Abstract

In recent time, the rise of synthetic image generation and manipulation is causing immense amount of concerns.The paper discusses about the difficulties of detecting fake images and also the methods used to detect facial manipulation.

Introduction

The purpose of the paper was to collect a large scale dataset consisting of millions of fake images and discussions about the state of the art hand crafted and learned forgery detectors. This paper also evaluated about the state of the art forgery detection methods that can be used on facial manipulations. Overall this paper contributed a benchmark for facial manipulation detection.

Methods

A large dataset is used containing of 1.8 million images from 4000 fake videos and the dataset is collected using four graphic based approaches.

Faceswap: A graphics based approach to transfer the facial part of a source video to a target video.

Deepfakes: A learning based approach that replaces the face region of a target video or image from a observed source video or image.

Face2Face: A graphics based approach to that transfers the expressions of a source video from a target video while keeping the identity of the person same.

Neural Textures: A learning based approach that changes the expression of the mouth region of the face while keeping the eye region unchanged.

Two forgery detection methods are used to detect facial manipulation. Facial manipulation is detected based on steganalysis Features and on Learned Features.

Results

After comparing all results, it is found that all approaches perform highly on raw input data but performance drops a lot when hand carfted features are used.

Moreover, all approaches also performs lowly on GAN based NeuralTextures approach.

The results also show the importance of training corpus size, size of the training corpus impact positively on the overall performance of the forgery detectors.

Discussion and Conclusion

As new manipulation tactics are introduced everyday, so new methods for forgery detection must be developed too. Trained forgery detectors can detect manipulation in low quality which can't be even detected by humans. So, hopefully more work will be done on detecting facial forgeries in the near future.