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Deepfake Detection in Video

Priyanka Yadav (19SCSE1010902) batch12

Rohan Kapoor (19SCSE1140010) batch-CNCS-1

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Abstract

Deep learning has been successfully applied to solve various complex problems ranging from big data analytics to computer vision and human-level control. Deep learning advances however have also been employed to create software that can cause threats to privacy, democracy and national security. One of those deep learning-powered applications recently emerged is deepfake. Deepfake algorithms can create fake images and videos that humans cannot distinguish them from authentic ones. The proposal of technologies that can automatically detect and assess the integrity of digital visual media is therefore indispensable. This paper presents a survey of algorithms used to create deepfakes and, more importantly, methods proposed to detect deepfakes in the literature to date. We present extensive discussions on challenges, research trends and directions related to deepfake technologies. By reviewing the background of deepfakes and state-of-the-art deepfake detection methods, this study provides a comprehensive overview of deepfake techniques and facilitates the development of new and more robust methods to deal with the increasingly challenging deepfakes.

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Problem Statement

•To Design and Develop a Deep Learning algorithm to classify the video as deepfake.

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What are Deepfakes?

- Deepfakes are synthetic media in which someone in an existing image or video is transformed into person else's likeness. The act of injecting a faux character in a photograph is not new.
- Deep fake is a technique for human image synthesis based on artificial intelligence.
- Deep fakes are created by combing and superimposing existing images and videos onto source images or videos using a deep learning technique known as generative adversarial network.

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Keywords

- Deepfake Detection Model
- detection techniques
- eye blinking
- Deep learning
- Neural Networks

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Why Deep Fake Detection ?

- Fake News
- Malicious hoaxes
- Financial fraud
- Celebrity unusual video
- Revenge porn
- Politician videos

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Proposed Model

Previous approaches for deepfake detection have already achieved promising performances across various benchmarks. However, due to the improvement of machine getting to know, it has become less difficult to create deep fake films. It has almost come to be indistinguishable from actual motion pictures. Deep faux motion pictures are generally created by the use of GANs (Generative hostile network) and different deep gaining knowledge of technology. The chance of this is that era may be used to make humans believe something is real when it isn't. cellphone desktop applications like FaceApp and pretend Apps are constructed in this method. Those videos can have an effect on a person's integrity. So, identifying and categorizing these movies has come to be a necessity. This paper evaluates strategies of deepfake detection and discusses how they can be combined or changed to get greater accurate outcomes. With a bit of luck, we will be able to make the internet a safer location.

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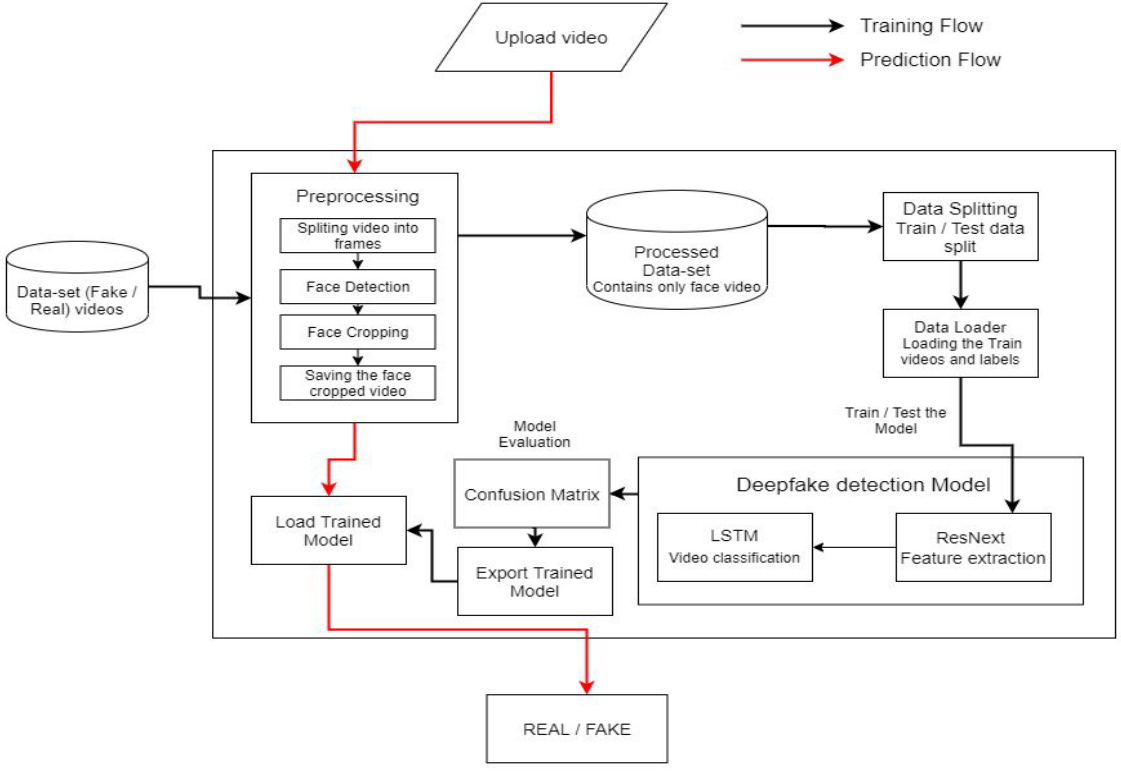
Architecture Diagram



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Tools

HARDWARE: COMPUTER SYSTEM.

SOFTWARE: VS code, Google Colab, Git, cmd.

LANGUAGES: Python.

Codes are hosted in Github .

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Literature Review

- David guera, et. al. [1] have demonstrated how Deepfake videos are created and how they can be detected using CNN and LSTM. GAN's are used for better quality deepfake videos.
- Irene Amerini, et. al. [2] have proposed a system to exploit possible inter-frame dissimilarities using the optical flow technique.
- Xin Yang, et. al. [3] have proposed a system to detect Deepfake using inconsistent headposes. Algorithms used in the previous model create the face of different persons without changing the original expressions hence creating mismatched facial landmarks. The landmark locations of few false faces often vary from those of the real faces, as a consequence of interchanging faces in the central face region in the DeepFake process.

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Phases

Phase 1: To read the relevant literature and check the feasibility of the project. Start tinkering with OpenCV and implement an algorithm to detect deepfake in still videos.

Phase 2: To implement deepfake detection in live motion video.

Phase 3: To implement deepfake detection in video

Phase 4: To implement deepfake detection while tracking objects in live motion video.

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Implementation and Description

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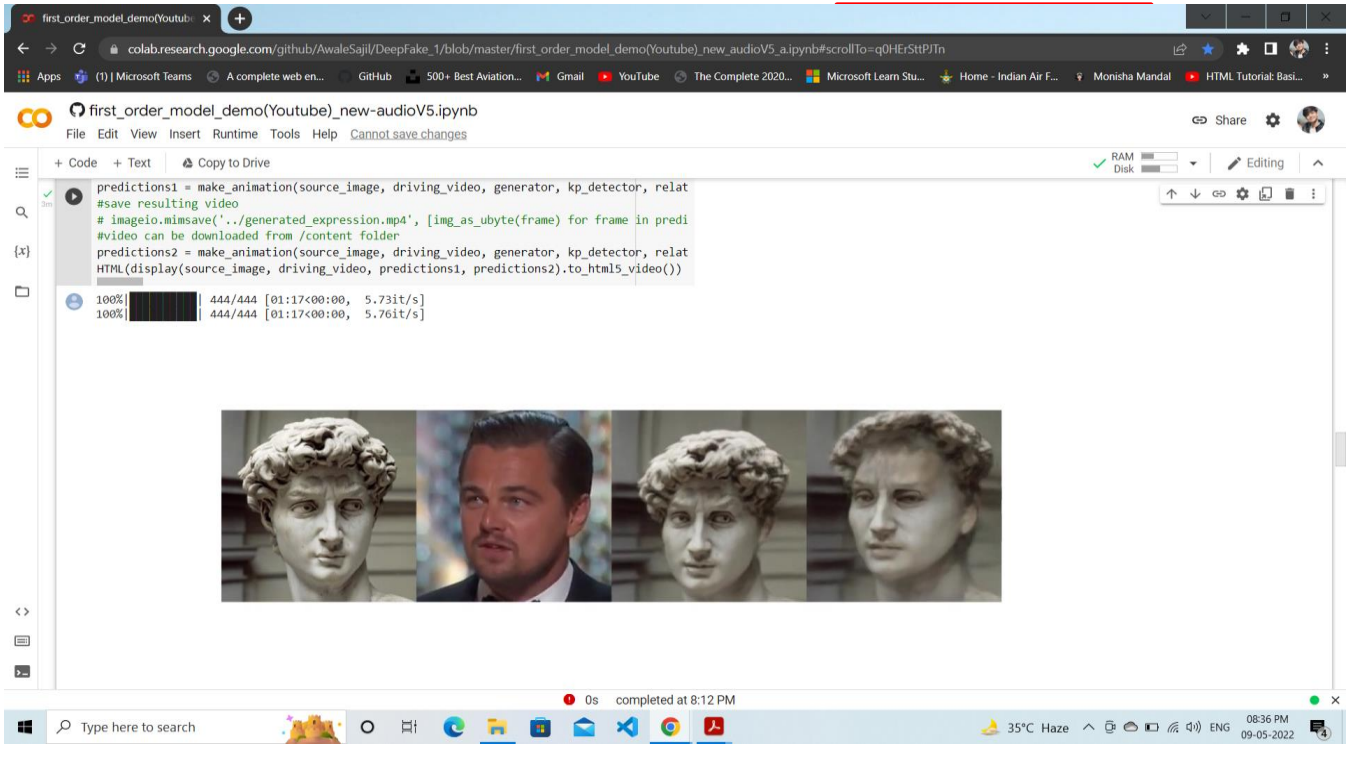

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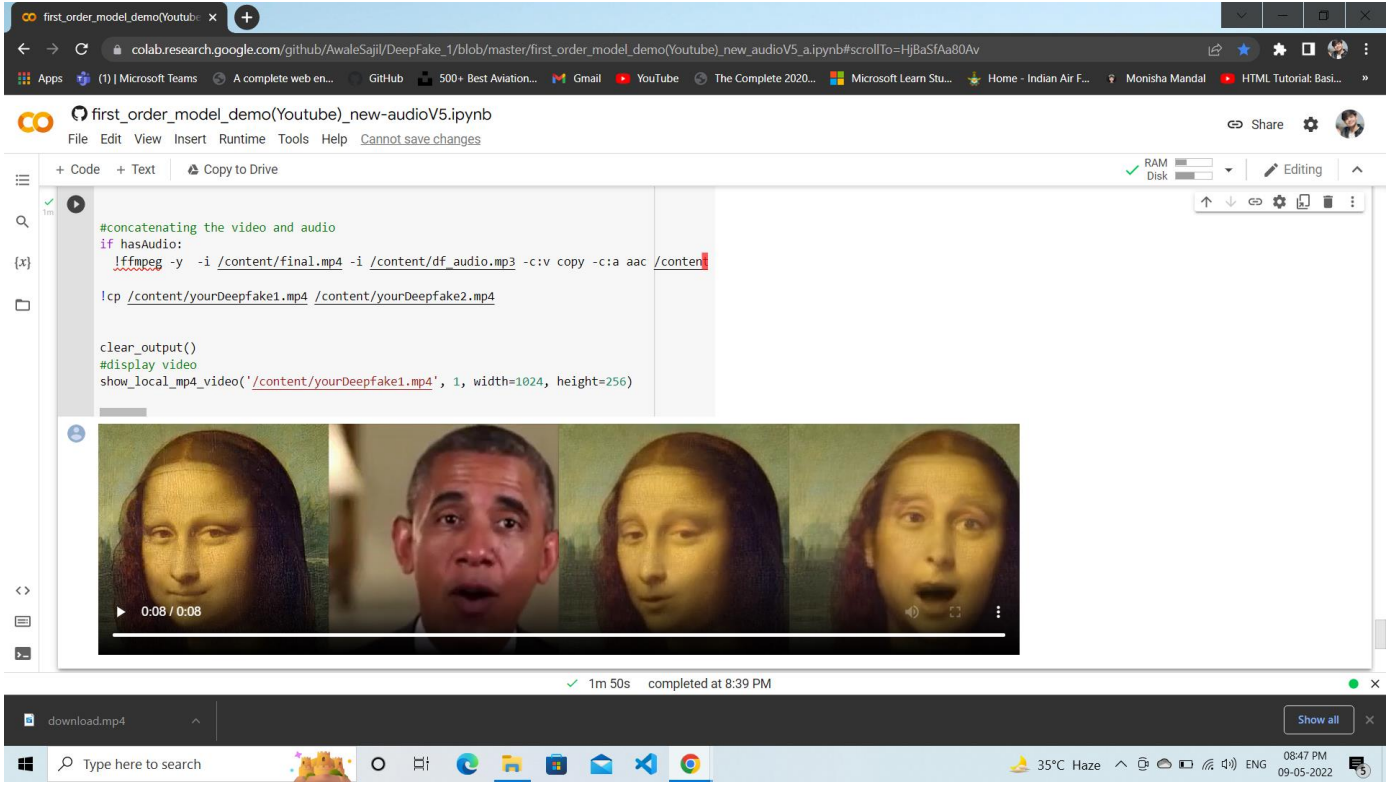

Video that source code saved

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References

[1] David Guera, Edward J. Delp, “Deepfake Video Detection Using Recurrent Neural Networks”, 2018 15th IEEE International Conference on Advanced Video and Signal Based Surveillance (AVSS).

[2] Irene Amerini, Leonardo Galteri, Roberto Caldelli, Alberto Del Bimbo, “Deepfake Video Detection through Optical Flow based CNN”, 2019 IEEE/CVF International Conference on Computer Vision Workshop (ICCVW).

[3] Xin Yang, Yeuzen Li and Siwei Lyu, “EXPOSING DEEP FAKES USING INCONSISTENT HEAD POSES”, ICASSP 2019 - 2019 IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP).

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THANK YOU