PROJECT - II

Session – 2024-2025

MEDI-CAPS UNIVERSITY

Deep-Fake Video Detection Model

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Abstract

- Detect DeepFake videos using machine learning models to enhance security and authenticity in digital media.

- Utilize deep learning techniques (LSTM & Xception Net) to analyze facial features from extracted video frames.

- Process datasets (Face Forensics++, Celeb DF), train/test models, and evaluate performance using a confusion matrix.

- Efficient detection of DeepFake videos, distinguishing real vs. fake with high accuracy for improved digital content integrity.

Problem Statement

- DeepFake technology leverages advanced AI to create highly realistic fake media , posing risks like misinformation, identity theft and loss of public trust

- Traditional detection methods struggle with the subtle manipulation and the need for both spatial and temporary analysis in video data.

- Aim to provide reliable model using XceptionNet + LSTM architecture to analyze both spatial features from individual frames and temporary dependencies across video sequence

Solution

- **Hybrid Model Architecture:** Utilizes a combination of XceptionNet for spatial feature extraction and LSTM for analyzing temporal dependencies in video sequences.

- **Frame-by-Frame Analysis:** Detects deepfake manipulations by examining individual video frames and their relationships over time.

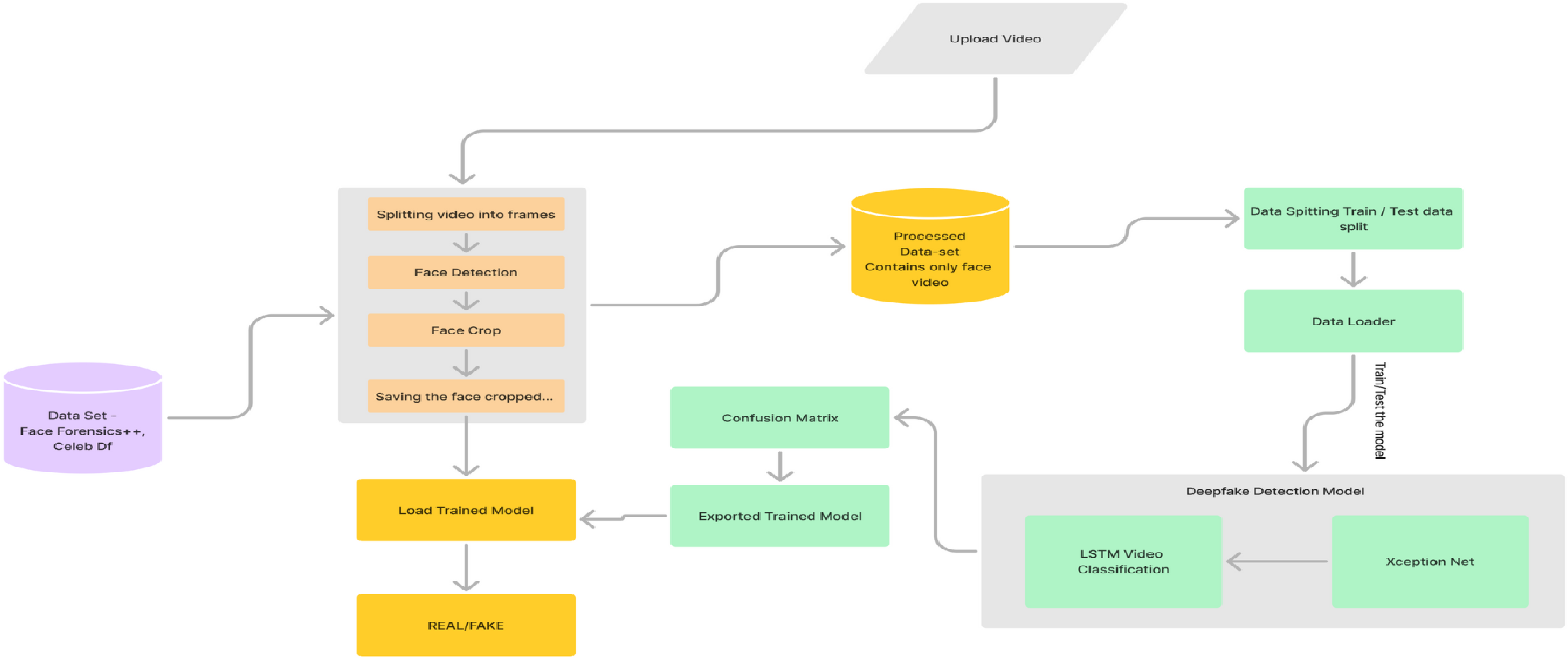
- **Multi-Phase Training:** The model undergoes multiple training phases to enhance performance and improve detection accuracy.

- **Pre-Trained Model Efficiency:** Leverages pre-trained models to optimize computational efficiency and achieve high accuracy in deepfake detection.

Technologies Included

- **NumPy** – Used for efficient numerical computations, especially matrix operations required for image and video data processing.
- **Pandas** – Used for handling and preprocessing structured datasets, including metadata and results of model predictions.
- **TensorFlow** – The core deep learning framework used to build, train, and fine-tune the XceptionNet + LSTM model.
- **GitHub** – Used for version control, collaboration, and managing code repositories throughout the project.
- **Keras** – Simplified neural network design and implementation, allowing faster prototyping and model experimentation.
- **Streamlit** – Used to develop an interactive web-based application for real-time DeepFake detection and visualization of results.

Flow Diagram



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Research done

- ❖ Research papers used for understanding :-

1. https://github.com/abhijitjadhav1998/Deepfake_detection_using_deep_learning/blob/master/Documentation%2FIJSRDV8I10860.pdf
2. A. Rössler, D. Cozzolino, L. Verdoliva, C. Riess, J. Thies, and M. Nießner, "FaceForensics++: Learn ing to Detect Manipulated Facial Images," in 2019 IEEE/CVF International Conference on Computer Vi sion (ICCV), Seoul, Korea (South), 2019, pp. 1-11, doi: 10.1109/ICCV.2019.00009.
3. Dr. CH. V. Phani Krishna, Sowmya Arukala, Vishanth Reddy Battula, M. Bhavya Sri, 2022, "Deep-Fake Detection Using LSTM and ResNext," Journal of Engineering Sciences, Vol 13, Issue 07, ISSN: 0377 9254.

Thank You!

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