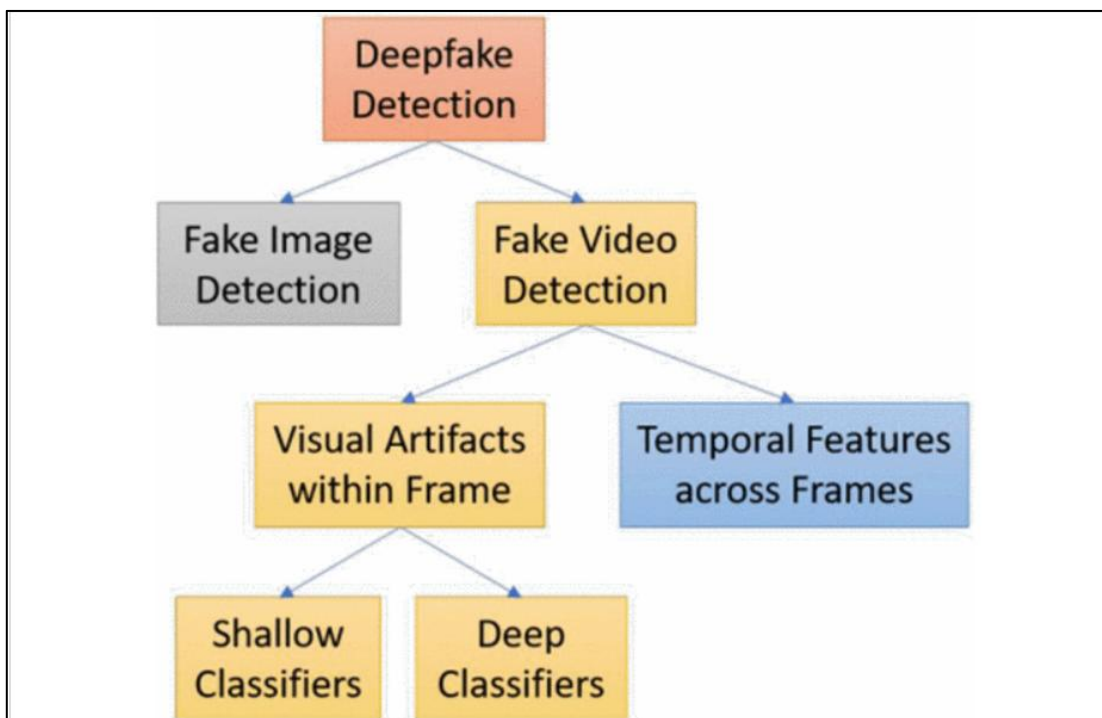# AI EXPERIMENT 10

Paper 1:

Paper Title: Artificial Intelligence into Multimedia Deepfakes Creation and Detection
Publication Name & Year: IEEE - 19 April 2023
Algorithm: Deep learning

Dataset: Sizable collection of actual and fraudulent videos.
Results: Discusses the use of deep learning for deepfake detection, considering it as a binary classification issue. The paper emphasizes the importance of a substantial dataset for training classification algorithms.
Observations Regarding Performance: The paper highlights the role of deep learning in automatically extracting distinctive qualities for detecting deepfakes. It underlines the necessity of a large dataset for effective training.

Paper 2:

Paper Title: Optimization of DeepFake Video Detection Using Image Preprocessing
Publication Name & Year: IEEE - 02 August 2023
Algorithm: Performing pre-processing and advanced image enhancement on the videos in hand for highlighting the face features for better feature extraction as well fake content detection, which is preceded by a close-up dataset cleansing.
Dataset: Kaggle's deepfake challenge, consisting of 200 real vs. 200 fake videos.
Results: Optimizes the Xception Binary Classifier-Inference model using a pre-processing phase with advanced image enhancement. Achieves a performance improvement from 94% to 96%.
Observations Regarding Performance: The paper notes the impact of dataset cleansing and contrast enhancement on detection accuracy. The proposed pre-processing scheme significantly enhances the Xception-based model's accuracy.

Paper 3:

Paper Title: BTS-E: Audio Deepfake Detection Using Breathing-Talking-Silence Encoder
Publication Name & Year: IEEE - 05 May 2023
Algorithm (Architecture): BTS-E (Breathing-Talking-Silence Encoding) framework. The main components are -

1. Sound Segmentation: Objective: Extracts a Segmentation Encoding Vector by classifying silence, breathing, and talking using GMM and AAD.

2. Positional Correlation Encoding:Objective: Transfers from sound segmentation to deepfake speech detection, extracting positional correlation through embedding.

3. Synthetic Speech Detection:Strategy: Fuses features to enhance accuracy, combining correlation encoding with RawNet2 for effective deepfake speech detection.
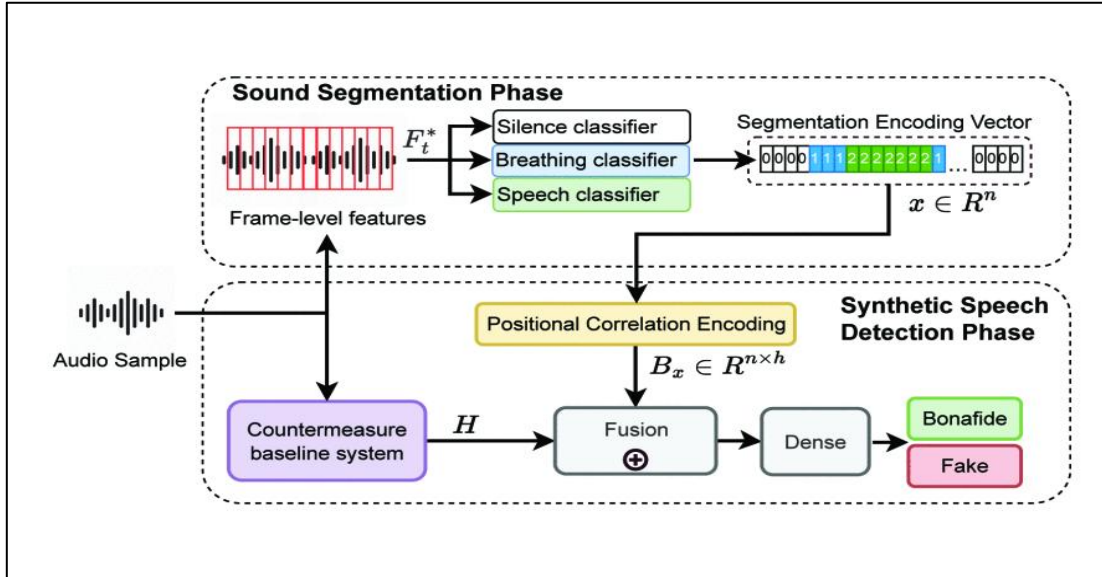
Dataset: ASVspoof 2019 and 2021 evaluation sets

Results: Introduces the BTS-E framework for deepfake audio detection, leveraging breathing, talking, and silence sounds. Shows a significant increase in classifier performance, up to 46%, using breathing sound features.

Observations Regarding Performance: Highlights the difficulty of synthesizing natural human sounds like breathing. The proposed BTS-E framework demonstrates a substantial enhancement in classifier performance.

Conclusion: Concludes that the breathing sound feature is applicable in detecting deepfake voices, significantly improving classifier performance.

Paper 4:

Paper Title: Detecting Deepfake Human Face Images Using Transfer Learning: A Comparative Study

Publication Name & Year: IEEE - 9 September 2023

Algorithm (Models used): EfficientNetV2 model family

Dataset: Kaggle dataset with 3,450 images of real and fake human faces

Results: Compares various versions of the EfficientNetV2 model family, with EfficientNetV2L achieving the highest accuracy of 99%. The study evaluates accuracy scores for different versions (B0-B3, S, M, L).

Observations Regarding Performance: EfficientNetV2L outperforms other versions, reaching a 99% accuracy rate. The study highlights the effectiveness of EfficientNetV2 in classifying deepfake images.

Conclusion: Suggests future scopes involving advancements in deep learning techniques, including GANs and RL, and incorporating 3D face recognition for improved precision and durability. Also suggests integration with other biometrics-based authentication methods.