A Survey On Image and video Metadata using AI and Image Processing

Prof. Y. L. Tonape, Gosavi Kiran, Jagdale Shubham, Kumbhar Aniket, Mane Rohit

Department of Computer Engineering, S.B. Patil COE, Indapur, Maharashtra, India

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ABSTRACT

Automatic Metadata extraction and generation in the context of e-learning standards is usually referred to algorithms able to process semi structured documents in plain text. As most of the information available on the web nowadays is unstructured and in the form of multimedia files, the need for more general approaches arises. We propose an automatic metadata generation procedure that allows to label specific unstructured data (video lectures) with metadata compliant to the SCORM reference model. After pre-processing, three different summarization algorithms are tested and used to obtain a synthetic description of video content, both in terms of Description and Title. Results show that, in the provided context, the Description field of videos has a good agreement with the true lesson abstract written by a human expert.

Keywords — Artificial Intelligence, Image Processing, Video Analysis, Feature and data Extraction, Metadata Object Detection.

I. INTRODUCTION

In today's digital age, the sheer volume of images and videos being created and shared is staggering. From personal photos and videos to vast media libraries, the need to organize, understand, and extract valuable information from this visual content has become paramount. This is where the fusion of Artificial Intelligence (AI) and image processing comes into play, offering a transformative solution.

In the dynamic landscape of digital media, the integration of AI and image processing stands as a transformative force.

II. LITERATURE SURVEY

"High Performance Artificial Intelligence Recommendation of Quality Research Papers Using Effective Collaborative Approach" Proposed by Vinoth Kumar Venkatesan, Mahesh Thyluru Ramakrishna, Anato -liy Batyuk, And -rii Barna, Bohdana Havrysh in year 2023. The problem solved in this paper is the for the purpose

of recommending a collection of quality, related papers to an intended researcher depending upon paper–citation relationships. The technique used to solve the problem the RPRSCA technique influenced the latent linkages between a research paper, its references, and citations of uncertain systems. Future work in this area could these Methodology, RPRSCA, has considerable improving the mostly uses metrics of information retrieval systems, accuracy, recall and F1 measurement.

"Video Processing Using Deep Learning Techniques: A Systematic Literature Review" Proposed by Vijeta Sharma, Ma-njiri Gupta, Ajai Kumar, Deepti Mishra in year 2021. The problem solved in this paper is to be using the deep learning techniques methodology for the purpose of classification, analysis and recognition of video. The techniques can now boost video understanding, video classification, video analysis, action recognition, and pose recognition. Future work is directions regarding such data, such as threat identification, multi-person identification, multi-object tracking, scene labelling etc.

"Automated metadata annotation:What is not possible with machine learning" Proposed by Hans Brandhorst, Joseph Busch,Dr.Joaquim More Lopez,Marjorie Hlava,Dr.Mariacristina, Dr. Mingfang Wu in year 2021. The problem solved in this paper is Automated metadata annotation is only as good as training dataset, or rules that are available for the domain. It's important to learn what type of data content a pre-trained machine learning algorithm has been trained on to understand its limitations and potential biases. The problem solved is the numerous software and technology companies offer solutions for full reliance on AI — and all have notable strengths and weaknesses in the technical areas described.

"Artificial intelligence in information systems research: A systematic literature review and research agenda" Proposed by Christopher Collins , Denis Dennehy, Kieran Conboy, Patrick Mikalef in year 2021. The problem is solved in these paper is the AI is used in mostly things which are related to that for examples perceiving, reasoning,learning, interacting with the environment,problem solving, decision-making and even demonstrating creativity. In Future an identification of the current reported business value and contributions of AI, research and practical implications on the use of AI.

"Case study: Integrating artificial intelligence metadata within Paramount's digital asset management system" Proposed by Dony West, Caitlin Denny, Rebe -cca Ruud in year 2020. The problem statement is the AI face detection, object detection and text detection tools are useful for getting an archivist closer to finding the answers they are looking for. AI tools can help find images of the set by searching for zero faces, objects for an image request, or even a green picture to hang over someone's couch; however, these tools are not sufficiently accurate to forgo human interaction. The techniques used are AI services, software companies (that provide AI solutions) should begin to incorporate user feedback regarding their glossaries and datasets.

"Video Summerization Using Deep Neural Networks: A Survey" Proposed by Evlampios Apostolidis,Eleni Adamantidou,Alex -andros I. Metsai, Vasileios Mezaris, Ioa -nis Patra in 2020. The problem solved is to the Video summarization aims to generate a short synopsis that summarizes the video content by selecting its most informative and important parts. The technique used to solve problems are this work focuses on the recent advancesin the area and provides a comprehensive survey of the existing deep learning-based methods for generic video summarization.

"AI in Video Analysis, Production and Streaming Delivery" Proposed by A. Jayanthiladevi, Arun Ganana Raj, Narmadha . R, Sajin Chandran, Sai Shaju, Krishna Prasad K in year 2020. The problem statement of the AI can figure out specific content, autonomous clip generation, optimize playback video and align the advertisement and content based on viewer's interest. Video technologies evolve steadily with the evolution of machine learning

and artificial intelligence which use cloud platform and video transcoding for better video production, delivery and live streaming.

"Improving plankton image classification using context metadata" Proposed by Jeffrey S. Ellen, Casey A. Graff, Mark D. Ohman in year 2019. The problem statement of the paper improving the plankton using the classification related data which is required for the improvement in the part of the metadata. The techniques used is the CNNs scale better with data set size than feature-based approaches, it is easier to consider more complicated and deeper architectures with them (i.e., Deep Learning). Published CNN benchmarks for image classification have increased from 19-layer networks, to an ensemble of seven separate 22-layer networks, to 152-layer networks.

"Artificial Intelligence in the 21st Century" Proposed by Jiyaing Liu, Xiangjie Kong, Feng Xia, Lei Wang, Qing Qing, Ivan Le in year 2018. The problem statement is that AI spanning over the first 16 years of the 21st Century. To better quantify the development, we have used scientific publications metadata covers 9 top-tier journals and 12 top-tier conferences from 2000 to 2015. In addition to the title, authors, and the authors' institutions, the metadata also provides us with the number of citations for each paper. The techniques used is in the field of Science, every field has its unique characteristics and development rules. Due to the development of related technologies, AI has developed rapidly in recent years.

"Generation Of Description Metadata for Video Files" Proposed by Antonio Maratea, Alfredo Petrosino, Mario Manzo in year 2013. The problem statement is the automatic extraction and generation of metadata compliant to the SCORM reference model from video files has shown to be viable and potentially useful. Results show that, in the context of scientific lecture videos, the tested automatics unmarization algorithms. The techniques used are the automatic Metadata Generation, SCORM, LOM Automatic Summarization. Future work is in trying to improve Title extraction and to use documents generated by different media.

Real-time applications like video conferencing and live   streaming demand the   reliable, ffective transmission of high-quality image and video data. This model is a useful tool for these applications due to its performance in busy network environments [7].

III. LIMITATIONS OF EXISTING WORK

Resource Requirements: Building and maintaining AI models for metadata extraction can be resource-intensive, requiring significant computational power and expertise.

Privacy Concerns: AI-based metadata extraction may inadvertently reveal sensitive or private information in images or videos, raising privacy concerns and potential legal issues.

Dependency on Data Quality: The quality of metadata heavily depends on the quality of the training data. If the training data is biased or incomplete, the AI system may produce biased or incomplete metadata.

Cost: Implementing and maintaining AI-driven metadata solutions can be costly, especially for smaller organizations with limited budgets.

Scalability: Adapting AI models for different types of media and ever-evolving data formats can be complex and may require constant updates and adjustments.

IV. CONCLUSION

leveraging AI for image and video metadata analysis represents a transformative advancement in digital content management and analysis. AI-powered solutions can automatically extract valuable information such as object recognition, facial recognition, scene analysis, and more from multimedia files, enabling efficient organization, search, and retrieval of visual data. Additionally, AI can assist in ensuring content compliance, enhancing user experiences, and enabling data-driven decision-making in various fields, from entertainment and advertising to security and healthcare. However, it's essential to consider privacy and ethical concerns when implementing AI for metadata extraction, as well as the ongoing need for human oversight and validation to ensure accuracy and mitigate potential biases in the metadata generated by AI systems. Overall, the integration of AI in image and video metadata offers substantial potential for innovation and efficiency across industries, but it must be approached with care and responsibility.

V. REFERENCES

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