Feature Selection for Deepfake Detection: A Comparison of Artemisinin Optimization and Particle Swarm Optimization on the FF++ Dataset

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Abstract

The proliferation of deepfake content poses significant threats to digital security. In this study, feature extraction was performed on the FaceForensics++ (FF++) dataset using the Xception model, and metaheuristic-based optimization methods were applied to examine the impact of selected features on classification accuracy. Specifically, we compared the Artemisin Optimization Algorithm (AO), a relatively new algorithm in the literature, with the classical and widely used Particle Swarm Optimization (PSO) algorithm. Selected features were classified using a multilayer perceptron (MLP), and performance metrics were evaluated using AUC, accuracy, precision, sensitivity, and F1-score. Experimental findings demonstrate that both algorithms provide effective feature selection. However, the AO algorithm achieved a higher success rate with an AUC of 99.30%, surpassing PSO's 98.79% performance. This result demonstrates that AO offers a powerful and innovative alternative for deepfake detection, while also providing a significant advantage over classical methods.

Keywords

Deepfake detection, feature selection, Xception, Artemisisin Optimization, Particle Swarm Optimization