

Audiovisual archives and Artificial intelligence Technologies: problems and transformations

الأرشيف السمعي البصري وتقنيات الذكاء الاصطناعي: اشكاليات وتحولات

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Abstract :

Artificial intelligence has revolutionized the management of audiovisual archives, transforming them from static repositories into intelligent systems capable of analysis, indexing, and interaction. Speech recognition and image analysis technologies have transformed thousands of hours of archival materials, such as historical footage from the history of Algeria, for example, into treasures That Can be discovered by pressing a button.

The study aims to introduce What the field of artificial intelligence has excelled in in the field of audiovisual archives, where many projects and experiments have emerged, such as the Italian archive Project That used DAIN AI technology to restore films and color them accurately.

The study concluded That the future of archives will depend on their ability to adapt to artificial intelligence, provided That cultural and linguistic identity is preserved.

Keywords :

Archives; Audiovisual archives ; Artificial intelligence; Speech recognition and image analysis techniques.

ملخص:

لقد أحدث الذكاء الاصطناعي ثورة في إدارة الارشيفات السمعية البصرية، حيث حولها من مستودعات جامدة الى أنظمة ذكية قادرة على التحليل و الفهرسة و التفاعل. فتقنيات التعرف على الكلام وتحليل الصور، حولت الاف الساعات من المواد الأرشيفية كلقطات تاريخية من تاريخ الجزائر مثلا الى كنوز قابلة للاكتشاف بالضغط على زر.

تهدف الدراسة الى التعريف بما اجاد به حقل الذكاء الاصطناعي في مضمار الأرشيف السمعي البصري ، حيث ظهرت العديد من المشاريع والتجارب، كمشروع الارشيف الايطالي الذي استخدم تقنية DAIN AI لإعادة ترميم الافلام و تلوينها بدقة. خلصت الدراسة الى أن مستقبل الأرشيفات سيعتمد على قدرتها على التكيف مع الذكاء الاصطناعي مع شرط الحفاظ على الهوية الثقافية واللغوية.

كلمات مفتاحية: الأرشيف ، الأرشيف السمعي البصري ، الذكاء الاصطناعي ، تقنيات التعرف على الكلام وتحليل الصور.

Introduction :

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Despite the potential of artificial intelligence technologies, its application to audiovisual archives faces many problems related to technical and ethical aspects. The Most important technical challenges are represented by the Low support for local languages and dialects, as Voice recognition models (ASR) used in the BBC archives suffer as an example. The latter have experienced significant shortcomings in the management of non-standard Arabic dialects, such as in the case of the Algerian television archives, where historical recordings in colloquial or Amazigh dialect have not been successfully converted. Some models trained in the English language give disastrous results when processing local audio contexts, such as trying to transform the Sound of a helicopter into images from documentaries on the Algerian war That appeared in incoherent words. The Most serious problem is hidden bias in algorithms That threatens collective memory. Facial recognition systems implemented, for example, at the Netherlands Institute for Sound and Image prioritize the faces of famous Western personalities, ignoring the faces of Algerian resistance fighters, in addition to many other problems.

From the above, the fundamental question of This research article revolves around What artificial intelligence technologies Can offer as an advantage to audiovisual archives?

1. Study questions:

- The best practices introduced by artificial intelligence technologies are represented in the audiovisual archive.
- Is There a complementary relationship between archives and artificial intelligence?
- What challenges does an archivist face when using artificial intelligence to manage audiovisual archives?

To answer these questions, the content of the research paper was divided into:

Section One:

A conceptual introduction to audiovisual archives and artificial intelligence.

Section Two:

Artificial Intelligence and the Audiovisual Archive: An Integrative Relationship

Section Three:

Challenges of using artificial intelligence in audiovisual archives.

2. importance of the study: The study derives its importance from It :

- ❖ The first studies to address the subject of audiovisual archives in the era of technology.
- ❖ He highlighted many issues related to the use of artificial intelligence in audiovisual archive management, including confidentiality, data security, intellectual property, and others.

3. Objectives of the study

- The study aims to identify important aspects related to artificial intelligence
- technologies and new developments in audiovisual archives.
- Reveal the benefits of applying artificial intelligence technologies

4. Earlier studies

4.1. First study (Artificial , 2022) :

A summary of the work presented at the forum. The interventions addressed the role of artificial intelligence in the Corona crisis, as It has become more important in the audiovisual world. Its widespread use in This sector results in legal consequences related to intellectual property in general, and in particular in the field of copyright and related rights. Speakers from Europe and North America presented a global picture of the future of artificial intelligence in the audiovisual world, including reimagining intellectual property.

4.2. Second study: (Azza Ali, 2024)

Article entitled : Applications of artificial intelligence in document and archive management: advantages and challenges Intelligence is an effective tool That contributes to improving document and archive management processes and achieving efficiency and organization in This field. The study concluded That artificial intelligence technologies enhance efficiency and accuracy in document management and contribute to improving the performance of organizations by providing smart solutions for classification, indexing, retrieval and analysis. With the need to find vigilant solutions to confront challenges and risks when using them.

4.3. Third study (Rolan, p. 181)

An article titled : More Human than human ? Artificial intelligence in the archive .It addressed the applications of artificial intelligence in digital record keeping and the challenges and risks arising from these applications, presented case studies of archives and Australian government institutions That sponsored

artificial intelligence initiatives, and discussed the lessons learned, issues and implications of applying these technologies in documents and archives.

4.4. **Fourth study:** (Aangenendt, 2022, p. 65)

Article entitled: The use of AI and machine Learning in the Swedish archival sector .The study examined the role of artificial intelligence technologies in archival institutions and the use of its technologies, such as Learning and processing Natural language and computers. The study explained That computerized archival science is specialized in studying how these technologies are used in archives, and It has been applied to archives in Sweden. It Also shed light on some of the risks That result from using these technologies in the archival field.

Section One: A conceptual introduction to audiovisual archives and artificial intelligence

1..Audiovisual Archive

1.1..The concept of audiovisual archives:

Audiovisual archives the term "audiovisual archives" is confusing. As highlighted by Françoise Hiraux, "The Audiovisual" category is actually very broad and quite imprecise. Several typologies coexist in audiovisual archives, sometimes favoring the criterion of support and format, sometimes that of production and primitive use of documents. (Hiraux, 2009, p. 5)

Audiovisual archives have an important playful potential and constitute a material of choice for the exploitation and valorization of the archives. According to the UNESCO definition published In 1991 in Questions juridiques at the audiovisual archives, the audiovisual archives are: visual recordings with or without soundtrack, regardless of their physical medium and the recording process used; sound recordings, regardless of their physical medium and the recording process used. (Audiovisuels, 2010, p. 3)

1.1.1..History of the Audiovisual support: (Audiovisuels, 2010)

The history of audiovisual support goes back a little more than a century, but yet the supports are very numerous and very varied. Evolution is only accelerating in a constant technical and industrial boiling That requires varied skills and significant technological follow-up. Therefore, archivists must know these techniques, in any case a minimum to be able to use them. Since the mid-1990s, the use of another technique has developed within archives: digital technology. However, today, with the end of the indissociability between the information medium and its content induced by the digital revolution, a particularly complex

challenge opens up to us. The problem, beyond all the difficulties intrinsic to any mode of diffusion of Knowledge is as follows: to be able to preserve in time This informational content, and keep It intelligible for those who will want to Access It, independently of all technological equipment (software, hardware, peripheral, operating system) That was used for its creation, even though This equipment continues to evolve at a rapid pace. Two major factors must be considered when long-term digital archiving of audiovisual documents: the medium and the format.

1.1.2..Audiovisual archives: the advantages (Didier,Philippe, 2014, p. 12)

The audiovisual archive has been established in the landscape of memory media for more than half a century. It presents, in the face of traditional archives, characteristics that make both its strength and its weakness. The audiovisual archive first has the advantage of attractiveness, through sound and image that capture attention without having to produce the effort to read and understand a text (This is the difference between the video recording of the debates of the National Assembly and their written minutes). In a society where audiovisual matters are paramount on a daily basis, the audiovisual form of an archive is an asset for the user, whether it be the final consumer who has the choice between the image with sound and the text, or the user-producer who exploits the archives for a new production (commercial advertising, courses, historical study, political demonstration...). The video.

1.1.3.. Audiovisual archive specialists (Marcq, 2024, p. 77)

Audiovisual researchers are experts in researching and verifying existing content. Their role is to spot and identify relevant visuals while checking the validity of sources and copyrights. Unlike AI, researchers have the sensitivity to distinguish between the origin and authenticity of content. Even though nowadays, Artificial intelligence is capable of imitating human feelings to perfection, it is pleasant to know and to be convinced That It cannot be a substitute for personal verification with sources and rights-holders.

A know-how that researchers develop and maintain, which requires interpersonal qualities and skills.

1.2.. Artificial Intelligence: (Brannan, 2025)

Artificial intelligence is defined as an interdisciplinary scientific field that focuses on creating and developing intelligent machines capable of simulating aspects of human intelligence, such as problem solving, learning, planning, and many more. Artificial intelligence derives its principles from disciplines such as computer science, mathematics, psychology, and even philosophy. It has

witnessed remarkable development since its inception, impacting many sectors such as health, economics, and technology.

1.2.1.. Features and Challenges of using artificial intelligence technologies

(Avantages et Inconvénients de AI, 2019)

1.2.1.1.. Features

➤ E-commerce

This technology is also very useful for some tasks in online businesses. It transforms the customer experience in e-commerce by making interactions more personalized and intuitive. Using predictive analytics, AI-based systems can recommend products or services tailored to individual customer preferences. Industry professionals can use AI in an online store by automating customer support interactions via chatbots.

➤ Improve productivity and efficiency

This technology is a powerful tool for improving productivity and efficiency across various sectors. By automating repetitive tasks and facilitating decision-making processes, artificial intelligence allows companies to focus more on strategic initiatives. It improves processes, reduces costs, and promotes the rapid and accurate achievement of goals.

➤ Health

In the medical field, these smart programs add real value by personalizing care, predicting diseases, discovering new treatments, and allowing for rapid and accurate analysis of health data, facilitating diagnosis and prediction. AI-based uses, such as robotic assistants, also improve the efficiency of healthcare professionals and patient well-being.

➤ Promoting learning and training

New proactive systems can now tailor educational materials to learners' individual needs, enabling a more personalized learning experience based on a large amount of data. In addition, this technology facilitates access to education for different populations, helping to reduce inequality.

➤ Improving strategic decisions

Integrating artificial intelligence into decision-making processes makes companies more flexible and responsive. The insights generated by AI are critical to making informed decisions, enabling leaders to formulate precise strategies and quickly adapt to market changes.

➤ Enhancing information technology security

Thanks to its advanced algorithms, artificial intelligence plays a crucial role in detecting and responding to computer security threats in real time, and continuously analyzes network traffic data to detect suspicious activity.

1.2.1.2.. Challenges: (Avantages et Inconvenients de AI, 2019)

➤ **Cost**

Creating AI requires very high costs, because it is a very complex machine that requires a lot of resources during its creation and learning phase and its maintenance also involves other costs.

➤ **Lack of oversight and transparency**

It is sometimes difficult for humans to understand how AI works and make decisions, and a lack of transparency can be a major problem, especially in vital areas such as health, finance, and justice.

➤ **Unemployment risk**

Replacing humans with machines can lead to significant unemployment. Automating tasks with AI could lead to job losses in some sectors, especially those involving repetitive and routine tasks. We are seeing more and more jobs affected, such as the language translator job, which has suffered the full burden of advances in AI.

➤ **Ethical risks**

Artificial intelligence raises a number of important ethical and societal issues, such as the use of data, the nature of consciousness, freedom of action, and the role of humans in society. It is important to conduct an open and comprehensive public debate on these issues in order to establish clear guidelines for the development and use of artificial intelligence in a logical manner.

2.. Section Two: Artificial Intelligence and the Audiovisual Archive: An Integrative Relationship

2.1.. Advantages of using artificial intelligence:

Studies have proven that there are many advantages That artificial intelligence can offer in the field of audiovisual archives, the most important of which can be mentioned below:

1. AI has a legitimate place among the tools available to archivists. She mentions AI's ability to automate repetitive tasks such as sorting and classifying documents, freeing up time for archivists to focus on more complex and strategic tasks. In addition, AI can enhance archival research by offering recommendations based on machine learning algorithms. However, she warns that AI should be used with caution to ensure that biases are not embedded in

- decision-making processes. The role of archivists is then to ensure that the implementation of AI remains ethical and transparent. (Archives, 2025)
2. AI offers new possibilities to enrich archival functions. She points to the automation of indexing and description of archives as key examples where AI can play a crucial role. This allows not only a saving of time, but also the possibility to discover relationships between documents that would have gone unnoticed. (Archives, 2025)
 3. Uses innovative technologies to organize and classify these images, with AI as a potential tool to improve the metadata and image recognition process, thus facilitating access to and use of images for scientific research.
 4. AI could facilitate interoperability by standardizing and automating data processing.
 5. AI as a tool of inestimable value for archivists, particularly in terms of automating tedious tasks such as annotating and classifying archives. AI would improve efficiency and accuracy, while freeing up time for archivists to focus on interpreting and enhancing the content of archives..
 6. Rather than perceiving AI as a threat, audiovisual researchers could consider it as a tool. A resource for indexing and managing existing content. AIs are able to analyze huge sets of visual data in order to spot patterns and trends. (CHAINON, 2023) . Researchers could use these analyses to speed up the search for relevant content in large archives. Similarly, AI technology could allow optimized research with increased content detection, through audio (timbre and voice grain, spoken sentences), visual (facial detection, decor elements) or textual means.

2.2.. The AI in audiovisual archives (Guèvremont, Colette, 2024, p. 2)

AI has transformed the video game industry, by creating unprecedented immersive experiences in addition to multiple jobs and staggering revenues. What is being created? in the field of music, AI accompanies artists in the exploration of new musical genres. AI also facilitates the detection of intellectual property rights violations and some platforms already use it for this purpose.

2.3.. The complementary relationship between archives and artificial intelligence:

AI has a lot to bring to archives and other areas in administrations, but the world of archives also has a lot to bring to AI. As mentioned previously, well-structured data in an efficient information system is an asset for the development

of machine learning models. Due to the large quantities of documents kept by the archive services and their data structuring habits, relations can be bilateral between AI and archives.

Not only does artificial intelligence offer the possibility of automating archival processing, but the archival world can also be a preferred provider of structured training data. First of all, the data is available in large quantities. The website of the National Archives of Luxembourg mentions forty-five linear kilometers of paper archival documents and twenty-five thousand microfilms distributed among eleven groups of described funds. (Marcq, 2024, p. 69)

2.4.. Intellectual property and artificial intelligence

The production of structured data in archives facilitates training and testing of AI models. The question of training large language models on online library data has already been debated, particularly around copyright issues. It has not yet settled significantly for the archives. Nevertheless, with the vast amounts of text available in the fonds, whether digitized or natively digital, and the standardization of archival description.

Should they be integrated into open data initiatives, thus allowing free and open access for the development of AI models, or on the contrary, considers monetizing this access by negotiating with companies wishing to use this data to train their models? This decision will have a direct impact on the visibility and use of national data in tools widely used by the general public. If these data are not integrated into the training corpora of the most widespread models, there is a risk that the documentary heritage of the country will be underrepresented or even invisible. (Marcq, 2024, p. 71)

Copyright protection, confidentiality of sensitive data and the balance between sharing and exploitation are all factors to be taken into account. The world of archives thus has the potential to enrich that of artificial intelligence through its structured and standardized data, in a world where information is becoming more and more valuable (Marcq, 2024, p. 71). Artificial intelligence has a lot of potential in the field of archives, both for process automation and for research and mediation with the public.

2.5.. Archives Organization: (Dan Lu, 2025, pp. 104-105)

The audiovisual archive is organized with the help of AI algorithms that process natural language, machine learning, visual character identification and recognition, and more to achieve intelligent archiving and classification.

Based on image recognition, audio and video recognition and biometric identification technology, the system is able to parse key information in

unstructured data such as pictures, audio and video. For example, it can extract time stamps and character features from photos through image recognition, or convert meeting recordings into text records and mark the timeline with audio/video recognition technology, and ensure the accurate control of archive access privileges by combining with biometric identification technology.

Section Three: Challenges of using artificial intelligence in audiovisual archives.

3.. Challenges of using artificial intelligence

➤ One of the main challenges is the long-term preservation of scientific digital archives. With the rapid evolution of formats and media, it is essential to develop robust infrastructures to ensure that these archives are readable and accessible for future generations.

➤ Warns against over-reliance on technology, emphasizing that human interpretation remains crucial to contextualize and make sense of the archive. AI must therefore be seen as a complementary tool that, used correctly, can improve the archive function without becoming its keystone. (Archives, 2025)

➤ **The problem of the diversity of audiovisual sources** (Dan Lu, 2025, p. 107)
The problem of data quality is particularly important in AI archive management and has become a key factor limiting its further development. Archival data, due to their wide range and diversity of sources, cover a variety of forms such as paper documents, electronic records, multimedia materials, etc. These different data sources often have significant differences in terms of format, coding method and storage structure, and lack uniform standards.

➤ Difficulty recognizing ancient letters

Historical archives may contain linguistic contexts with ambiguous meanings and characters, and artificial intelligence must understand their semantic content, historical context, cultural background, and other aspects, which requires developing its programs and algorithms to ensure the accuracy and reliability of the results. (Dan Lu, 2025, p. 108)

➤ Security and privacy issues

Thanks to a thorough exploration and analysis of artificial intelligence algorithms, as they have two learning functionalities, sensitive and confidential information about the content of the audiovisual archive will be stored. Given that security archive management systems are weak, they represent a very serious threat. (Dan Lu, 2025, p. 109)

3.2.. Successful use of artificial intelligence tools in archives

1. Furthermore, to successfully carry out artificial intelligence projects, close collaboration with IT stakeholders and information system security managers (CISO) is essential. Projects can draw on the expertise of IT project managers, developers and other IT professionals, who are at the same time made aware of archival issues, which are generally quite unclear for them. They can then more naturally take into account archival concerns at the time of IT development. (Marcq, 2024, p. 67)

2. The explainability of AI will never be perfect due to the inherent complexity of these technologies but integrating archival principles into the development and management of AI systems could help improve transparency and trust . (Marcq, 2024, p. 74)

Proposals

- Precautions should be taken when using artificial intelligence, regardless of its technology.
- Training archivists to use these techniques as a tool to help them perform their jobs and not dispense with them.
- The audiovisual archive field is very sensitive because it contains audio and video memory that must be preserved.

Conclusion:

Audiovisual archives are no longer just a repository of old recordings, but have become a living system thanks to artificial intelligence. Despite the technical and linguistic challenges, Arab initiatives have proven the possibility of localizing these technologies. The future of archives will depend on their ability to adapt to artificial intelligence while preserving cultural and linguistic identity. The success of this transformation requires an investment in Arabic data, the development of frameworks and the adoption of supportive policies that combine innovation and originality.

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