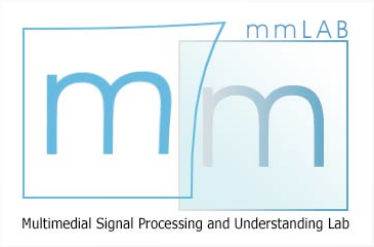

University of Trento

Engineering Faculty

Telecommunication Engineering Master Degree

FINAL THESIS

GA-BASED ROBUSTNESS EVALUATION METHOD FOR DIGITAL IMAGE WATERMARKING

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Prof. Francesco De Natale

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Academic year 2006-2007

Application field

Multimedia content security

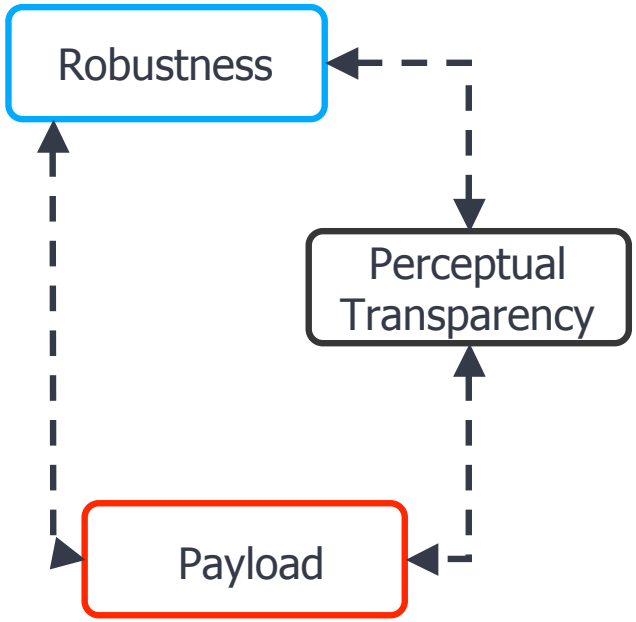
- Copyright protection
- Authenticity of the document
- Copy protection
- Traitor tracing

Proposed approach: DIGITAL WATERMARKING

(the art of hiding a message (*watermark*) within a host (*cover)* signal)

Purpose of the thesis

Benchmarking tool to automatically evaluate robustness of Digital Watermarking techniques

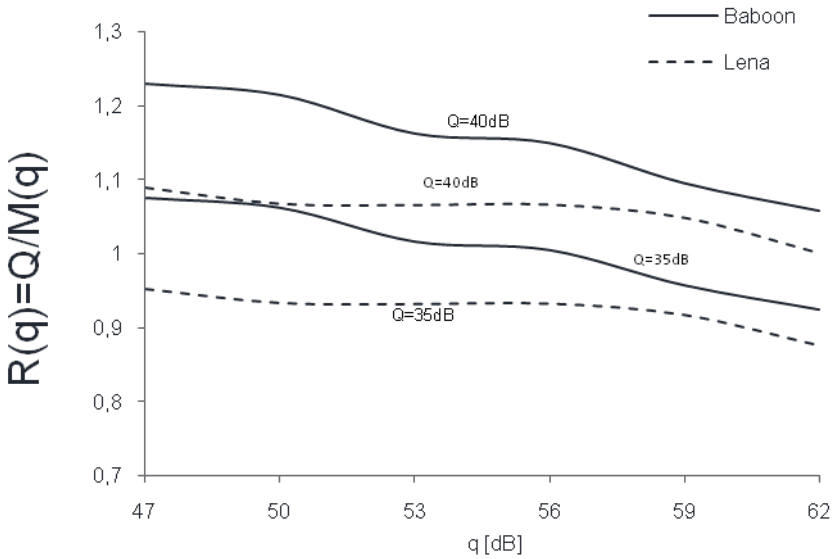


AIM : given a set of attacks, remove the watermark while granting the perceptual quality of the image as high as possible, here measured in terms of *Weighted Peak Signal to Noise Ratio*

→ Stochastic search of the most suitable parameterization of attacks through the use of Genetic Algorithms.

Innovation & Results

- Combination of attacks
- Dynamic parameterization of attacks
- Definition of a new metric to evaluate robustness in term of perceptual quality
- Use of optimization algorithms (Genetic Algorithm) in a watermarking benchmark



Performances plots for Q = 40 dB and Q = 35 dB under the combination of JPEG2000 compression, addition of WGN and resize attack.

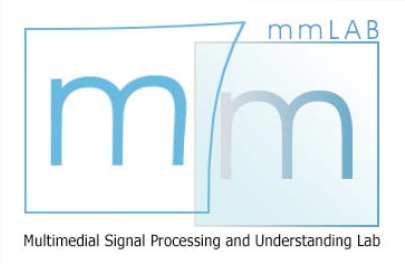
Lena image watermarked with q = 47dB (left) and unmarked with $M(q)$ = 37.37 dB (right).

Multimedial Signal Processing and Understanding Lab

Applications

- Developers : improvement of the algorithm under development, by identifying method's weaknesses and failings.
- Users : fair comparison of existing techniques in order to choose the most suitable for the intended application.

- A user-friendly interface has been developed



Thank you!

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