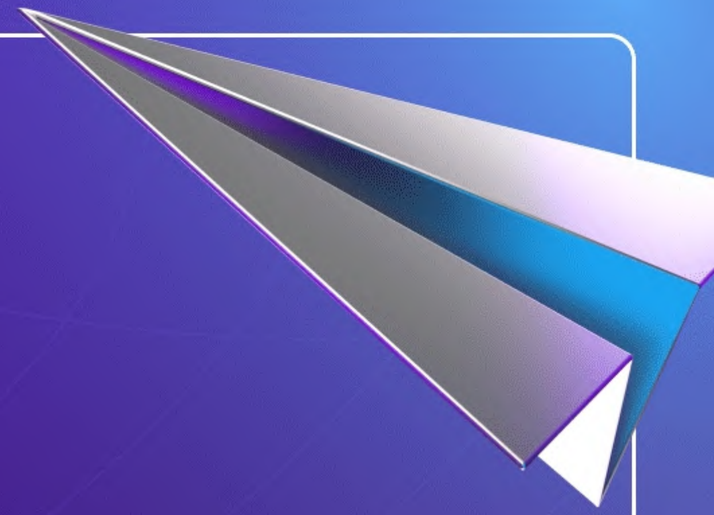
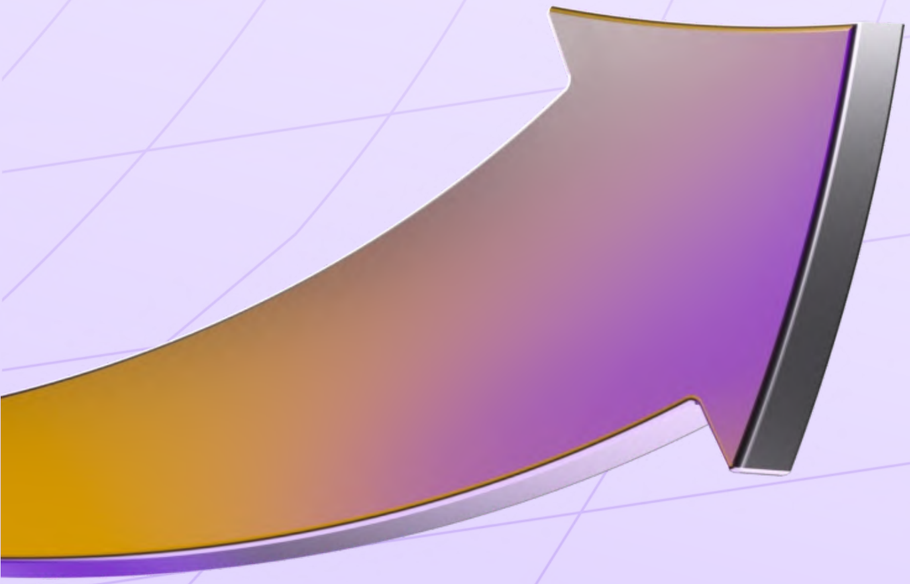


An Introduction To

VIDEO WATERMARKING

By Marilou GRIGNOLI, Andrea-Isaac MIENS
& Thibault ELLONG

SUMMARY



INTRODUCTION

GOAL

A *SHORT* REMINDER

PROPOSED METHODOLOGY

RESULTS

CONCLUSION

INTRODUCTION

What is watermarking ?

Information Hiding Science

Transparency

Robustness

Context ?

Digital Multimedia Content

1. Media
2. Copyright
3. Documents
4. Forensics
5. Medical
6. Authentication

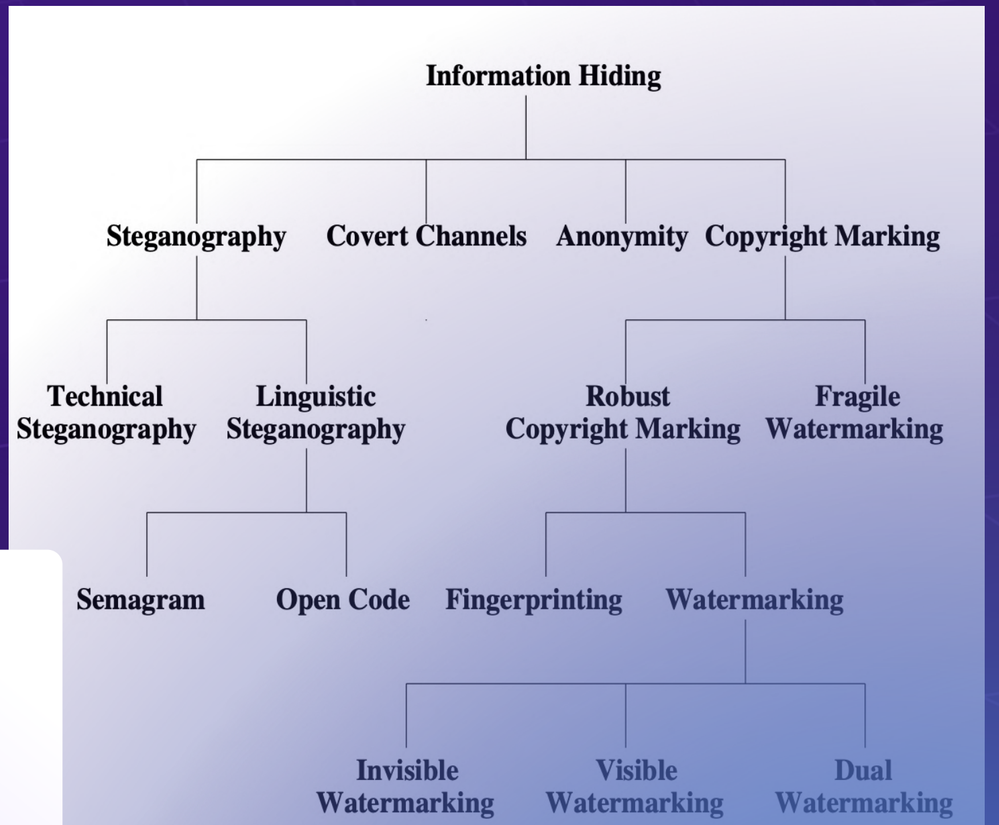
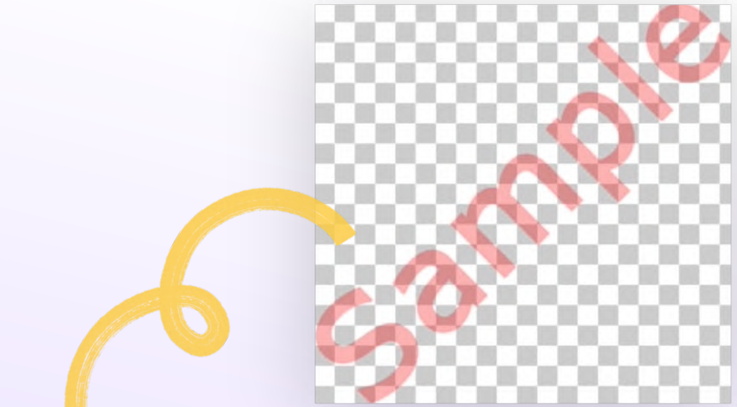


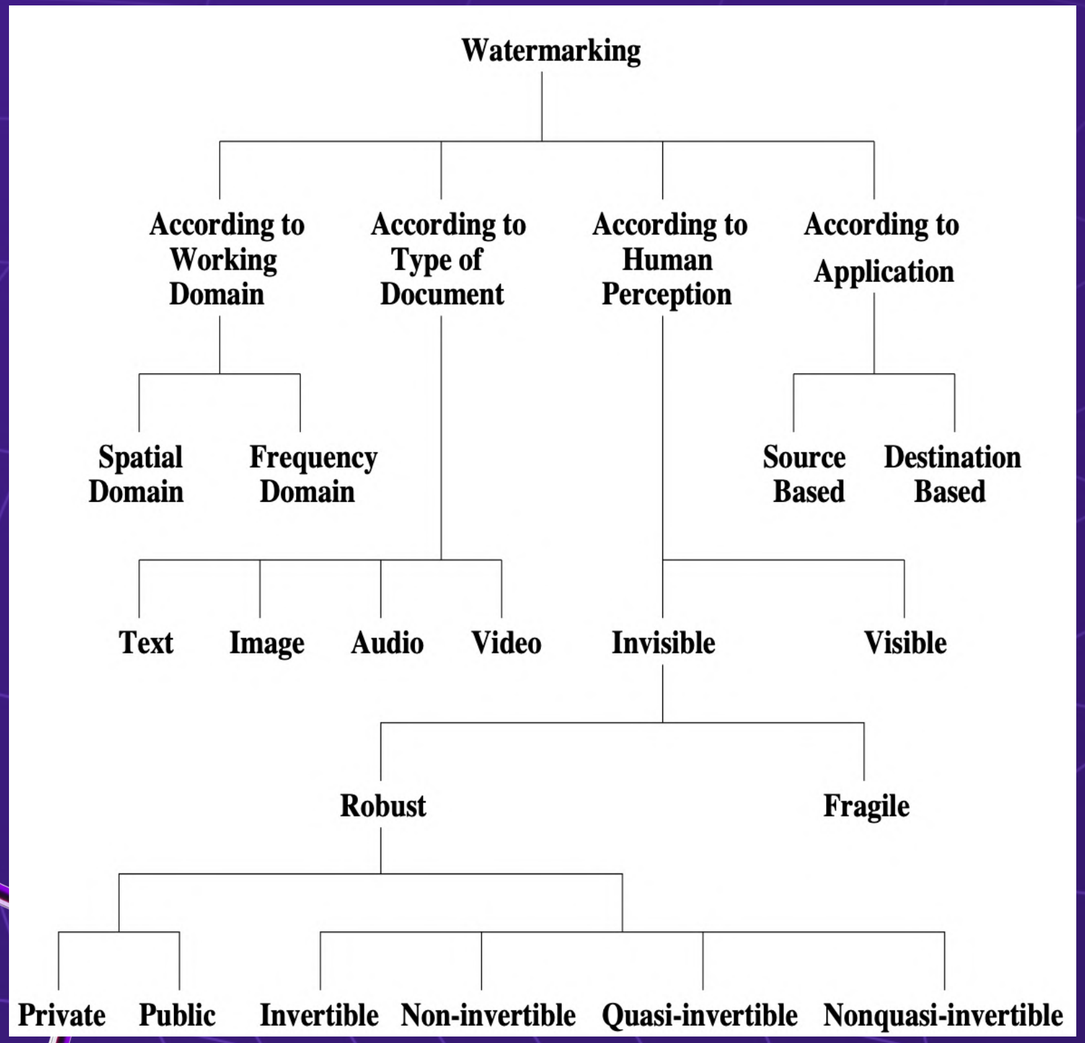
Figure 1: Information Hiding Techniques

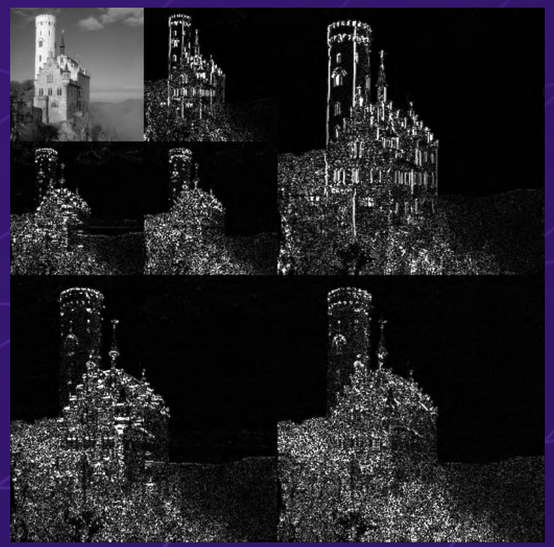
OBJECTIVE OF OUR PROJECT

Define, setting up and test the limits of a watermarking sample

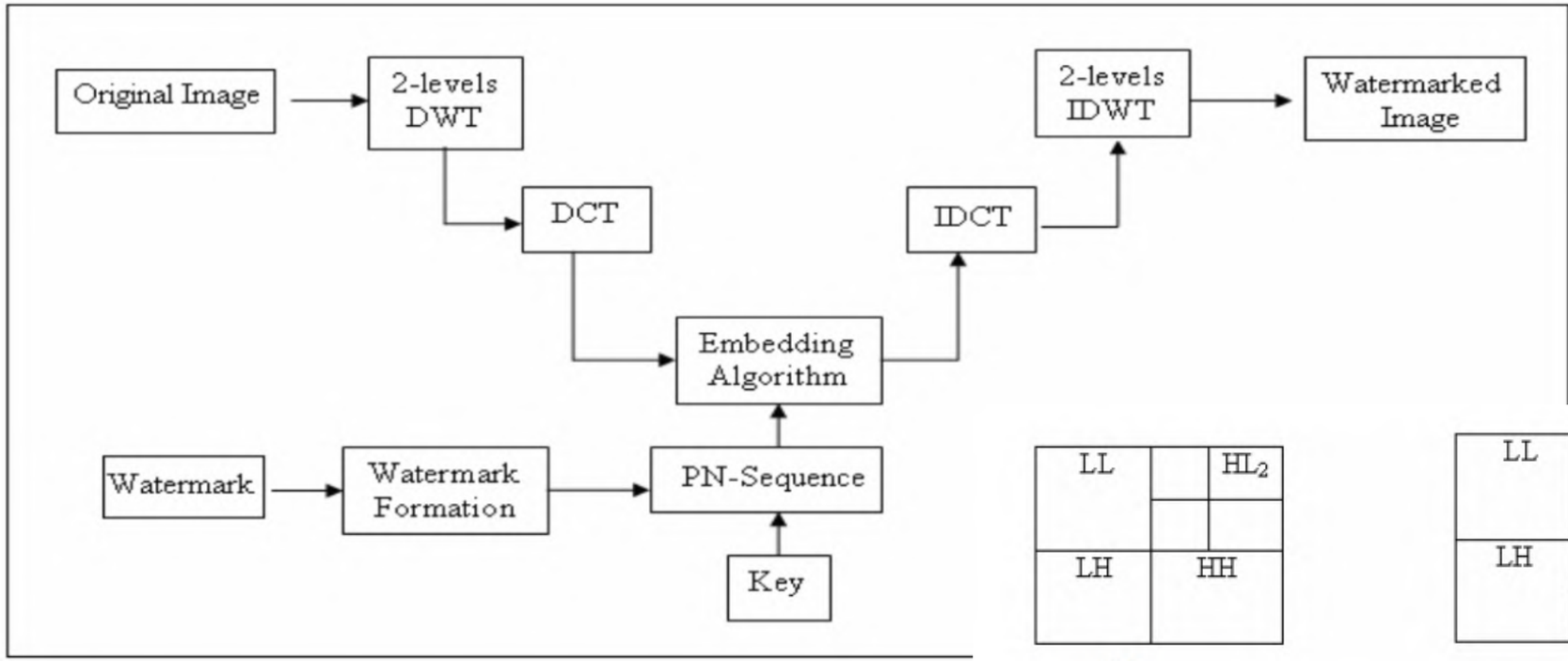


A SHORT REMINDER





IMPLEMENTATION



Combined DWT-DCT watermark embedding procedure.

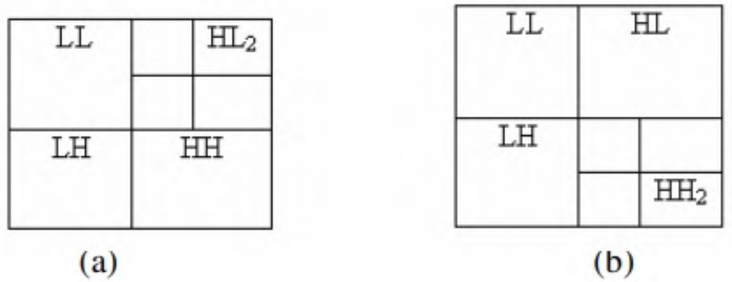
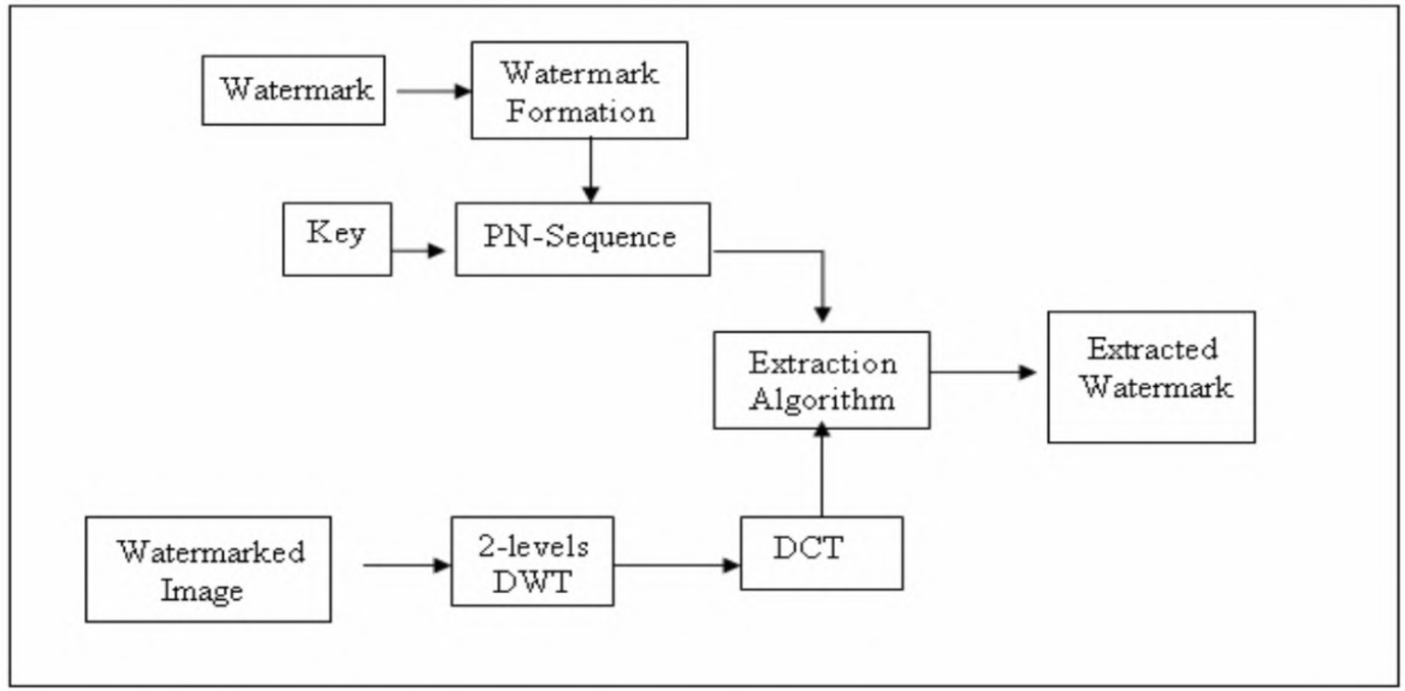


Fig. 2: Multi-resolution DWT sub-bands of the original image

IMPLEMENTATION



Combined DWT-DCT watermark extraction procedure

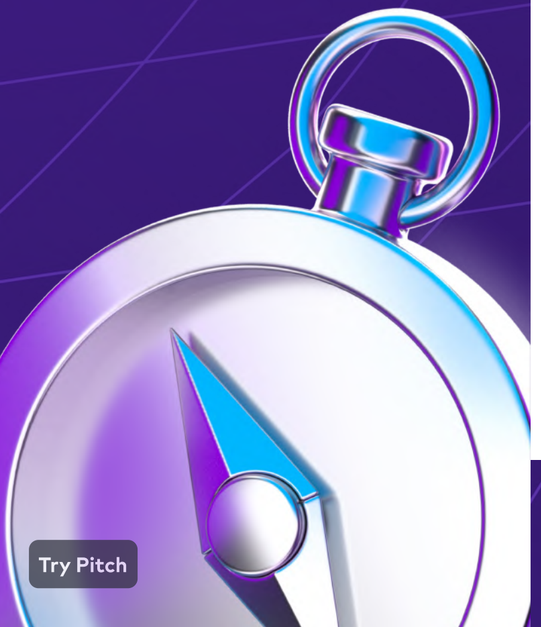
CODE REVIEW

PROPOSED METHODOLOGY

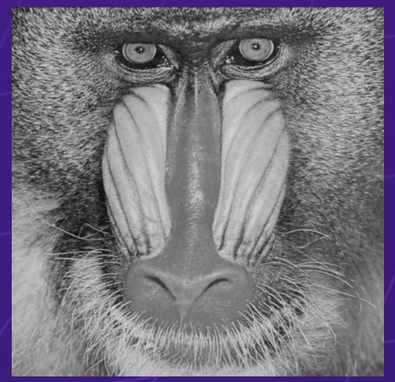
- Adapt an existing GitHub
- Embed the watermark into a video
- Extract the watermark from the digital image
- Extract the watermark from the recording of a screen
- Extract the watermark from the recording of a screen and a wall projected video

Typical Distortions and Intentional Tampering

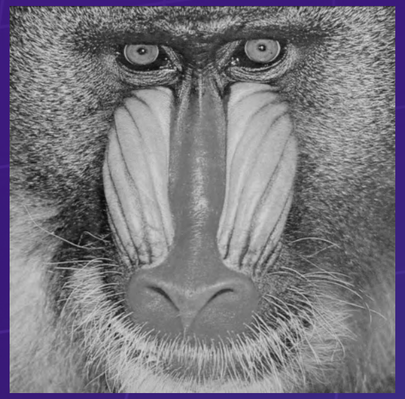
Lossy Compression	Geometrical Distortion	Common Signal Processing Operations	Other Intentional Tamperings
JPEG MPEG	Rotation Translation Scaling Cropping	D/A or A/D Converssion Resampling Requantization Dithering Recompression Linear Filtering Non-Linear Filtering Color Reduction Addition of Offset Value Addition of Noise Local Exchange of Pixels	Printing and Rescanning Rewatermarking Collusion Forgery IBM Attack Unzign Attack Stirmark Attack



FIRST TESTS ON BABOON



Baboon + watermark



Screen shot of baboon + watermark

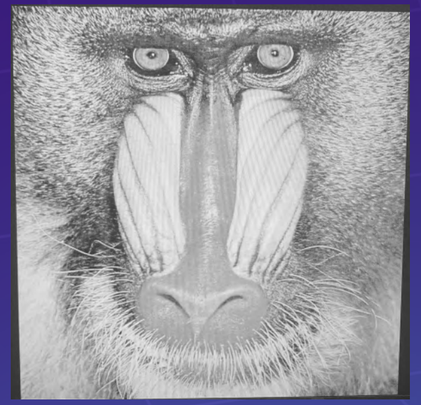
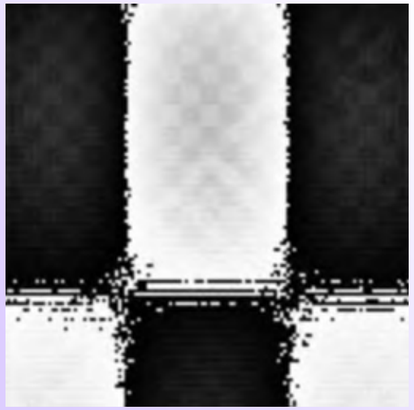


Photo of a screen of baboon + watermark

Photo of a projection of baboon + watermark

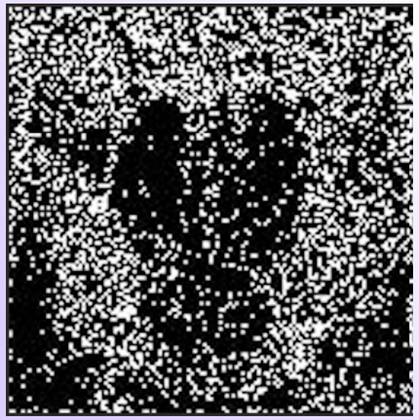
Extraction of the watermark

Extraction of the watermark



Extraction of the watermark

Extraction of the watermark



FIRST TESTS ON LENA

Lenna + watermark

Extraction of the watermark

Screenshot of Lenna + watermark

Extraction of the watermark

Photo of a screen of Lenna + watermark

Extraction of the watermark

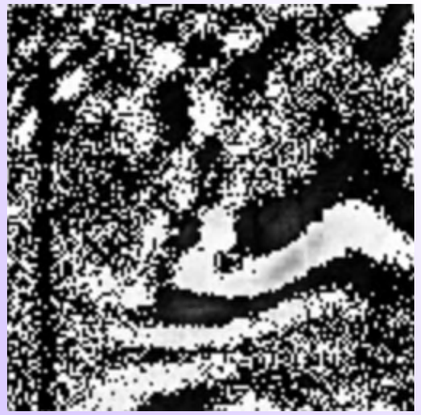


Photo of a projection of Lenna+ watermark

Extraction of the watermark

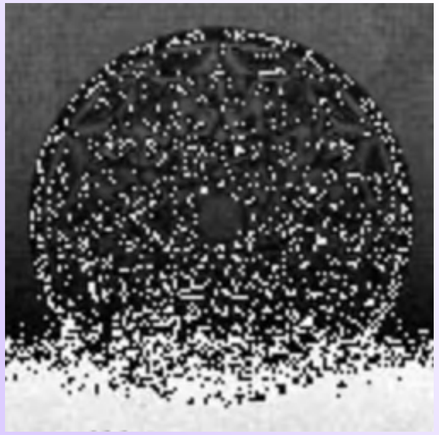
SECOND TESTS ON LENA

lena with watermark

extraction of the watermark

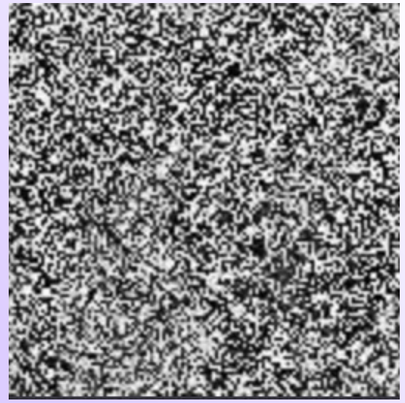
lena with watermark screenshot

extraction of the watermark



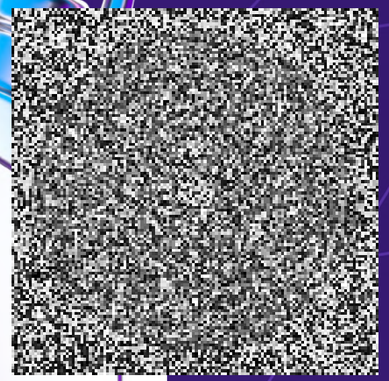
lena with watermark picture of screen

extraction of the watermark

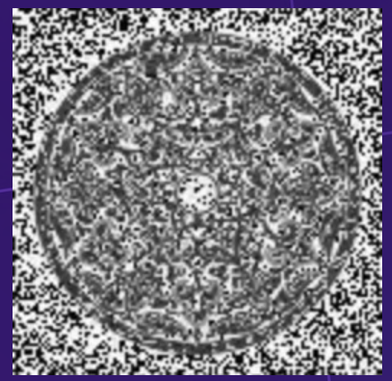


GAUSSIAN NOISE

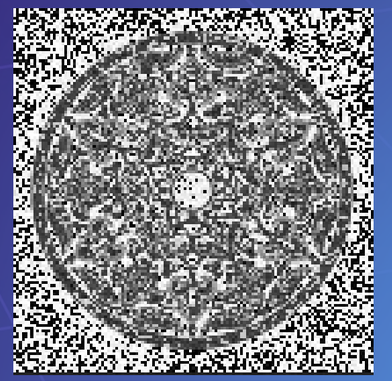
Standard deviation = 5



= 1

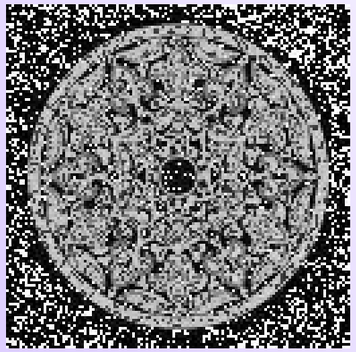


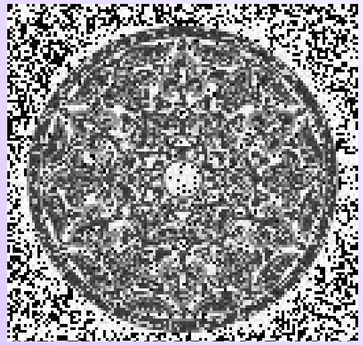
= 0.5

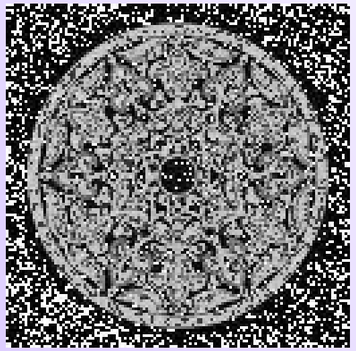


GEOMETRICAL ATTACK

Rotation



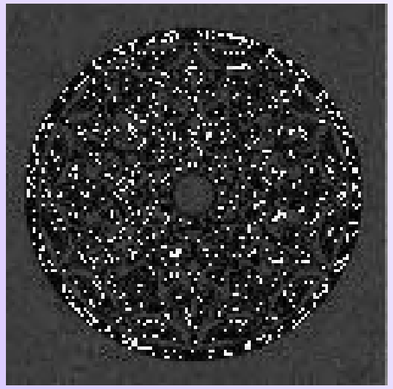




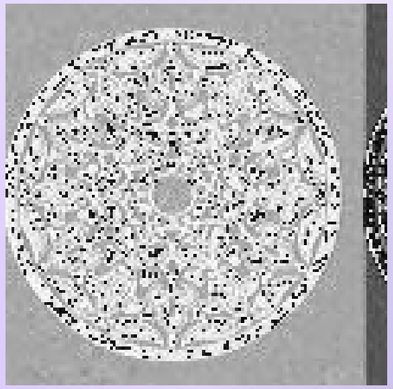
GEOMETRICAL ATTACK

Translation and Duplication

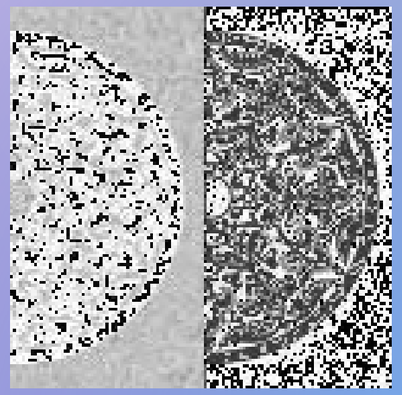
Translation of 15 pixels



Translation of 200 pixels



Duplication of the half of the picture

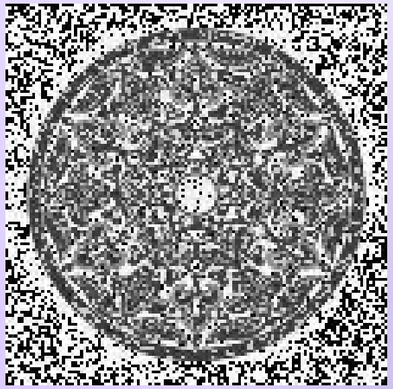


COMMON SIGNAL PROCESSING

Random exchange of pixels

Exchange of 10 pixels

Exchange of 100 pixels

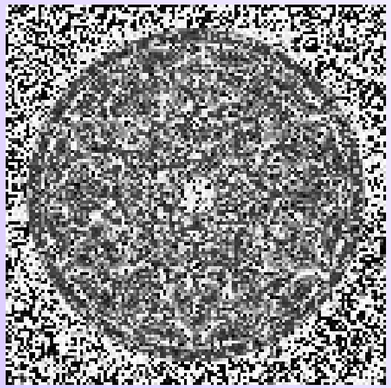


Exchange of 1000 pixels

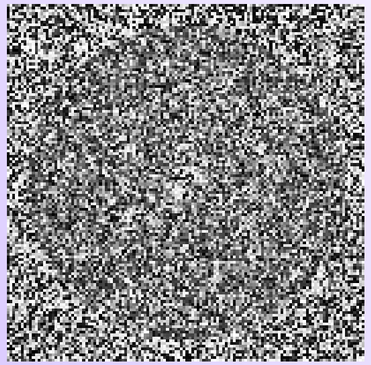
COMMON SIGNAL PROCESSING

Random exchange of pixels

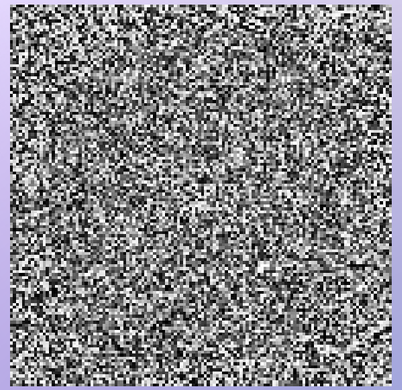
Exchange of 10000 pixels



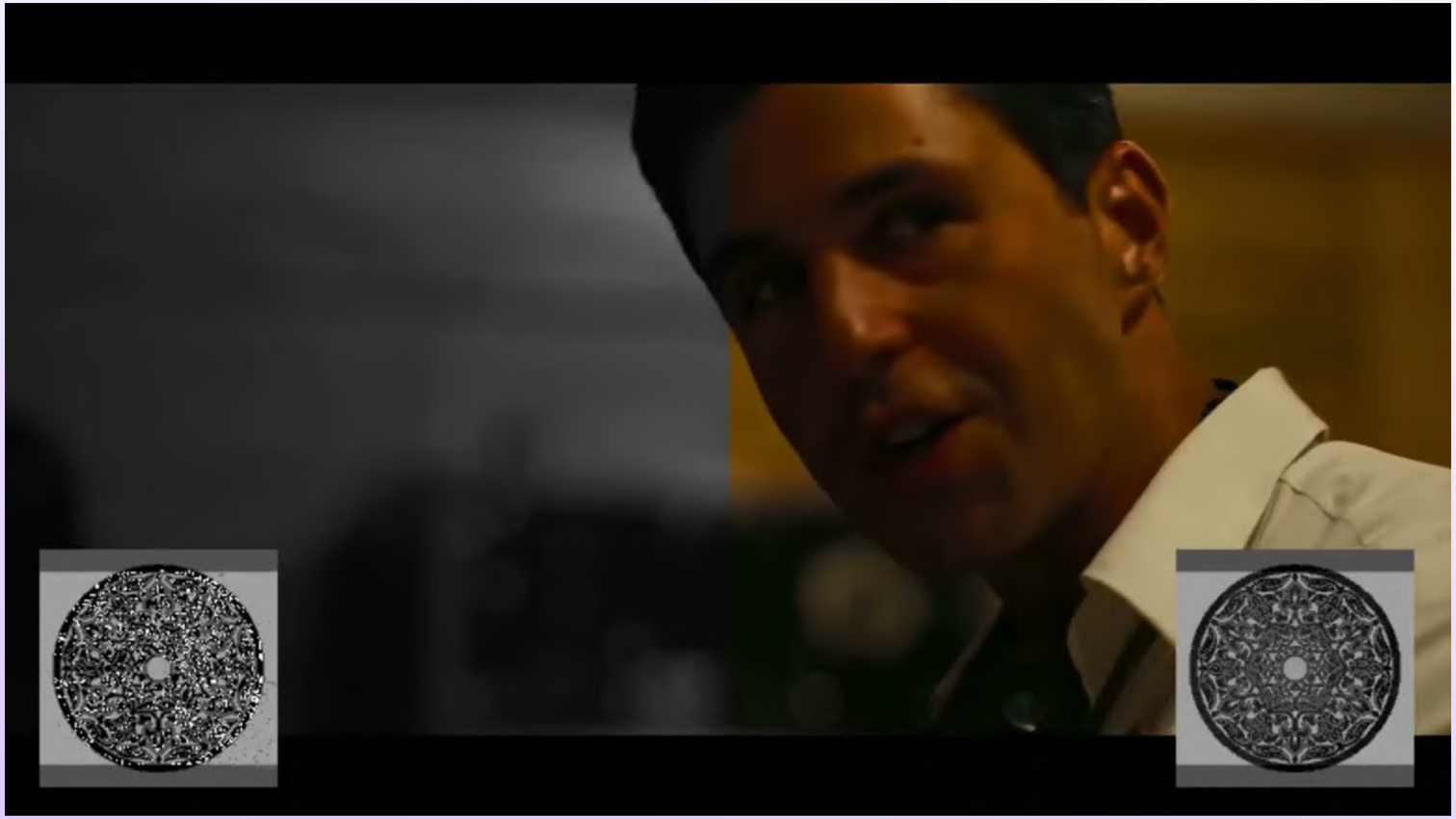
Exchange of 50000 pixels



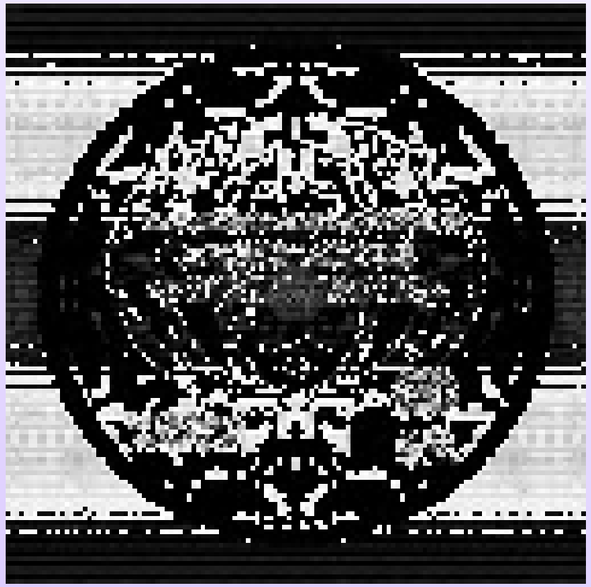
Exchange of 100000 pixels



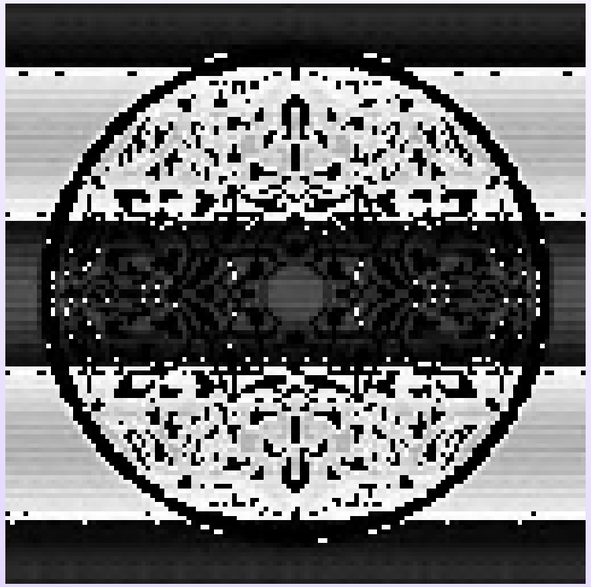
RESULTS ON A SHORT VIDEO



RESULTS ON A SHORT VIDEO EXPORTED IN H.264



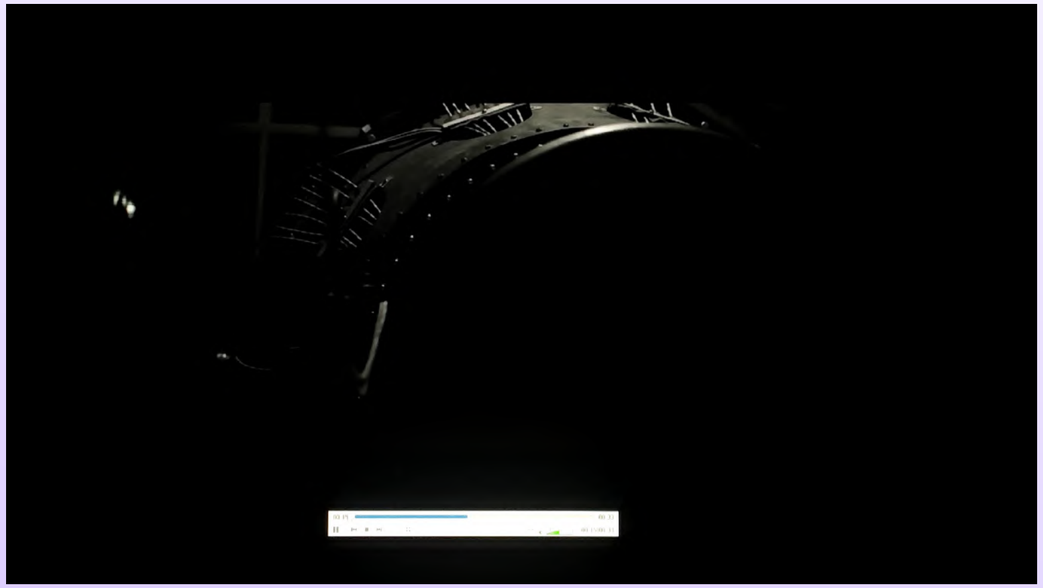
Watermark retrieved from b&w

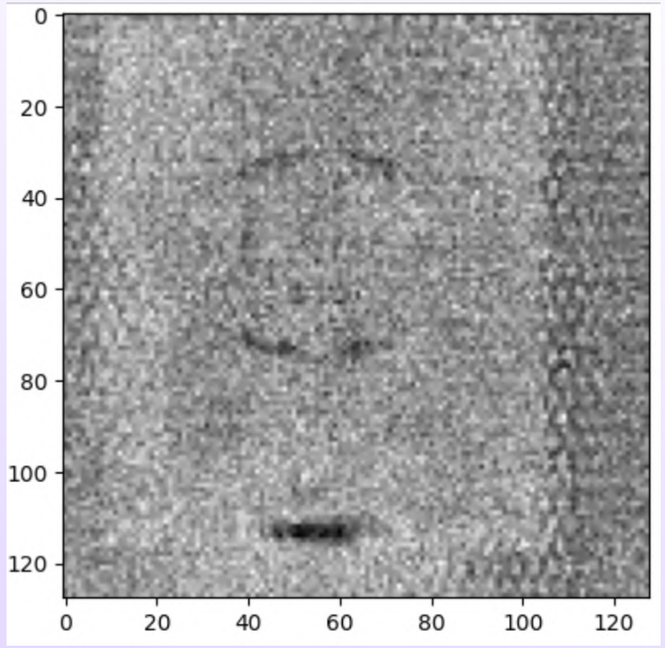


Watermark retrieved from colored video

RESULTS ON FILMED SCREEN

RESULTS ON FILMED SCREEN





Average Watermark on ~500 frames

CONCLUSION

THANK YOU

QUESTIONS ?