Adaptive Steganography by Oracle (ASO)

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1 Background

The goal of steganography is to hide a secret message in an unsuspicious object in such a way that no one can detect it.

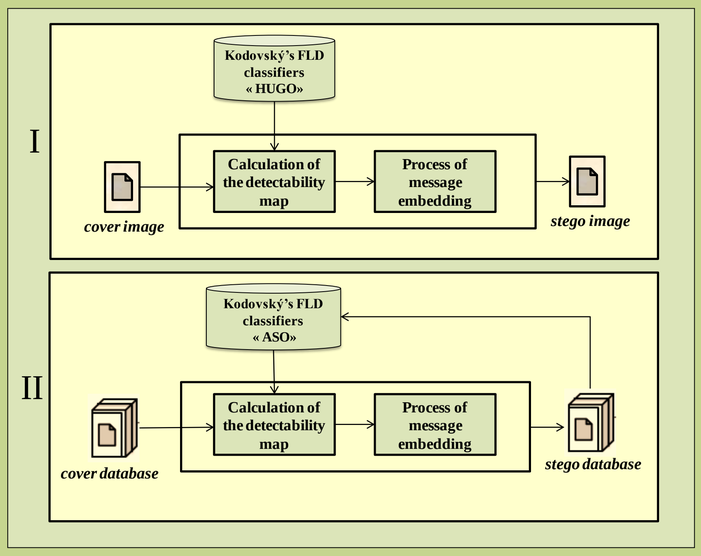
The stego image must be visually undetectable and .also statistically.

Cover image **Stego image**

2 ASO Scheme

New concept of embedding based on an Oracle.

The Oracle is trained with the best state of the art algorithm, witch is HUGO [1].



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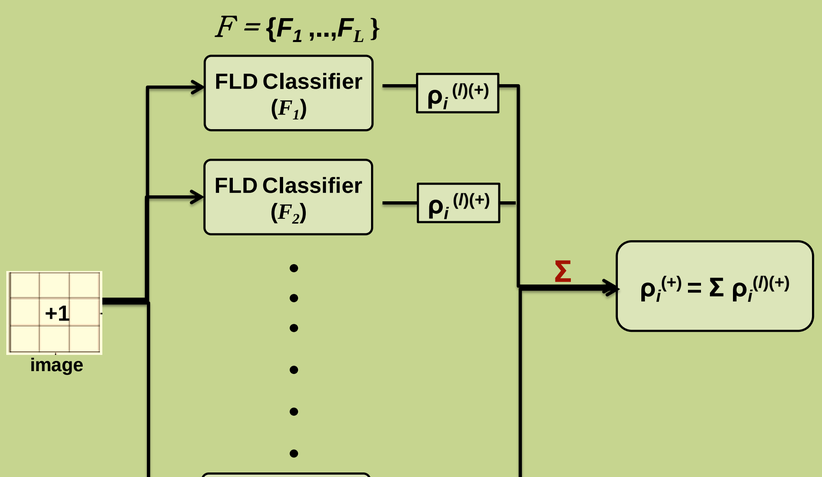
3 Detectability Map

For each pixel (±1) : $\rho = min\ (\rho_i^{(+)}, \rho_i^{(-)})$.

To compute the detectability map we use the Kodovsky's ensemble classifiers [2] as an oracle.



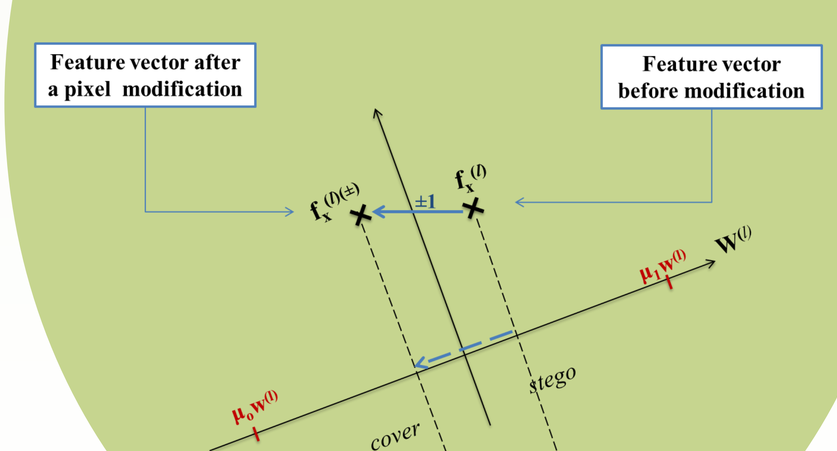
Respectively for $\rho_i^{(-)}$

4 FLD Costs

For an FLD :

$$\rho_i^{(l)(+)} = W^{(l)}(f_{x_{\sim xi}}{}^{(l)(+)} - f_x{}^{(l)})/s^{(l)}.$$

$$\rho_i^{(l)(-)} = W^{(l)}(f_{x_{\sim xi}}{}^{(l)(-)} - f_x{}^{(l)})/s^{(l)}.$$

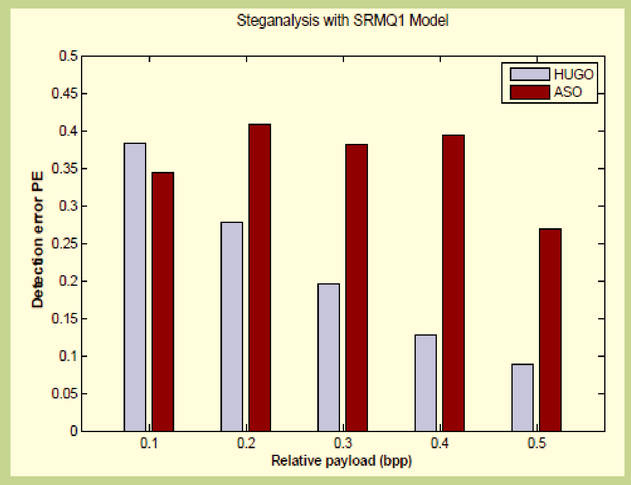


5 Results

BossBase v1.00 database with 10000 grayscale images of 512 x 512.

Rich Model SRMQ1 [3] of 12753 features.

The reported performance of each payload is averaged over five random database splits.



6 Conclusion

A new adaptive embedding scheme based an oracle (ASO).

A new paradigm witch is the steganography by database.
The proposed method scales well with dimension.

7 Future Work

Security evaluation with a pooled steganalysis.

Position with game theory aspects.

* References

[1] T. Pevny, T. Filler, and P. Bas, "*Using High-Dimensional Image Models to Perform. Highly Undetectable Steganography*," IH'2012.

[2] J. Kodovsk´y, J.J. Fridrich, and V. Holub, "*Ensemble Classifiers for Steganalysis of Digital Media*," IEEE TIFS'2012.

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