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Bio Inspired Optimization for Universal Spatial Image Steganalysis

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Highlights of Research

- Image steganalysis is a two class optimization problem.
- S-UNIWARD spatial steganographic algorithm is used to create stego images.
- Image features extracted in spatial domain are noise models giving 34671 features.
- Ant Lion Optimization is used to get best image features (381 features).
- Single (SVM and MLP) and Fusion classifiers (Bayes, Decision Template, Dempster Schafer) are used.
- Fusion classifiers give classification accuracies in the range of 99.3%.
- Thus Fusion classifiers with ALO act as best universal steganalyser in spatial domain.

Abstract

Universal Image steganalysis is a two class optimization problem. This research uses S-UNIWARD spatial steganographic algorithm to create stego images from 500 cover images. The image features extracted in spatial domain are noise models of neighbouring pixels giving 1000×34671 features. Ant Lion Optimization (ALO) is used to get best image features (1000×381 features). The classifiers used are Single (SVM and MLP) and Fusion classifiers (Bayes, Decision Template, Dempster Schafer). All fusion classifiers and SVM give classification accuracy of 99.3%. Thus Fusion classifiers with ALO act as best universal steganalyser in spatial domain.

Keywords: Image steganalysis, Fusion classifiers, Ant Lion Optimization, Support Vector Machines, Bayes fusion classifier, Decision template fusion.

1. Introduction

Steganography is the art of concealed communication where the very existence of the secret data in a digital media is not noticeable. Among the different steganographic carrier media,