Cultural Heritage Protection and Artificial Intelligence; The future of our historical past

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Abstract. This paper aims to present the existing regulatory framework, both at the level of the European Union and at the level of Greece, regarding the protection of cultural goods and the wider cultural heritage. The paper is a comprehensive overview of the conventions, agreements and legal texts adopted, at the international and regional level, for the protection of cultural heritage. In particular, the paper begins with the presentation of the main terminology aiming to give the concept of cultural heritage as it has been shaped over time and the elements that define it. Therefore, in the first part, the paper presents the main definitions as set through the UNESCO Convention for the Protection of the World Cultural and Natural Heritage of 1972. Then, the paper, in the second part, analyzes the existing regulatory protection framework as it applies in the European Union. First, the basic pieces of European legislation aiming at protecting cultural heritage, at all levels and by any means, are presented. Then, the corresponding framework established at the national level, in Greece, is analyzed in a similar way. In the third part, the connection with Artificial Intelligence (Artificial Intelligence and henceforth AI) is attempted. The connection focuses on two main areas: the first concerns the possibilities that Artificial Intelligence provides in the protection of Cultural Heritage and the second the possibilities offered through AI in improving the accessibility of the individual to cultural goods. Finally, the approach of developing that regulatory framework that will delimit the possibilities of AI within the framework of Ethics and the reliability of Artificial Intelligence methods is attempted.

Keywords: Cultural Heritage, Monuments, Natural Heritage, Protection, Regulatory Framework, Cultural Goods, Artificial Intelligence, Ethics.
1 Introduction

The Notion of Cultural Heritage

A. Cultural heritage, as defined by UNESCO, is "the heritage of physical objects and intangible characteristics of a group or society that are inherited from past generations, preserved in the present and handed down for the benefit of future generations" [1].

In addition, the term is also defined by Article 1 of the 1972 Convention for the Protection of the World Cultural and Natural Heritage (World Heritage Convention), which considers the following types of natural artefacts and intangible features as "cultural heritage" [2]:

- monuments: architectural works, works of monumental sculpture and painting, elements or constructions of an archaeological nature, inscriptions, cave dwellings and combinations of features, which have outstanding global value from the point of view of history, art or science;
- groups of buildings: groups of separate or connected buildings which, because of their architecture, their homogeneity or their position in the landscape, have outstanding universal value from the point of view of history, art or science;
- sites: works of man or combined works of nature and man, as well as places, including archaeological sites, which have outstanding universal value from a historical, aesthetic, ethnological or anthropological point of view.

The World Heritage Convention, as it also covers the protection of Natural Heritage, proceeds by considering it as the set of those natural features formed by natural and biological formations or as the groups of various such formations of exceptional universal value from an aesthetic or scientific point of view. In addition, geological and physiographic formations and precisely demarcated areas that constitute the habitat of endangered species of animals and plants of exceptional universal value from the point of view of science, or the conservation of the natural environment, are also considered as Natural Heritage.

The convention then includes in the meaning of the term, natural sites or precisely defined natural areas of outstanding universal value in terms of science, conservation or natural beauty [2].

It is also observed that the vision of the protection of Cultural Heritage is further expanded after the adoption of the World Heritage Convention (1972). In particular with the 1980 Recommendation on the Safeguarding and Preservation of Moving Images, UNESCO recognizes the audiovisual Heritage as part of the Cultural Heritage. So the Moving Images are dynamically added to the protective network of the World Heritage.

1 Magdalena Pasikowska-Schnass, Briefing on Cultural heritage in EU policies, PE 621.876 – June 2018
2 Article 1, Convention for the Protection of the World Cultural and Natural Heritage, Paris, November 1972
3 Article 2, Convention for the Protection of the World Cultural and Natural Heritage, Paris, November 1972
In addition, the concept of Cultural Heritage was broadened once again with the adoption of the 2001 Convention on Underwater Heritage aimed at the protection of underwater areas and, subsequently, with the 2003 Convention aimed at safeguarding the Intangible Cultural Heritage, which added a new dimension to the term regarding the protection of human traditions and way of life.

Overall, taking into account the armed conflicts that threaten the preservation of cultural heritage, which is protected by The Hague Convention for the Protection of Cultural Property and its two Protocols, since 1954, UNESCO has categorized cultural inheritance to the following types:
- tangible heritage, which includes movable heritage such as sculptures, paintings, coins and manuscripts; immovable monuments, archaeological sites and others; and underwater cultural heritage such as shipwrecks, underwater ruins and cities;
- intangible heritage, such as oral traditions, performing arts, crafts and rituals;
- natural heritage, i.e. cultural landscapes, geological, biological and physical formations; and
- cultural heritage threatened by destruction and looting in armed conflicts.

Under this prism, the World Heritage List was sculpted, in which several sites and traditions are included.

B. Among the heritage included in the List, almost half of the sites and a quarter of the intangible cultural heritage are located in Europe and mainly in the EU [1]. This spatial designation is obviously not exclusive and definitive. On the contrary, it highlights the problem of recording the elements of the Cultural Heritage at a global level so that UNESCO can extend its safety net to these elements as well. However, at the European level, the European Union has developed the relevant regulatory framework in order to ensure the protection of Cultural Heritage within the territorial scope of the EU member states.

2 The Regulatory Framework on the protection of cultural heritage

2.1 The Framework in the European Union

A. Multilateral Conventions

Considering the total amount of cultural heritage elements found in various forms in the area of the European Union, the action taken in the EU level towards the protection of it, has been shaped by several relevant Conventions and further developed within the Union’s regulatory framework by specific regulatory acts. Apart from these, the importance of culture is highlighted under the Treaty of the Functioning of the European Union and more particularly the Article 167 of it. According to the provisions of the aforementioned, it is initially noted that the Union “shall contribute to the flowering of the cultures of the Member States, while respecting their national and regional diversity and at the same time bringing the common cultural heritage to the fore”.
In addition, Article 167 sets the aim for the relevant action taken by the EU to encourage inter-Union cooperation and to support the Member States when their actions are related to i) improving the knowledge and dissemination of the culture and history of the European peoples; ii) conserving and protecting cultural heritage of European significance; iii) boosting artistic and literary creation, including in the audiovisual sector; and iv) conducting non-commercial cultural exchanges. Moreover, it is pointed out by the provisions of the present Article, that Member States are expected to enhance cooperation with third countries and the competent international organizations in the sector of culture, with particular emphasis being given on the Council of Europe. Furthermore, the EU is obliged to consider all the necessary cultural aspects when acting under the provisions of the Treaties, aiming to promote the diversity of its cultures and to boost respect towards them [3]\(^4\).

Finally, the TFEU foresees the need for the European institutions to act in specific ways in order to contribute to the success of the previous goals. More specifically, according to the same Article, the European Parliament and the Council shall act in accordance with all the legislative procedure and adopt any incentive measures, only after consulting the Committee of the Regions respectively. Excluded from such measures are those concerning any harmonization of the laws and regulations of the Member States. In addition, the Council, also acting in accordance with the relevant legislation, shall adopt recommendations, following the Commission’s proposals [3]\(^5\).

Further, in 1985, the Council of Europe established, through the Granada Convention, which focuses on the protection of Architectural Heritage, the common principles of European coordination and cooperation on architectural conservation policies. Thus, contracting Parties of it undertake, inter alia, the tasks of taking statutory measures to protect the architectural heritage, within the framework of which and by means specific to each State or region, they also need to shape the provisions for the protection of monuments, groups of buildings and sites [4]\(^6\).

Following, with the 1992 Valetta Convention on the Protection of the Archaeological Heritage, the aim of protecting archaeological heritage from illegal excavations and major construction projects was set. To this end, Parties undertake to institute, in a proportionate way, a legislative system on the protection of the archaeological heritage, provisioning in particular the framework on the maintenance of an inventory of its archaeological heritage and the designation of protected monuments and areas; the creation of archaeological reserves, even where there are no visible remains on the ground or under water, for the preservation of material evidence to be studied by later generations, as well as the reporting, mandatorily, to the competent authorities by a finder of the chance discovery of elements of the archaeological heritage and setting them available for examination [5].

Further, Parties are expected to apply procedures for the authorization and supervision of excavation and other archaeological activities in such a way, so that to prevent any illicit excavation or removal of elements of the archaeological heritage and ensure

\(^4\)Article 167, par. 2-4, TFEU
\(^5\)Article 167, par. 5, TFEU
\(^6\)Article 2, Convention on the protection of Architectural Heritage, Granada, 1985
at the same time that archaeological excavations and prospecting are undertaken in a scientific manner. They are also expected to safeguard that excavations and other potentially destructive techniques are carried out only by qualified, specially authorized persons, using methods and equipment also properly authorized under the relevant domestic legislation [5].

A few years later, in 2001, the EU Convention on the Protection of the Audiovisual Heritage broadened the understanding of cultural heritage, by expanding it to audiovisual productions, under the provisions of which it was moreover introduced as a requirement the compulsory legal deposit of moving image material, such as films and videos [6].

Then, the Framework Convention on the Value of Cultural Heritage for Society that followed in 2005, emphasized in the social and economic benefits of preserving cultural heritage as a prerequisite for achieving sustainable development. Consequently, it defined the common European heritage as covering all forms of cultural heritage, in the context of a shared source of identity. The convention, throughout its provisions focused on the importance of the cultural heritage to the creativity and social cohesion, and to the ideals, principles and values deriving from previous experiences and current efforts to make progress. Finally, through the provisions of the Faro Convention the link between cultural heritage and the development of a peaceful society is presented, which is based on the constant respect for human rights and the rule of law [7].

Additionally, the Council of Europe Convention on Offences relating to Cultural Property aiming to prevent and combat the illicit trafficking and destruction of cultural property, in the framework of the Organization’s action to fight terrorism and organized crime, stands as the sole international treaty, particularly dealing with the criminalization of the illicit trafficking of cultural property, establishes a number of criminal offences, covering cases of theft and other forms of unlawful appropriation; unlawful excavation and removal; illegal exportation and illegal importation; acquisition; placing on the market; falsification of documents; destruction and damage. The Convention sets the base for wide-reaching preventive measures, both at domestic and international level while it focuses on transnational co-operation to fight offences regarding cultural property [8].

B. European Regulations

Apart from the above, the European regulatory framework concerning the protection of the cultural heritage has seriously been based on the Regulation (EEC) No 3911/92 on the export of cultural goods, which had been amended by the Regulation (EEC) No 752/93 on laying down the provisions for its implementation and the Regulation (EC) No 974/2001, before its replacement by the Council Regulation (EC) No 116/2009 of 18 December 2008 on the export of cultural goods. Following this development, the Regulation (EEC) No 752/93 has accordingly been replaced by the Commission

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In particular, the present Regulation, governing the export of cultural goods in the EU level initially lists the goods characterized as cultural in the Annex I and includes among them, indicatively:

a) Archaeological objects more than 100 years old which are the products of: excavations and finds on land or under water, archaeological sites or archaeological collections;

b) Elements forming an integral part of artistic, historical or religious monuments which have been dismembered, of an age exceeding 100 years;

c) Pictures and paintings, other than those included in categories 4 or 5, executed entirely by hand in any medium and on any material;

d) Mosaics in any material executed entirely by hand, other than those falling in categories 1 or 2, and drawings in any medium executed entirely by hand on any material;

e) Original sculptures or statuary and copies produced by the same process as the original, other than those in category 1;

f) Books more than 100 years old, singly or in collections and

g) Printed maps more than 200 years old [⁹][¹⁰].

In addition, the Regulation sets the procedure and the prerequisites on issuing the license for such exports, along with the provisions on the competent authorities, while highlighting the importance of administrative cooperation between the competent authorities of the Member States. Further, it is noted that Member States need to inform the Commission on the measures taken pursuant to this Regulation, which shall pass such information on the other Member States.

Then, the Commission is also expected to present a report every three years to the European Parliament, the Council and the European Economic and Social Committee, regarding the implementation of this Regulation [⁹][¹¹]. The procedural details regarding the licensing of these exports are established by the Regulation (EU) No 1081/2012 of 9 November 2012 for the purposes of Council Regulation (EC) No 116/2009 on the export of cultural goods.

C. European Directives

Moreover, the framework regarding the protection of cultural heritage within the EU also includes the Directive 2014/60/EU of the European Parliament and of the Council of 15 May 2014 on the return of cultural objects unlawfully removed from the territory of a Member State, which has replaced the Council Directive 93/7/EEC of 15 March 1993 on the return of cultural objects unlawfully removed from the territory of a Member State, as amended by Directive 96/100/EC of the European Parliament and of the

⁹See Appendix I
¹¹Articles 2, 3, 6 and 10, Council Regulation (EC) No 116/2009 of 18 December 2008 on the export of cultural goods
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In particular, the Directive 2014/60/EU governs the return of cultural objects classified or defined by a Member State as being among national treasures, which have been unlawfully removed from the territory of that Member State. Further, as ‘cultural object’ is considered an object which is classified or defined by a Member State, before or after its unlawful removal from the territory of that Member State, while as being among the ‘national treasures possessing artistic, historic or archaeological value’ under national legislation or administrative procedures within the meaning of Article 36 TFEU. Thus, the Directive provisions set that such objects that have been unlawfully removed from the territory of a Member State shall be returned in accordance with the procedure and in the circumstances provided by it. To that cause, the cooperation between the States’ central authorities and the States’ national competent authorities need to be highly promoted\(^\text{13}\).

Additionally, the provisions of the Directive set the process each requesting Member State needs to follow in order to secure the return of such cultural objects\(^\text{14}\), while following, in Article 8, it is stated that the Member States need to include in their legislation the provision that the return of objects under this Directive shall not take longer than three years since the date the competent local authority became aware of either its location or the possessor of it. Following, the procedure of the return, the expenses and the necessary details on any related compensation the requesting Member State may be eligible to receive, are also established in next provisions of the Directive\(^\text{15}\).

Finally, the Directive also foresees that Member States need to submit to the Commission a report on the application of this very Directive which will, in its turn, present a similar report to the European Parliament, the Council and the European Economic and Social Committee, reviewing the application and effectiveness of this Directive. The report shall, further be accompanied if necessary, by appropriate proposals\(^\text{16}\).

Last but not least, the Regulation (EU) 2019/880 on the introduction and the import of cultural goods is similarly to the Regulation (EC) No 116/2009 on the export of cultural goods, important for the framework covering the protection of cultural heritage since it sets out the conditions that govern the introduction of cultural goods respectively.

In addition, it establishes the procedures regarding the import of cultural goods as well, in order to safeguard humanity’s cultural heritage and to prevent the illicit trade in cultural goods, especially where such illicit trade could contribute to terrorist financing\(^\text{11}\).

A list regarding the above mentioned regulatory framework is displayed in the Appendix I.

\(^{12}\)See Appendix I

\(^{13}\)Article 1-5, Directive 2014/60/EU of the European Parliament and of the Council of 15 May 2014 on the return of cultural objects unlawfully removed from the territory of a Member State

\(^{14}\)Articles 6-7, Directive 2014/60/EU

\(^{15}\)Articles 8-10, Directive 2014/60/EU

\(^{16}\)Article 17, Directive 2014/60/EU
2.2 The National Framework in Greece

A. International Conventions and Agreements in the National Legislation

Similarly to the European level, the protection of cultural heritage is of high importance within the national framework as well. In that sense, numerous parts of the legislation begin shaping the respective framework by ratifying several international or regional Conventions, or important bilateral agreements connected to aspects of cultural heritage and its protection.


In the same year, Law 1126/1981 ratified the UNESCO Convention on the Protection of the World Cultural and Natural Heritage (Paris, 1972), the primary goal of which was to set the initial base regarding the protection of both cultural and natural heritage after having the terms clearly defined first. Based on this Convention, the vision of the protection of cultural heritage, including the parts considered as natural heritage, was further developed and expanded in the process through significant texts. In the light of the above, important Conventions resulted within the Council of Europe work fame, such as the Conventions regarding the Protection of the Archaeological Heritage and the one concerning the Protection of the Architectural Heritage (Granada Convention), both ratified by the Law 1127/1981 and Law 2039/1992 respectively.

A few years later, the revised Convention concerning the protection of the Archaeological Heritage, known as the Valletta Convention was ratified by Law 3378/2005, while in parallel, Law 3317/2005 ratified the Second Protocol of the Convention for the Protection of Cultural Property in the Event of Armed Conflict (Hague Convention - UNESCO). In the meantime, the Council Directive 93/7/EEC on the return of cultural objects unlawfully removed from the territory of a Member State was ratified by the Presidential Decree 133/1998, along with its amending Directive 96/100/EC. The Presidential Decree had respectively been amended by the Presidential Decree 67/2003, before it got annulled and replaced by Law 4355/2015 on introducing the Directive 2014/60/EU on the return of cultural objects unlawfully removed from the territory of a Member State. Respectively, the latter, had priory replaced Directive 93/7/EEC in the European Union level.

In addition, bilateral agreements, important for the protection of cultural heritage for Greece were signed and introduced in the national regulatory framework as Laws. Such an Agreement is the one between the Government of the Hellenic Republic and China on the prevention of theft, illegal excavation and illicit import and export of cultural property, which was written in law through L. 3914/2011, or the Agreement between the Federal Council of the Swiss Confederation and the Government of the Hellenic Republic on the import, transit and repatriation of cultural property, which was introduced by L. 3915/2011, as well. Then, another example is the Bilateral Agreement between the USA and Greece regarding imposing import restrictions of archaeological
and Byzantine artifacts dating up to the 15th century AD, which was signed in July 2011 and introduced later that year by L. 4026/2011.

Further and most recently, another convention was ratified by law connected to the protection of cultural heritage and that one is the Council of Europe Convention on Offences relating to Cultural Property, (Nicosia 2017), ratified by Law 4744/2020[17].

B. Elements of the National Legislation on Cultural Heritage

Apart from the above, the main law particularly focused on issues related to the protection of antiquities and cultural heritage within the national legislation, is Law 3028/2002, as amended by Law 4744/2020 on the Ratification of the Convention on Offences relating to Cultural Property; and Law 4761/2020 on the Reorganization of the Fund for Archaeological Resources and Expropriations and its renaming to Organization for the Management and Development of Cultural Resources, promotion of the cultural heritage abroad, arrangements for the Historical Museum of Crete and other provisions. In particular, the context of the current law concerns protection provided by provisions that includes the cultural heritage of the country from the ancient times until today. The purpose of this protection is to preserve the historical memory for the sake of the present and future generations and to upgrade the cultural environment.

In addition, it is set that the cultural heritage of the Greece consists of the cultural goods located within the borders of the Greek territory, including the territorial waters, as well as within other maritime zones in which Greece exercises relevant jurisdiction in accordance with international law, while such cultural heritage also includes intangible cultural assets. What is more, in the framework of the rules of international law, the Greek State also takes care of the protection of cultural goods coming from the Greek territory whenever they are removed from it, while it also safeguards, in the context of international law, the protection of cultural goods that are historically associated with Greece wherever they are located [12][18].

Then, Law 3028/2002 governing antiquities defines several useful to its content acts, among which it distinguish cultural objects from monuments, defining the first ones as “testimonies of the existence and the individual and collective creativity of human kind” and the second one as “cultural objects which constitute material testimonies belonging to the cultural heritage of the country and which deserve special protection”.

These are stipulated by the provisions of the Law among the following categories: a) ancient monuments b) recent monuments c) immovable monuments d) movable monuments [12][19].

These categories are particularly described as such:
- Ancient Monuments or Antiquities are considered to be all cultural objects (artifacts and monuments) back to prehistoric, ancient, Byzantine and post-Byzantine times up to 1830. Among these, caves and paleontological remains, for

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[17]See Appendix II
which there is no evidence that they are related to human existence, are also included.

- Recent Monuments are defined as those cultural objects dating after 1830, which deserve protection due to their historical artistic or scientific significance.

- Immovable monuments means those monuments which have been connected with the ground and which remain on it or at the bottom of the sea or at the bottom of lakes or rivers, as well as monuments which are on the ground or at the bottom of the sea or at the bottom of lakes or rivers; it is not possible to move without damaging their value as testimonies.

- Immovable monuments include facilities, constructions and decorative and other elements that are an integral part of them, as well as their immediate environment.

- Then, Archaeological Sites are areas on land, at sea, in lakes or rivers that contain or there is evidence that they contain, ancient monuments, or which have constituted or there is evidence that have constituted monumental, urban or burial groups from ancient times up to 1830. Archaeological sites shall also include the necessary open space so as to allow the preserved monuments to be considered in a historical, aesthetic and functional unity.

Moreover, in the context of the current law, the protection of the cultural heritage of the country mainly consists of a) locating, searching recording and documenting and studying its data; b) preserving and preventing its destruction, deterioration and in general any direct or indirect damage to it; c) preventing illegal excavation, theft and illegal export; d) its maintenance and, where appropriate, necessary restoration; e) facilitating public access to and communication with it; f) its promotion and integration into modern social life; and g) education, aesthetic education and public awareness of cultural heritage. In that sense, the protection of monuments, archeological sites and historical sites is included in the objectives of any level of spatial, developmental, environmental and urban planning or plans of equivalent effect or their substitutes.

In total, the provisions of the Law set the governing framework for the management and protection of immovable monuments and sites and any activities happening is these; the protection of movable monuments and the rights and obligations of the owners of them; the framework regarding archeological research and activities of monuments’ preservation; and the framework governing the operation and accessibility of museums.

Furthermore, Law 3658/2008 on Measures for the Protection of Cultural Objects, as amended by Law 4761/2020, is also significant for the relevant framework in the country, since its provisions established within the Ministry of Culture, the service unit at the level of Management, entitled "Directorate of Documentation and Protection of Cultural Property", which reports to the General Directorate of Antiquities and Cultural Heritage. In particular, the purpose of the unit is the protection of cultural goods and the fight against antiquities, by searching, documenting the origin and movement and claiming movable monuments, within the meaning of Law 3028/2002, which are products of theft, embezzlement, illegal excavation or hoisting (from the seabed, lake or

river) or have been smuggled in or out of the country. Following to these, the provisions of the current Law set the necessary details for the structure, responsibilities and operation of the Unit [13]21.

C. General Provisions on Culture

As far as the general framework on cultural issues is concerned, several provisions of laws and acts are relevant to the protection of cultural heritage in an indirect way. For instance, Article 10 "Regulations Related to the Ministry of Culture" of Law 3207/2003 regarding the Preparation for the Olympic Games is one of them, while Law 3323/2005 on the establishment of the Governmental Committee on Culture and Education and governing the operation of it, is an additional one. Similarly, Articles 17 and 21 on partnerships and archeological findings respectively, of Law 3389/2005 on Public-Private Partnerships, are indirectly connected to the protection of cultural heritage as well, since they include provisions on excavations during public construction works.

Finally, in an even broader sense, Law 3525/2007 on Cultural Sponsorship; Law 3691/2008 on the prevention and repression of legalization of income from criminal activities and financing of terrorism and other provisions, and more particularly the Article 3 of it, before its annulment; Law 3711/2008 on regulating the administrative issues related to the new Acropolis Museum; and the Presidential Decrees 85/2012 and 86/2012 on the establishment of the new “Ministry of Education, Religious Affairs, Culture and Sports” and appointment of the Ministers, Deputy Ministers and Deputy Ministers, as amended by PD 118/2013, along with the P.D. 96/2012 on the establishment of Secretariat of Culture, Ministry of Education, Culture and Sport are also among those parts of the national legislation that contribute indirectly into shaping the general framework on the protection of cultural heritage domestically.

A list regarding the above mentioned regulatory framework is displayed in the Appendix II.

3 The use of Artificial Intelligence in the cultural heritage

3.1 Artificial Intelligence and the use of predictive modeling for the protection of cultural heritage

The development of the regulatory framework for the protection of cultural heritage highlights the importance of its preservation for present and future generations and their culture. At the same time, the world is undergoing a major digital transition, the media of which can play a critical role in preserving cultural heritage and developing ways to secure it. In this sense, research and work on the applications of Artificial Intelligence (AI) in the field of cultural heritage has been done by important actors coming from or collaborating with the field of advanced technology.

In begin with; it is important to explain particular terms. Thus, within the complex terminology of artificial intelligence, the use of the term “machine learning” means a

set of algorithms that are capable of learning from data. Furthermore, "deep learning" is a form of prior machine learning that excels at solving high-dimensional problems. The results of training a machine learning algorithm are the development of a predictive "model" that can be used to provide additional metadata from a given piece of content. In addition, "data models" used in the field of cultural heritage, such as Europeana\textsuperscript{22} - which aims to empower cultural heritage through its digital transition by developing expertise and tools to adopt digital progress and drive innovation - are mechanisms that support cultural heritage institutions to structure metadata about related objects. In this sense, when referring to an AI model it refers to an algorithm trained to carry out a specific task. Such a task could be, in a very simplified way, determining what an object is among certain choices. In this case, the algorithm will be trained to look for key features of specific objects and judge whether or not what is presented is accurate to any of them.

Besides, according to the text of the European Ethics guidelines for the development of Artificial Intelligence, that intelligence is defined as such, which refers to systems characterized by intelligent behavior, analyzing their environment and acting - with a certain degree of autonomy - to achieve specific goals. AI-powered systems can be purely software-based, acting in the virtual world (e.g. voice assistants, image analysis software, search engines, speech and facial recognition systems) or AI can be embedded in hardware devices (e.g. advanced robots, autonomous cars or Internet of Things applications)\textsuperscript{23}.

Following on from these, Artificial Intelligence has the potential to produce large amounts of data that can be used to enrich collections of cultural heritage objects, either by making them easier to explore, or by providing institutions with the ability to link many collections to others in different institutions, etc. Today, considering that a large part of cultural heritage has been digitized and includes a lot of data and materials, the quality of this data is of utmost importance. For example, instead of picking 100,000 random paintings from the internet and training a model to recognize 'impressionist art', what could be done is to use heritage materials that will already be able to provide advice and guidance on accuracy. Similar applications of artificial intelligence extend far beyond painting, also to many areas of the cultural heritage sector in general.

More specifically regarding the use of artificial intelligence in the field of cultural heritage, multiple applications are already underway that support the preservation of important elements of both tangible and intangible cultural heritage, as defined at the beginning of this analysis.

Therefore, in addition to the above applications of artificial intelligence in the field of cultural heritage, the contribution to the preservation of other forms of cultural heritage, such as that of rarely spoken languages, is valuable. It is estimated that a language disappears every two weeks when its last speaker dies. Thus, technology can now be used to preserve and revive such endangered languages. One such example is the

\textsuperscript{22}The project's official website: https://pro.europeana.eu/about-us/mission

contribution of artificial intelligence to the preservation of the tereoMaori language in New Zealand, when experts worked with Microsoft to introduce their language into everyday use, launching it as a Microsoft Translator language and making it accessible to a new generation of speakers.

Together, technology and artificial intelligence can create the future of our historical past by providing all the necessary means to preserve the heritage of world culture. Through the use of advanced technology such as drones, 3D printing, virtual reality applications and wider digitization, current and future generations can access detailed explanations of ancient languages, expanded restoration of ancient texts (through the use of deep learning), more accurate identification of antiquities, while a further contribution of technology is in the field of art crime detection and the detection of fake works of art by specially designed algorithms.

Additionally, in light of the use of modern technologies for cultural heritage conservation, the use of GIS (Geographic Information System) and spatial analysis to develop predictive models in preventive archeology is of great importance. In particular, such tools are mutually important for the Decision Support System (SDS) for archaeological research, as well as for providing information necessary to minimize archaeological risks. In this sense, a number of predictive models have been developed, with differences found mainly in the methodological approaches and parameters used for the analysis. In general, predictive modeling is characterized as a technique used to predict archaeological sites in an area, based on either the observation of patterns or hypotheses about human behavior.

Over the years, the use of predictive modeling has contributed significantly to the field of archaeology, while today there are two main reasons for the use of predictive modeling, which are: the prediction of archaeological site positions, in the sense of management of archaeological heritage, in order to guide future developments in the contemporary landscape, as well as the possibility of gaining knowledge of past human behavior in a given landscape, in the sense of academic research.

Furthermore, as Archaeological Predictive Models were developed, there were two typical types of research under them: Qualitative Models, i.e. a mainly theoretical approach based on the observation of human-ecosystem relationships to determine habitat suitability but without a level of quantitative assessment of spatial areas, and the Quantitative Models, i.e. models based on the quantitative extrapolation of environmental variables and the creation of statistical estimates of known archaeological sites, for projection into unexplored areas.

In addition to these, another type of predictive model has been used, almost by the majority of experts in the field, and is the type of Informal (Intuitive) Models. In light of these models, the process involves designing strategic research based on the idea that one could distinguish suitable site areas according to simple rules, such as that people do not live on steep slopes, instead they will likely choose to live near permanent water sources etc. In this sense, archaeological sites are more likely to be found in places similar to where they have already been found before, while specific areas that have been destroyed since people lived there do not need to be investigated.

The project’s official website: https://inculture.microsoft.com/arts/maori-language/
In general, predictive models are central to both archaeological research and cultural resource management. However, their application is often inadequate due to small training data sets and insufficient statistical techniques available, together with a lack of theoretical knowledge to explain the responses of past land uses to the predictor variables.

As a result, it becomes evident that greater use of AI feeds a greater range of information into predictive models and therefore predictions tend to be formulated at a more detailed level, drastically reducing the chances of prediction failure.

3.2 Artificial Intelligence and the improvement of the individual’s accessibility to cultural goods

Another aspect of the contribution of Artificial Intelligence to the Protection of Cultural Heritage manifests itself in the field of accessibility of cultural heritage by people who lack mobility, hearing or vision.

This field is the tip of the spear of the association of Cultural Heritage with Artificial intelligence: Cultural Heritage is given meaning through the fact that it contributes to the formation of the historical consciousness of the individual. Concomitantly, expanding the number of people who can have access to what is considered Cultural Heritage is also the underlying reason for its protection.

In this field, Artificial Intelligence opens a new era since the possibilities are multiple [15]. It is an area of Artificial Intelligence in which human-centered applications are created with the aim of enabling the individual to experience the Cultural Heritage object even in those cases where the individual cannot visit the archaeological site or the museum in situ. The possibility of access that can be ensured by artificial intelligence is developed through specific applications that create a virtual experience for the remote visitor which, however, is not static in nature but interactive. It becomes obvious that the specific applications acquire enormous importance, mainly of an educational nature, since now the learners (whether they are pupils or students) have the possibility to virtually tour places that are geographically or even health-wise (after the recent experience of the pandemic crisis) inaccessible.

In order to provide a complete experience of virtual access to different groups of visitors (different age groups and/or different linguistic and cultural backgrounds), Artificial Intelligence has integrated both data from the learning sciences and data from evolutionary psychology [15]. This is how the interaction between the Cultural Heritage asset and the virtual visitor is achieved and is analyzed in the following methodologies: Interaction with virtual reality and three-dimensional (3D) visualization, interaction on the websites of the respective cultural space, interaction with automated models (Robots) in remote visit. Especially for this last possibility, Robots are located inside the museum space and conduct a guided tour in the language chosen by the virtual visitor adapted to their age [15].

More specifically, Microsoft has recently entered into partnerships with the public sector in various places, including Greece, in order to implement the use of artificial intelligence to support and highlight important archaeological sites. Under this light,
the Greek competent authority, the country’s Ministry of Culture and Sports, created, in collaboration with Microsoft, the Common Grounds project which is a revival project aimed at preserving and restoring pieces of human history that are precious, as well as empowering global audiences to embrace the idea of finding common ground through our widely shared history.

As part of this project, viewers have the opportunity to explore Ancient Olympia as it was in ancient times, through the use of artificial intelligence technology, allowing history, sports and culture lovers to be part of a virtual interaction with the historic site. More specifically, the company collaborated with another technology company, specialized in the digitization of historical sites in 3D, in order to create a model of Ancient Olympia. Thanks to the use of ground cameras and drones simultaneously, thousands of photos were taken from the field, which were then processed by Microsoft AI to create accurate models, with a sense of photorealistic performance. The project was developed by facing various challenges and covered the extensive network of ancient ruins in the area by bringing these structures to life. Moreover, the work is unique for an additional reason, that it is accessible from anywhere in the world and not particularly by those who actually visit the site in person.

The penetration of Artificial Intelligence into the sensitive area of Cultural Heritage Protection presents two important challenges. One concerns the development of those applications that will ensure the diagnostic need to include those elements of Cultural Heritage that have not been included to date and therefore escape the protective regulatory framework of the relevant legislation. The second challenge concerns the development of reliable applications in order to achieve the optimal effect of accessibility in the experience of each cultural asset. For both of these challenges the need to come up with reliable AI applications and whose footprint remains within the ethical rules that delimit the possibilities of AI is now more than important. To the extent that our Cultural Heritage determines the historical reference of each individual, the violation of the above frameworks automatically means the cancellation of the history of the human race.

At this point, it would be expected that the European legislator had not been content with formulating guidelines. On the contrary, it would be expected to have dared to take the next step that would mark the first (worldwide) attempt to legislate Artificial Intelligence on the altar of preserving the history of the human race, but free from the risk of its alteration.

26 The project’s official website: https://inculture.microsoft.com/arts/ancient-olympia-common-grounds/

4 Artificial Intelligence; from ethics to the regulatory framework

4.1 Basic values and principles

Under the prism of the worldwide increasing use of new technologies, data and methods of machine learning and deep learning, UNESCO issued recently a set of recommendation on the moral standards that should be kept in mind when using such artificial intelligence tools. This text manages to express the tendency on the field and provide a general insight on what the future framework on the use of AI systems could begin to look like.

The aim of the recommendation lies on providing the base to ensure that AI methods and systems shall be used for good purposes and in peaceful ways. In addition, its scope is to set a universally accepted framework on the use of AI which will include the factors of inclusiveness and environmental protection in it, as well as which will make the stakeholders involved to take shared responsibility on this.

Following, among the objectives of the text the creation of a common values and principles framework is included, in order to guide the legislators of all states in shaping their AI related policies and regulatory frameworks accordingly. Additionally, among these objectives is also the goal of providing guidance to individuals or groups acting privately or through institutions, on absorbing such AI ethics in their processes throughout their life cycle activities. In parallel to these, one of the goals that the recommendation on AI ethics tries to achieve is the promotion of respect on human rights and freedoms and of the preservation of the natural environment while using AI systems or applications at any stage of their development and operation. To that cause, multidisciplinary discussions need to be done and supported on the moral issues arising from the use of AI. Last but not least, sufficient and fair accessibility on the developments in the sector of AI is being highlighted as necessary to be ensured.

In the light of the above, the international community tries setting commonly accepted values and principles [18] – that have been already met and implemented in the several other fields so far – for the development and use of AI systems and applications. Such values include:

- the respect and protection of the human rights and liberties as well as of the human dignity;
- the protection and preservation of the natural environment and the broader ecosystem;
- the promotion and support of inclusiveness and diversity; and
- the safeguarding of a peaceful life within fair and interconnected societies.

In addition, among the fundamental principles proposed by the international community, through UNESCO’s Recommendation on the Ethics of AI, on the morality of AI are:

- the promotion of the proportionality principle;
- the “do no harm” principle;
- the principle of fairness and non-discrimination;
- the principle of safety and security, in order for unwanted harms or vulnerabilities to attack to be avoided (safety and security risks)
- the sustainability;
- the protection of the privacy rights and data protection
- the principle of transparency;
- the human oversight
- the responsibility and accountability on the use of AI;
- the public awareness and literacy; and
- the adaptive governance and cooperation

Furthermore, in parallel with the development of UNESCO’s principles, the European Union also proceeded to issuing relevant guidelines on the trustworthy use of AI in a way that respects fundamental rights[19]. In that sense, the European Commission first released its definition proposal on AI [20]which is described as such

“Artificial intelligence (AI) systems are software (and possibly also hardware) systems designed by humans that, given a complex goal, act in the physical or digital dimension by perceiving their environment through data acquisition, interpreting the collected structured or unstructured data, reasoning on the knowledge, or processing the information, derived from this data and deciding the best action(s) to take to achieve the given goal. AI systems can either use symbolic rules or learn a numeric model, and they can also adapt their behavior by analyzing how the environment is affected by their previous actions.

As a scientific discipline, AI includes several approaches and techniques, such as machine learning (of which deep learning and reinforcement learning are specific examples), machine reasoning (which includes planning, scheduling, knowledge representation and reasoning, search, and optimization), and robotics (which includes control, perception, sensors and actuators, as well as the integration of all other techniques into cyber-physical systems)” [19].

After having the AI defined as possible, the EU presents in its Ethics guidelines for trustworthy AI [19] the fundamental human rights that need to the basis on the framework governing the use of AI in a trustworthy way. These rights are - in the same spirit with the values included in UNESCO’s guidelines:

- the respect on human dignity;
- the freedom of the individual to make decisions and express themselves;
- the respect for democracy, justice and the rule of law, in the sense that AI should be used to facilitate democratic procedures and maintain the respect on the numerous different values and choices of the individuals;
- the equality, non-discrimination and solidarity, which in the sense of AI use means that the system’s administrators should not generate biased outputs, as well as that it should operate on with the necessary respect on vulnerable and marginalized people and groups;
- the citizens’ rights, such as their right to vote, to good administration, to access to information and public documents and more, which need to be safeguarded and not negatively affected by the use of AI systems.

Following, based on the need to protect the above mentioned fundamental rights, the EU provides some key principles towards the development of the framework to be
governing the use of AI in an ethically accepted manner. These are the principle of respect for human autonomy; the principle of prevention of harm; the principle of fairness and the principle of explicability. In particular, the principle of respect for human autonomy aims on protecting the ability of the individuals to effectively self-determine themselves when interacting with AI system. In addition, the principle of prevention of harm prioritizes the protection of human dignity and human mental and physical health against the potential malicious use of AI systems. Further, the principle of fairness aims on the protection of equality and justice in both the procedural and substantive dimensions. Then, the principle of explicability, completes the set of principles by highlighting the importance of transparency and clarity of the use and purpose of the AI systems to those directly or indirectly affected by these [20].

On the basis of the guidelines issued on the ethics of AI—both internationally and on the EU level—it is clearly shown that the further development and future use of AI systems include important risks on valuable elements of people’s lives. Something that leads, consequently, to the necessity of shaping an adequate regulatory framework on the use of AI, adjusted to the needs and the rights of those interacting with it directly or not.

4.2 Artificial Intelligence ethics on the culture

Following the discussion on the connection between human rights and the development and use of AI, UNESCO took some further steps by suggesting the implementation of the relevant values of AI ethics on particular fields of the present operations. In that framework, UNESCO’s recommendations try a division of the moral issues to be addressed among several of these fields, in eleven policy areas that include: ethical impact assessment; ethical governance and stewardship; data policy; development and international cooperation; environment and ecosystems; gender; culture; education and research; communication and information; economy and labor; as well as health and social well-being [18].

Under that prism, considering that the right to share the benefits of the common heritage of mankind belongs in the third generation of human rights, it makes sense that among the areas listed in UNESCO’s recommendations is the policy area of culture, in a universally innovative initiative[21].

More particularly, in the area of culture UNESCO’s text encourages States to use AI solutions under the principle of proportionality and when appropriate, in order to preserve or enrich or manage either the tangible or intangible cultural heritage including endangered parts of it such as rarely spoken languages and indigenous knowledges. Such use of AI solutions could be met in the form of educational programmes with a participatory character. In that framework, countries are supported to initiate—especially related to intangible cultural heritage—the examination of the cultural impact of AI systems, like the natural language processing applications on the nuances of human language and expression.

At the same time, states are also encouraged to move forward with AI education and digital training for professionals of art in order to maximize the suitability of AI applications in their fields of work, considering that AI can be used to create, distribute and consume a broad variety of cultural goods and services—always keeping into
consideration in important role on preserving cultural heritage and freedom of arts. In that sense, states should also raise awareness and promote the evaluation of AI solutions among the smaller or bigger actors of local cultural industries.

Following that, tech companies should also be supported to get involved as stakeholders in the field of cultural heritage and its protection - as it has already happened in several examples, as mentioned earlier in this paper. This would lead to a diverse supply of cultural expressions enhancing the visibility of local content.

Further, emphasis needs to be given on the relation between AI and intellectual property (IP), especially when it concerns issues as to how to determine or protect the work created by means of AI systems. In parallel, what should also be examined under that prism, is the ways AI systems might affect the rights or the interests of intellectual property owners the work of whom might have been used to research and develop AI solutions.

Finally, states are seriously advised to support entities such as museums, libraries etc. to use AI technologies nationally, in order to promote their collections and to enrich their databases while increasing their accessibility as well.

What is being highlighted by the UNESCO recommendation for the states, before closing, is the need to implement concrete, well-structured and transparent procedures and mechanisms – nationally implemented – in order to monitor in a credible way and in accordance to their internal particularities and governing conditions, the implementation of the ethics on AI. Such mechanisms should consist of a combination of qualitative and quantitative methods in order to bring the most accurate and realistic results possible in each case.

4.3 Future challenges to be addressed

Under the prism of the potential of AI in the cultural sector and after having considered the main points of AI ethics related to it, it is important to focus on two crucial issues out of which important challenges might arise in absence of the necessary regulatory framework respectively.

To begin with, as it has already been mentioned, AI can be used in order to increase the accessibility of cultural sites through virtual tours and tools of virtual reality, providing this way access to a vast amount of monuments and historical sites to a great deal of people who might not be able to physically visit them in their lifetime. On top of that, AI can also be used to bring in the present the experience of important historical events, also through the use of virtual reality tools. In that sense, AI contributes to increasing the quality of human life by enriching it with easily accessible elements of humans’ common history, while raising awareness on these elements for the younger generations of people to preserve [22].

However, apart from the challenge of the huge workload until this can be efficiently implemented, considering the huge amount of cultural elements in the world, it is important here to highlight the risk arising on the topic of data protection. More particularly, when using AI and virtual reality methods on facilitating the “visits” on cultural sites big amounts of data are produced along with the respective need for their protection. Indicatively, using AI and VR to facilitate people with physical disabilities to e-visit an archaeological or historic site not only their identity data are being produced
and stored but also the very fact of their physical disabilities. Of course, such a sensitive
detail of a person’s identity needs to be secured and treated in the safest and most reg-
ulated way possible.

In addition to the above, further risks arising from the use of AI are related with the
protection of the Intellectual Property rights of the individuals interacting with these
systems. In the general sense, AI is designed to work similarly to the human brain. On
top of that though, it is designed to continuously improving its system through the op-
eration of the AI algorithms[23]. In that sense, initial creators of software, or even hard-
ware at times, might lose their intellectual property entitlement on devices and systems
they worked to develop in the first place. More specifically, a valid concern arises re-
garding copyright claims and IP rights on software coding which has been globally
protected as work of literature and arts [24] [25].

Under the prism of the above, the developers of the coding and software have been
considered to have the same rights over their creations as authors have over their writ-
ings. It is although noted that, such rights often vary according to the different jurisdic-
tions but it is commonly accepted that in general they touch upon the reproduction,
change and distribution of the systems. As a consequence, when parts of the AI systems
and their software are being improved or developed by the very AI system itself, im-
portant issues arise of the ownership of these creation. Issues that are critical to be ef-
ciently regulated and framed in the near future so that they can be adequately resolved
once they arise.

5 Conclusions

In conclusion, it is a fact that cultural heritage and its preservation, in all its forms,
is of utmost importance not only for a specific region and people but for the entire
humanity on a global scale. Europe in particular, is undeniably a rich and diverse mo-
saic of cultural and creative expressions, which come as a legacy from the previous
generations of people living on the continent and pass on to the next generations as a
legacy.

A. Cultural heritage, worldwide, in Europe, the EU or in Greece in particular, in-
cludes natural, built and archaeological sites. Monuments; museums and works of
art, including literary, musical and audiovisual works; in many cases certain his-
toric cities as a whole and of course the knowledge, experiences, practices and
traditions of previous generations of people. Thus, its protection is vital to the
development of today’s vibrant communities and actually enriches their individual
lives, adding quality to them and acting as a driving force for the cultural and
creative sectors to keep moving forward.
In addition to these, cultural heritage is also important for supporting and strength-
ening European social capital, since it is, moreover, an important source of eco-
nomic development, employment and social cohesion, offering, among other
things, the possibility of revitalizing urban and rural areas and promotion of sus-
tainable tourism.
B. Consequently, it appears, as expected, that the legislator, at all the above-mentioned levels, is particularly interested in the protection of cultural heritage and this can be seen from the moment the course of development of the relevant regulatory framework is observed, as it is reviewed in the context of this text.

C. Promoting the objectives of Cultural Heritage protection through Artificial Intelligence is obvious. Both in terms of protection per se, as well as in terms of the development of the individual’s accessibility to cultural elements, it constitutes a cornerstone of the need for its protection.

However, important legislative gaps arise:
- Although the global legislator demonstrates a maximalist attitude when defining the term “cultural heritage”, it has not shown the corresponding dynamics in the adoption of those legislative texts that would limit the possibilities of Artificial Intelligence, especially in the direction of its development of reliable applications and within the framework of the ethical rules for Artificial Intelligence prescribed by UNESCO.
- In parallel, even though the legal framework on Data Protection and Intellectual Property are quite mature, till present, no attempt to interconnect them with the development and use of AI in a legal level has been done.

Appendix I

Protection of Cultural Heritage – EU Level

<table>
<thead>
<tr>
<th>Treaty on the Functioning of the European Union (TFEU)</th>
<th>Consolidated version of the Treaty on the Functioning of the European Union; Title XIII, Culture, Article 167 (ex Article 151 TEC)</th>
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</thead>
<tbody>
<tr>
<td>CoE Convention on Offences relating to Cultural Property, 2017</td>
<td>Council of Europe Convention on Offences relating to Cultural Property, Nicosia 19/05/2017</td>
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**Appendix II**

**Protection of Cultural Heritage – National Level**

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<tr>
<td>Law 3323/2005</td>
<td>Law 3323/2005 (FEK A’ 61/7.3.2005) - Governmental Committee on Culture and Education</td>
</tr>
<tr>
<td>Law / Decree</td>
<td>Description</td>
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<tr>
<td>Law 3691/2008, Art. 3</td>
<td>Law 3691/2008 (FEK A’ 166/5.8.2008) - Prevention and repression of legalization of income from criminal activities and financing of terrorism and other provisions; Relevant Article 3</td>
</tr>
<tr>
<td>Law 3711/2008</td>
<td>Law 3711/2008 (FEK A’/5.11.2008) - Law regulating the administrative issues related to the new Acropolis Museum</td>
</tr>
<tr>
<td>Law 4026/2011</td>
<td>Law 4026/2011 (FEK A’ 231 / 3.11.2011) - Bilateral Agreement between USA and Greece signed in July 2011 on imposing import restrictions of archaeological and Byzantine artefacts dating up to the 15th century AD</td>
</tr>
<tr>
<td>Presidential Decree 96/2012</td>
<td>Presidential Decree 96/2012 (FEK A’ 154/24.7.2012) - Establishment of Secretariat of Culture, Ministry of Education, Culture and Sport</td>
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</tbody>
</table>

**References**

23. J. C. Bublitz, “Might artificial intelligence become part of the person, and what are the key ethical and legal implications?,” 2022.