

Internship offer

Deepfakes detection by analyzing video encoding and compression features

Key words:

Video encoding, video compression, image and video analysis and processing, deepfakes detection, temporal features

Context of the study

Deep learning methods have seen significant development in recent years. Generative AI models are now capable of generating natural-looking images and creating fake identities in images or videos. We are particularly interested in the technique known as Deepfakes [1], which synthesizes images of people using artificial intelligence. Initially created for recreational purposes, the use of this technique now raises numerous ethical and security concerns. Indeed, the use of celebrities' or political figures' faces to create fake images or videos can lead to numerous societal problems (for example, malicious individuals can create fake videos to support potential “fake news”). Detecting manipulated videos is therefore an important issue that requires expertise in the fields of multimedia security and image/video processing.

Description of the subject

It has been shown [2] that the camera type can be more accurately identified by relying solely on *Intra-frames* (*I-frames*). During previous research, we noticed that deepfake detection relied primarily on the content of *I-frames*. However, there are fewer *I-frames* in a video than predicted frames, which makes it difficult to use only these frames for training neural networks.

For this reason, during this internship we will focus on studying deepfake videos from the perspective of encoding and compression point of view. In addition to *I-frames*, we will utilize predicted frames—and in particular *P-frames*—to improve the detection of recent deepfakes videos.

Additionally, it has been shown that generative AI methods leave traces in manipulated images [3] and that it is possible to detect image forgeries by analyzing the images' color palettes [6]. Therefore, we would like as well to explore the possibility of combining the temporal features [5], different color spaces [4] and considering the video encoding techniques to improve the deepfake detection methods. The main objectives of this internship are as follows

- 1) Analyze the dataset videos [2] considering the video encoding used.
- 2) Analyze image sequences extracted from videos to highlight the inconsistencies (related to video encoding and compression).
- 3) Propose a novel method that considers the detected inconsistencies and improves the detection results considering video encoding and color palettes.
- 4) Write a scientific report and a scientific paper (if the results are promising).

Required profile

- The candidate must currently be enrolled in a Master 2 program or in the final year of engineering school (that corresponds to Bac+5 in France) in Computer Science.
- Programming languages: Python.
- Libraries for image analysis and processing: OpenCV, scikit-image (Python).
- Machine learning frameworks: scikit-learn, PyTorch.
- Scientific knowledge: video processing, image analysis, machine learning and deep learning.
- Knowledge on multimedia security will be considered a plus.
- Languages: French or English.

Place and allowance of internship:

The internship will take place in LIRIS (Laboratoire d'Informatique en Image et Systèmes d'information) laboratory, campus of Université Lumière Lyon 2, Bron.

Internship allowance is 4.5 euros per hour (January 2026).

References

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- [5] M. Atamna, I. Tkachenko, S. Miguët, "[HFVideoSwin: High-Frequency Spatio-Temporal Features for More Generalizable Deepfake Video Detection](#)", ICPR, August 2026, Lyon, France.
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Please provide your CV, the motivation letter, and the transcripts with your marks for the last two years of studies.