

MesoNet: Facial Video Counterfeit Detection Network Analysis

Ravi Sankar Gogineni

rgoginen@ttu.edu

Abstract

A method to automatically and efficiently detect face tampering in videos, and particularly focuses on two recent techniques which are used to generate hyper realistic forged/counterfeit videos: Deepfake and Face2Face. The popularization of smartphones and the growth of social networks have made digital images and videos very common digital objects. Tremendous use of digital images has been followed by a rise of techniques to alter image contents, using editing software. The field of digital image forensics research is dedicated to the detection of image forgeries in order to regulate the circulation of such falsified contents. Deep learning performs very well in digital forensics and disrupts traditional signal processing approaches. Addressing the problem of detecting these two video editing processes, Deepfake follows Face2Face. Up to today, there is no other method dedicated to the detection of the Deepfake video falsification technique.

- Deepfake is a technique which aims to replace the face of a targeted person by the face of someone else in a video. The core idea lies in the parallel training of two autoencoders.
- Face2Face Reenactment method are designed to transfer image facial expression from a source to a target person. Face2Face.

The final image synthesis is rendered by overlaying the target face with a morphed facial blend shape to fit the source facial expression. We propose to detect forged videos of faces by placing our method at a mesoscopic level of analysis. At a higher semantic level, human eye struggles to distinguish forged images, especially when the image depicts a human face. That is why we propose to adopt an intermediate approach using a deep neural network with a small number of layers. The two following architectures have achieved the best classification scores among all our tests, with a low level of representation and a surprisingly low number of parameters:

- Meso-4
- MesoInception-4

Deliverables:

By the end of September: Gathering the requirements and scrutinizing few related papers.

By the end of October: Downloading the dataset and testing with different number of layers and to generate hyper-realistic forged Deepfake and Face2Face videos/images.

By the end of November: Evaluate the results on the tested dataset and verify the detection rate on both Deepfake and Face2Face.