: to showcase the most engaging material, even when that material is disturbing or inaccurate.

AI Biases

Artificial intelligence (AI) has the potential to make the world a better and more egalitarian place. However, if left uncontrolled, it has the potential to perpetuate historical imbalances. Businesses, fortunately, may take steps to limit this risk, allowing them to deploy AI systems and decision-making software in general, with confidence.

AI promises far more than basic automation. The allure of AI has always been objective, data-driven, and educated decision-making. While that promise is within reach, firms should evaluate and minimise potential dangers, such as ensuring that their software does not result in bias against specific groups of people.

Making AI systems trustworthy has become increasingly important. AI will become a mainstream technology in their firms this year, according

to 86% of C-suite executives (including 200 CEOs) polled for PwC's AI Predictions 2021 research. It is also no longer limited to the back office. It pervades every aspect of the business. A quarter of the CEOs polled report extensive usage of AI-enabled operations. Another one-third is introducing relatively narrow use cases. These efforts' top three aims include not only the typical benefits of automation, such as efficiency and productivity, but also innovation and revenue development.

If AI cannot be trusted, its promises will be broken. This involves ensuring that AI models are not biased against specific categories of individuals. Bias in data sets, those creating AI models, and those interpreting its outcomes all contribute to AI bias. Addressing bias is part of a responsible AI approach that includes establishing governance and controls, diversifying your staff, and continuous monitoring.

Artificial Intelligence and Intellectual Property Rights

AI systems are gaining popularity in today's technologically advanced environment. It's only a matter of time before these systems start producing amazing inventions without any human participation. Intellectual Property Rights (IPR) are raised because of this, as it challenges established views of concepts such as patents and copyrights, as well as the regulation of such inventions, among others. A global perspective on IPR laws and artificial intelligence is explored in this study, along with the significant problems it entails. It also tries to make solutions that go beyond IPR and addresses questions about criminal accountability for the content created by such technology, as well as other concerns.

Referring to the "WIPO Conversation on IP and AI", the WIPO agency has begun interacting with the various parties involved. When it comes to protecting their AI ideas, the United States, South Korea, Japan, and China lead the way. Even though AI-based inventions are advancing rapidly, IP rules are still trailing behind. Now Google has come up with its own suggestions for protecting its intellectual property.

To be effective, regulations governing AI inventions must be able to protect and compensate inventors in a manner that benefits society. A fair distribution of the advantages of the discovery should be ensured for all social groups. It is easier to discover infringement in the

traditional patent system than it is in the AI system because so much information is discreet and can be compared to a "black box."

Artificial Intelligence (AI)-driven advancements include AI ethics, data security and privacy. In addition, the IP policy must decide whether AI algorithms are patentable or not. The idea that artificial intelligence (AI) can be an innovator is widely acknowledged. There's also the issue of co-inventorship. When it comes to joint inventions, can AI and humans work together? Artificial intelligence (AI) usage on newer technologies is on the rise. The owner of the innovation has a legal obligation to disclose the usage of artificial intelligence (AI) applications.

When intellectual property meets AI-based creations, various issues occur, including disclosure, infringement, identifying the inventor and owner, and copyright regulations, among other things. IP laws as they currently exist do not adequately address these challenges. To keep up with the increasing complexity and variety of AI-based inventions, existing regulations have fallen short. As a result of the WIPO discussion, IP regulations can be simplified considering AI-based inventions complexity. Humans will always endeavour to improve the quality of life for themselves and others. In the search for automation, these inventions will only increase. An important difference must be noted here between human-created inventions and machine-created inventions. Patents, copyright, industrial designs, and trade secrets safeguard qualifying human-created works and inventions.

If those frameworks and processes need to be adjusted for machine-created inventions and works, the discussion continues. When it comes to discussing inventions/works produced by machines, the main topic is whether they should be protected. Here the focus is on whether AI can be a creator within the current IP frameworks. AI algorithms and software could be protected in the future. Legal rights relating to the training data and data inputs that underlie them. Additionally, the question of how much human input or guidance may be necessary to fall into one category or the other has been debated for some time now.

Justification for Artificial Intelligence Based on Intellectual Property

Rapid breakthroughs in artificial intelligence (AI) have far-reaching ramifications for the business and society. Machine learning as a general-purpose technology, can directly influence both the production and characteristics of a wide range of products and services, with significant consequences for productivity, human labour, and competition. This, in turn, may alter traditional innovation and creation processes, with ramifications for organisations' innovation strategies.

Traditional human labour and capital-intensive manufacturing processes are progressively being replaced by machine learning applications that, for example, predict the outcomes of analogous real-world physical experiments. This, among other things, has the potential to generate welfare-improving productivity efficiencies. The broad application of AI may minimise not just the role of people in the manufacturing process, but it may also lower investment costs. Furthermore, the expanding usage of AI, particularly in the context of the AI-driven Internet of Things, is causing corporations to develop innovation methods.

Because most AI systems require new data, modelling, and training on a regular basis, new types of contracts with a service component appear to be on the horizon. This may also reduce the chance of competitors free riding because they will be unable to supply the necessary services. From a utilitarian incentive standpoint, the expanding role of factual data exclusivities and the exclusive aggregation of data scientists' know-how may also render the job of IP protection obsolete. The primary competitive variables in the development of AI are factual data exclusivity and knowledge. It may already be sufficient to have such input exclusivities once the possible IP protected subject matter in AI is sufficiently de facto excludable. This input aggregation could be an additional foreclosure method that could replace or supplement the usual strategic deployment of IP. As a result, AI is about to disrupt the paradigms on which the IP regime has historically been founded.

Nonetheless, the European Commission (EC) has already laid out the strategic role that the EU legislative framework for AI should play in

determining the world we will live in. In the face of severe global competition, the correct legal framework for rewarding investment in AI in Europe is critical for what the European Commission calls "one of the most strategic technologies of the twenty-first century." (Hilty, et al., 2020) As a result, it is critical that the EC undertake a strategic manoeuvre in terms of IP innovation policies and AI. This is especially relevant considering the increased digitization caused by the COVID-19 pandemic. To that aim, the trade-off between static societal welfare losses from over-protection of exclusivity and dynamic welfare gains from the incentive impact for increased investment in AI development must be thoroughly evaluated.

Humans are still in charge of AI-related procedures for the time being. Both the development and design of an AI tool, as well as its use to generate new intangible goods, generally necessitate significant human input, such as programming initial software, selecting, and labelling training data, building neural network architecture, defining training methods, and interpreting solutions. However, deontological justification fails when a process falls short of a critical level of human creative or innovative supervision. Only some form of 'attribution perpetuation,' i.e., the idea that IP justification for specific initial AI components developed with significant human impact may 'live on' in subsequent, derivative generations, might change this finding. However, such "initial protection" may not be justified. In any event, the theories appear oversimplified when protection includes follow-on outputs where the human link is gradually diminishing.

Another critical point raised is whether deontological theories might exclude protection, particularly for AI outputs, if such a system has detrimental effects for human creators or inventors. Market mechanisms appear to be the best way to address such concerns: Human inventorship or authorship may provide a competitive advantage in the eyes of consumers who place a premium on human efforts. Also, keep in mind the limitations of intellectual property laws. General social policy issues are outside their purview. The socio-political worth of general progress (driven by AI) vs. human-led progress (attributing specific value to creative endeavour or inventive spirit) extends beyond the realm of law.

Also, in terms of economic justification for IP rights relevant to AI tools and outputs, it should be noted that utilitarian welfare-maximizing arguments based only on efficiency criteria are often incommensurable with the scope of EU IP legislation. Even with economic reasons, the starting point must be that IP protection in and of itself is not a requirement for collaboration gains and effective product allocation. This is most evident in the case of IP justification in the protected subject matter of AI tools, where sufficient factual and technical exclusivity, particularly considering the 'black box' nature of many AI applications, already addresses the potential public good issue and safeguards business innovation incentives. In this view, the significance of factual data exclusivity as a firm innovation incentive must be approached with caution in the present data access regulation policy discussions.

The market opening theory, prospect theory, and disclosure theory, all of which are based on the idea of optimising patterns of creative or innovative productivity through the establishment of artificial scarcity, are no longer relevant once there is sufficient exclusivity. Although there may be welfare-enhancing impacts of IP due to reduced rent dissipation as new and creative information is more likely to be disclosed, enterprises' open innovation initiatives, along with a thriving openness and sharing culture in AI applications, currently achieve the same goal.

Nonetheless, it has been discovered that, particularly in the case of AI-generated output, it must be properly reviewed if investments were made and whether a loss of recoupment opportunities does not limit incentives for enterprises to continue engage in AI discoveries and creations. This comes with the proviso that investment expenses may have been considerably reduced because of the usage of AI. However, there are instances where even AI-driven innovation and creative processes may be expensive and labor-intensive.

Knowledge Management, as a subset of Intellectual Property Rights

IPR consists of knowledge management and has a lot to do with originality. It can be cultural, logistical, mechanical, legal, or

mathematical. Originality is essential when the role of IPR is taken into consideration. In addition to this, many economic indicators suggest that originality should be taken into consideration. Many countries around the world have adopted a totally new approach to economic growth, based on promoting knowledge acquisition, use, and transfer, as the innovation economy takes shape. When it comes to innovation or knowledge-based economies, the main difference is that intellectual property such as knowledge and advanced technologies becomes a national intellectual reserve for both businesses and the country as a whole and is used as a primary resource for their development. The world's leading companies have a vested interest in accelerating knowledge growth, and for good reason. Science, technology, and innovation have become key factors of economic growth in the context of an innovation economy. Therefore, the research intensity of an economy determines a country's place in the global economic system today, for the same reasons.

Only by increasing the research intensity of their economies will countries in transition be able to successfully integrate into the global economic system. R&D, especially in high-priority areas, needs to be given special attention in innovation policy to meet this requirement. For R&D to be successful, it requires first and foremost financial support, which has an impact on the national budget.

There has been a steady increase in R&D funding around the world. First and foremost, this trend is determined by the world's leading countries, where R&D expenditures have doubled or tripled over the past 20 years. In addition, the relative R&D expenditures of the world's leading countries as a share of their GDP have shown positive trends over the past decade. It is the commercial (practical) use of intellectual work that serves as the most important metric for determining the success of an innovative process. Incorporating IP rights into the economic cycle is possible in two ways:

1. exploitation of intellectual property during business activities - capitalization strategy for intellectual assets.
2. IP commercialization strategy - entry into the IP market

There have been a variety of approaches to intellectual property management and knowledge management, both academically and

professionally. The former handles intangible assets that are eligible for protection (copyright, patents, and trademarks, among others) while excluding those that cannot be realised in any way using intellectual property law. Whereas for latter, there is no specific status for protected knowledge because it is dedicated to knowledge management processes.

In general, the different approaches to knowledge management and the frameworks that they propose suggest that knowledge management is primarily concerned with knowledge identification, sharing, creation, storage, and assurance, without any specific reference to its protection and other management processes, such as assessment, negotiation, and marketing. In this way, the framework proposes the merging of protected and unprotected knowledge processes

Social, economic, and legal transformations are underway as a result of massive data collection and appropriation of social life. It is a new colonial move to evaluate the social. Data colonialism has evolved in terms of its modes, intensities, scales, and contexts of dispossession, but its underlying motivation remains the same, which is to acquire "territory" and resources from which economic value can be extracted. Through a new legal and regulatory order, the injustices embedded in this system need to be made "liveable." Through the continuous extraction of data from our social lives, a new order should be constructed. For capitalism's next phase, this new order, should optimise the creation of economic value, could become the social order that determines the future of capitalism. To define data issues purely in terms of an "evil" kind of capitalism, however, overlooks the true scope, magnitude, and nature of what's occurring with data. It's important that legal, social, and ethical solutions are anchored in a larger debate about what we can name as, *data colonialism.*

The Legal and Ethical Implications of Artificial Intelligence in the EU

In its 2018 Communication, the EU Commission emphasised the importance of establishing an effective AI legal and ethical framework. In terms of the legislative framework, the Communication cited elements of the General Data Protection Regulation (GDPR) that

already provide a high level of personal data protection. It especially alluded to Article 22 (1), which grants the 'data subject' the right "not to be subject to a decision based primarily on automated processing, including profiling, that generates legal consequences concerning him or her or otherwise significantly affects him or her."
An accompanying 'Staff Working Document' on Responsibility for Developing Digital Technologies (European Commission, 2016) provided an overview of EU-wide safety regulations for emerging digital technologies, as well as the principles of extra-contractual liability laws that apply in the same context. It also included case studies on AI-powered technologies and systems (autonomous unmanned aircraft [drones] and autonomous automobiles) and the Internet of Things (smart home systems and cyberattacks), as well as references to parts of the 1985 Product Liability Directive (European Council, 1985) that need more investigation. The White Paper highlights additional dangers that AI technologies pose to consumers when they are integrated in products and services, such as faults in the object recognition system installed in an autonomous car, and which a better regulatory framework could address.

Social Challenges

The identification of circumstances where artificial intelligence is likely to be particularly challenged when it comes to making the appropriate judgement occurs before regulation and any legal action that may follow. Social problems occur when what is best for one person is not the same as, or even contradicts, what is best for others. But what about artificial intelligence, particularly in one-off circumstances when the 'machine' must decide whether to behave in the owner's (or user's) best interests or in the best interests of others. Bonnefon and others (Bonnefon, et al., 2016), who investigated the social problem of autonomous cars, made an outstanding argument.
Eventually, such cars will be forced to choose between two evils: running over people or sacrificing themselves and their passengers to save pedestrians. The main issue is how to programme the algorithm to make the "correct" decision in such a circumstance. Is there truly such a thing as the "correct" decision? Participants in six Amazon

Mechanical Turk tests agreed that autonomous vehicles that sacrifice their passengers for the greater good are desirable and would encourage others to purchase them, but they would prefer to travel in autonomous vehicles that protect their passengers at all costs. "Regulating for utilitarian algorithms may paradoxically increase casualties by delaying the deployment of a safer technology," he concluded. Humans have the knowledge and capacity to programme extremely altruistic computers, but we are just too self-aware and protective of ourselves to utilise them.

Finally, we need good regulation and a prepared legal system to address the issues that arise when a machine's designer directs it toward a goal without considering whether its values are fully aligned with humanities, or when the machine is designed to "Super Cooperator" standards, rather than harming the user than others. This, on the other hand, introduces a new set of problems, particularly those that are solely legal in nature.

Legal Challenges

Artificial intelligence, due to its multifaceted nature, inherently touches on a wide range of legal fields, including legal philosophy, human rights, contract law, tort law, labour law, criminal law, tax law, procedural law, and so on. In fact, artificial intelligence has impacted almost every field of law. While AI is only now beginning to gain traction in terms of its use by lawyers and within the legal industry (Miller, 2017), legal scholars have long been interested in the topic.

Patentability, joint infringement, and patent quality are some of the most widely discussed legal issues in the field of law and AI. Because the Internet of Things (IoT) relies on communication between two or more smart objects and consumers, it's unclear whether inventors of certain IoT applications will be able to pass the patent eligibility test. Furthermore, even if they obtain patents on new methods and protocols, enforcing the patents against multiple infringers may be difficult. Furthermore, as data collection and analysis spreads from software companies to manufacturing companies, which have begun to exploit the opportunities arising from the collection and exploitation of potential data to create added value, this information explosion (also

known as a "data deluge") raises a slew of legal issues that could spark a regulatory backlash.

Possible Solutions

Improving the digital skills of the workforce across all professions and age groups necessitates public policies and funding, can help to overcome the challenges. Additionally, strict liability for the marketing of autonomous objects, while ostensibly needed to protect society from the dangers of robotisation, discourages investment in this field, reducing robotisation's potential to make society safer. This is the main regulatory conundrum when it comes to the introduction of AI into new applications. In addition to this, before self-driving cars hit the roads, liability issues must be clearly defined by law, so that it is not up to the user to find and prosecute the responsible party.

Conclusion

Artificial intelligence has the potential to improve our lives significantly. It is already happening, but, like the adoption of any new technology, integrating artificial intelligence into our daily lives comes with its own set of challenges and roadblocks. In this paper some of the more obvious social and legal challenges have been discovered, but we're still not fully prepared for them. We've looked at social dilemmas as traditionally difficult situations in which we're torn between what's best for us and what's best for others and for society.

Technology based on artificial intelligence can provide enormous economic value and create whole new services. To protect their assets, organisations developing and implementing AI technologies should seek legal exclusivity. A strategic portfolio of intellectual property rights can be built with the help of EU legislation, which allows for a variety of possibilities. When AI is used to solve a technical problem, patent protection can be gained. Identifying technical factors and motivations may be significant in establishing the contribution of an AI algorithm or model to the technical field. Utility models can be used to quickly secure enforceable IP rights in certain countries, including France and Germany. Trade secrets provide the broadest protection for intellectual property rights. An owner must develop appropriate

internal policies and protective procedures to rely on trade secret protection.

It can be further stated that,

- Data sets used for algorithm training rarely meet the conditions for copyright database protection.
- Collections of data used to train algorithms can be protected under the database sui generis regime, but the exact standards for protection remain controversial and ambiguous.
- The system of copyright exceptions and limits is not flexible enough to allow the use of IP-protected subject-matter for the purpose of building AI systems.
- There is a requirement to acquire and use training data in the public interest even when it is protected by exclusive IP rights.
- Artificial Intelligence (AI) inputs that are protected by unique rights should only be available in limited circumstances.
- It is possible to breach the right to integrity by using copyright-protected content in AI training.
- As a result, the IP framework must be rigorously matched with existing and future competition law-based or sector-specific data access regulations.

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