Metadata Analysis of Images and Videos

An alternate approach for analyzing images and videos by consolidating structural properties

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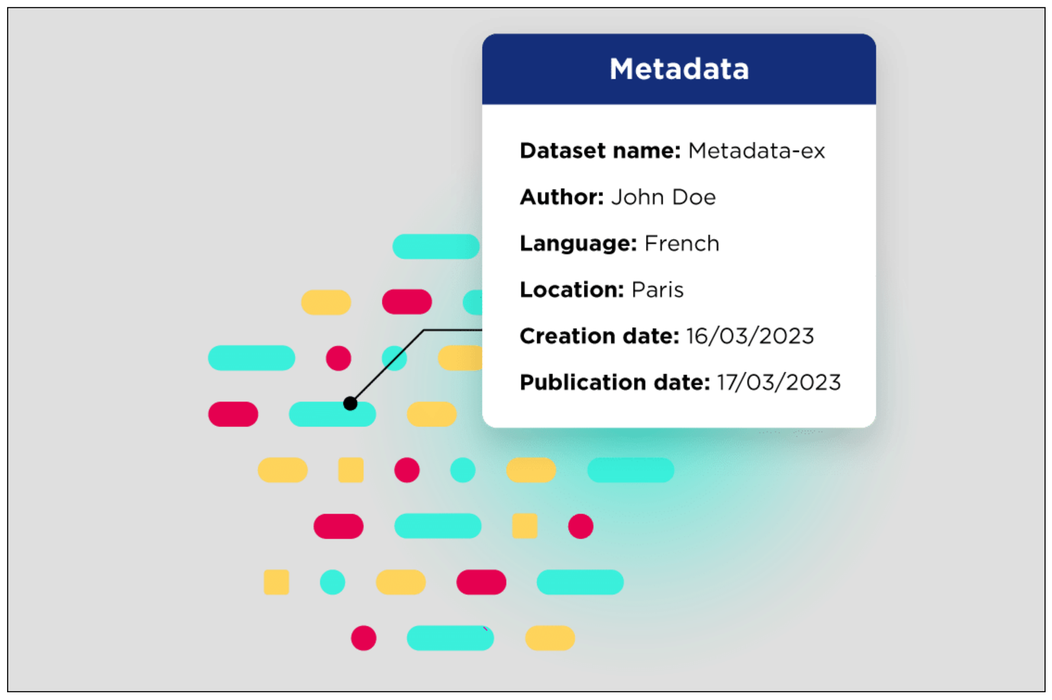
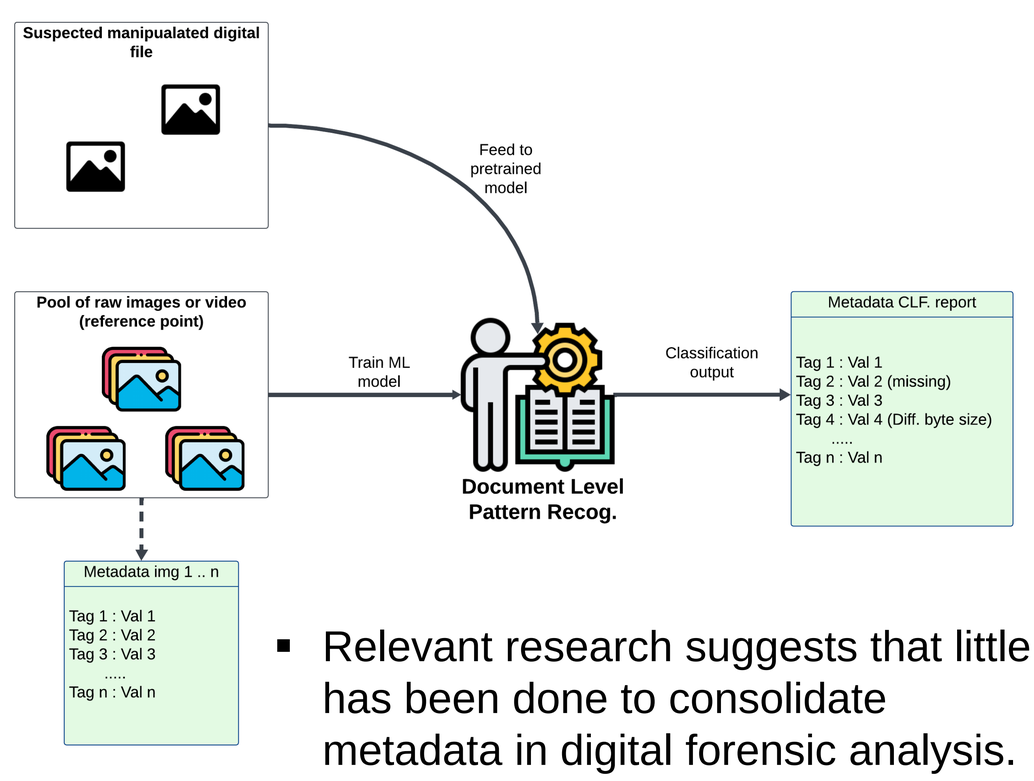
Media Futures



Introduction

- Digital image forensics often leverage pixel level analysis.
- Analysing images by consolidating metadata constitutes an untapped potential in analysis.
- Metadata may be altered, deleted and reshaped, thus leaving traces.
- The associated paper will deal with different techniques for analyzing the structural properties of the metadata headers by consolidating tag address, file offset and the tags' byte sizes.



- Relevant research suggests that little has been done to consolidate metadata in digital forensic analysis.
- Manufacturers store metadata in images (.jpeg, .heic, .nef) and videos (.mp4, .mov), but few strictly follow the current ISO standards.
- Even though current standards are not strictly followed, most manufacturers store them according to their own structural schema.
- It is possible to look for alterations in the image headers by analyzing structural properties in the metadatas.
- Different approaches is possible, including training ML algorithms for pattern recognitions.

Research question

1. How can we efficiently detect manipulation in images and videos by consolidating structural evidence in image header data and video tree structure.

2. What role can machine learning play in identifying patterns in image metadata to enhance metadata-based classification.

Conclusion

In a lot of cases, pixel level image and video verification is not enough to reveal alterations. A solution to this is therefore to consolidate the adjoining metadata information embedded in the digital files. By reviewing specific tag level information, we might save time fact-checking digital evidence by first reviewing the header information alone. Disclaimer: This is an independent project, but I believe this could become a potential collaboration with MediaFutures.

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