# Deep Fake Video Detection in Deep Learning using Res-Next Convolution Neural Network

Ms. A. SUNITHA M.E ASSISTANT PROFESSOR , Department of Computer Science and Engineering

Mr. A. SANTHOSH B.E, Student of Computer Science Engineering

Mr. P.PRAVEEN KUMAR, B.E, Student of Computer science and Engineering

St. Joseph College of Engineering, Sriperumbudur, Chennai.

## Abstract

Deepfake content can be used to manipulate people's opinions. So, Deepfakes detection plays a prominent role in identifying fake content on social media and other forms of media. Deep fake creation tools leave distinctive artefacts in the resulting deep fake videos, and we show that they can be effectively captured by Res-Next Convolution Neural Networks. Deepfakes can distort our perception of the truth and we need to develop a strategy to improve their detection. Deep Fakes are increasingly detrimental to privacy, social security, and democracy.

At this point, people might tend to react accordingly because the video is exactly the same as the person by looks and voice. This way, deep fake content can be used to manipulate people's opinions. So, deep fakes detection plays a prominent role in identifying fake content on social media and other forms of media.

**Key Terms:** NN – Neural Network, CNN – Convolution Neural Network, RNN – Recurrent Neural Network, ML – Machine, LSTM - Learning, Long Short Term Memory, SMOTE – Synthetic Minority Oversampling Technique.

## Introduction

Introduces advanced deep learning models for improved deepfake detection using Res-Next Convolution neural network LSTM and RNN. Res-Next Convolution neural network extracts the frame-level features and these features are further used to train the Long Short Term Memory based artificial Recurrent Neural Network to classify the video as Deepfake or real. We proposed to evaluate our method against a large set of deep fake videos collected from multiple video websites. Face Warping is used as approach to detect artifacts by comparing the generated face areas and their surrounding regions with a dedicated Convolutional Neural

Network model. Recurrent Neural Network (RNN) for deepfake detection used the approach of using RNN for sequential processing of the frames along with ImageNet pre-trained model.

## Literature Survey

Detection by Eye Blinking describes a new method for detecting the deepfakes by the eye blinking as a crucial parameter leading to classification of the videos as deepfake or pristine. The Long-term Recurrent Convolution Network (LRCN) was used for temporal analysis of the cropped frames of eye blinking. As today the deepfake generation algorithms have become so powerful that lack of eye blinking cannot be the only clue for detection of the deepfakes. There must be certain other parameters must be considered for the detection of deepfakes like teeth enchantment, wrinkles on faces, wrong placement of eyebrows etc.

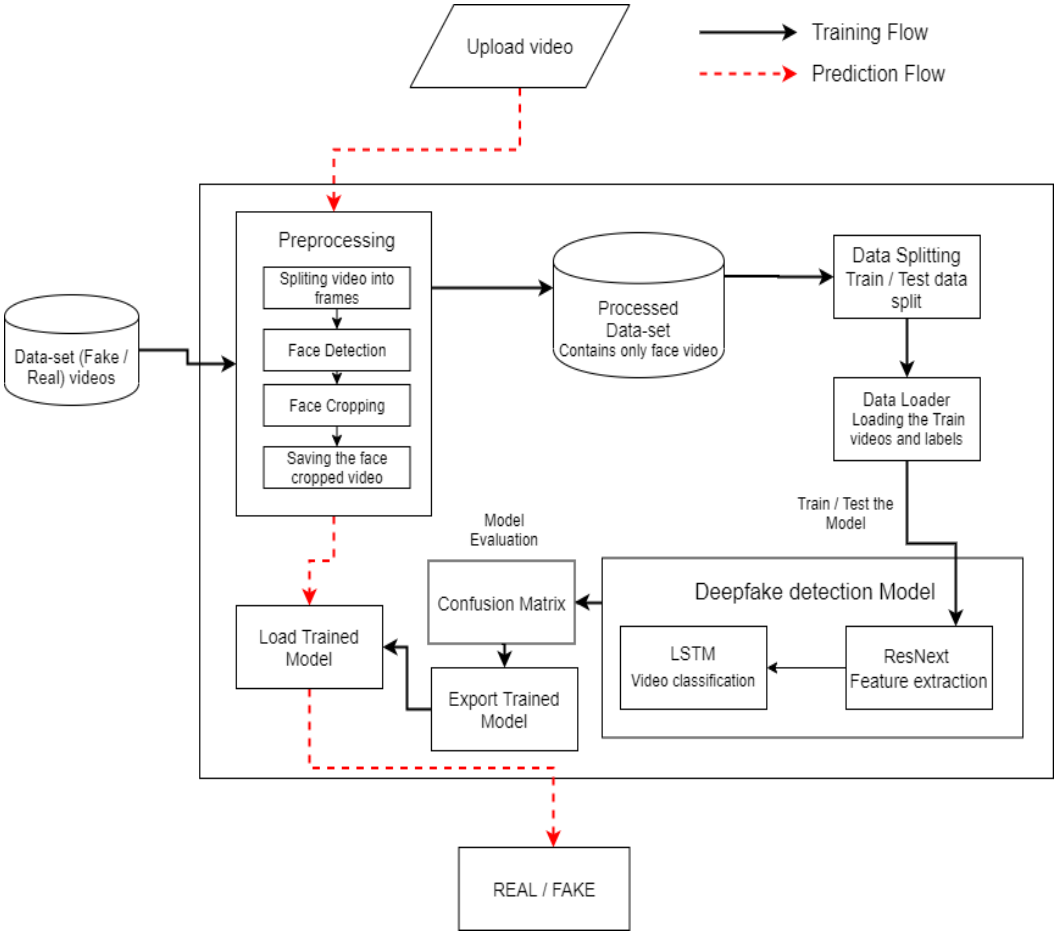
Capsule networks to detect forged images and video uses a method that uses a capsule network to detect forged, manipulated images and videos in different scenarios, like replay attack detection and computer-generated video detection. In their method, they have used random noise in the training phase which is not a good option. Still the model performed beneficial in their dataset but may fail on real time data due to noise in training. Our method is proposed to be trained on noiseless and real time datasets. Recurrent Neural Network for deepfake detection used the approach of using RNN for sequential processing of the frames along with ImageNet pre-trained model.

## System Design

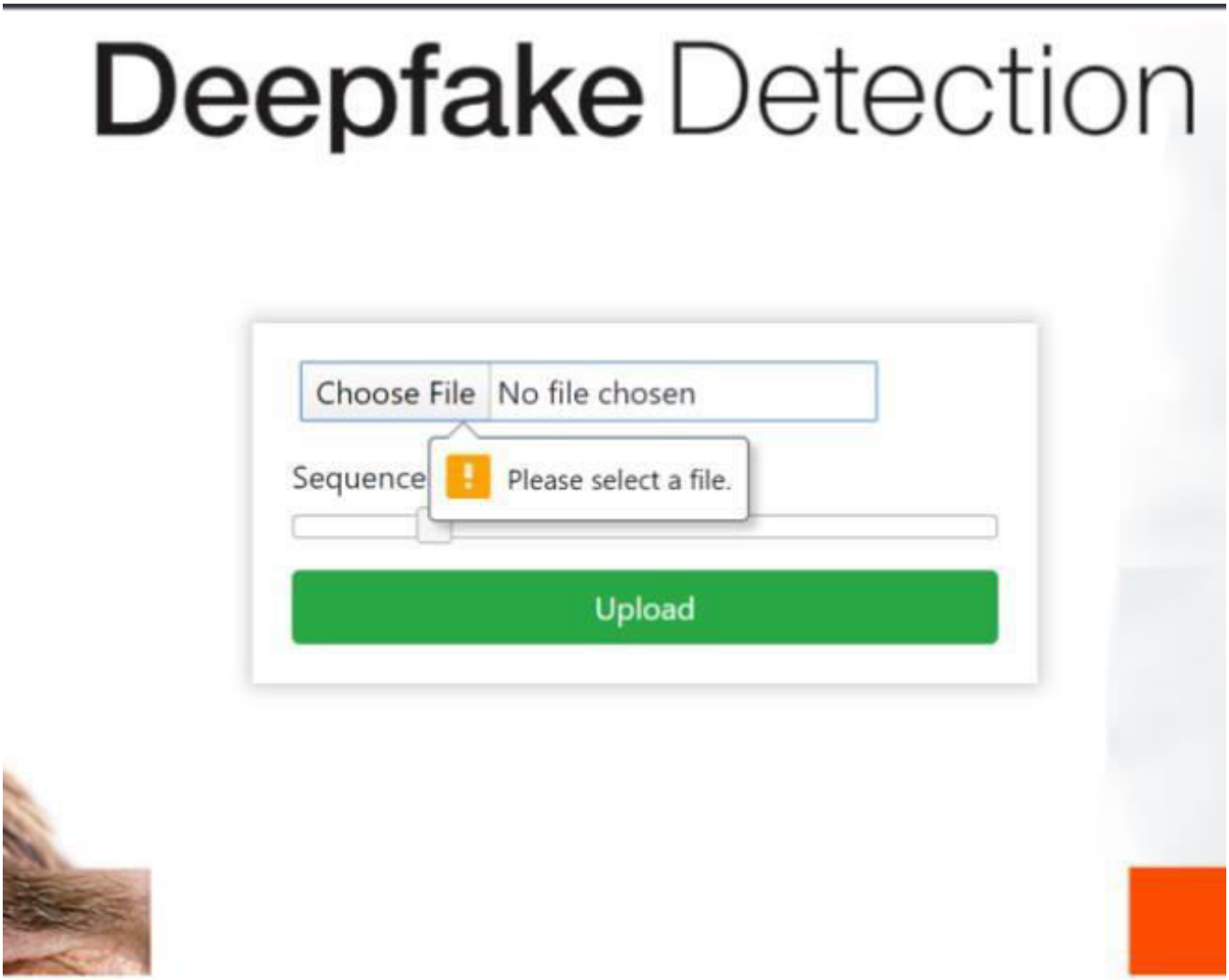
The dataset is the collection of data that is used to train and evaluate the machine learning model. It typically includes features such as age, gender, medical history, lifestyle factors, and other relevant information that may contribute to the risk of stroke.

Data preprocessing involves preparing the dataset for use in the machine learning model. This may include cleaning the data, removing outliers and errors, filling in missing values, and scaling or normalizing the data.

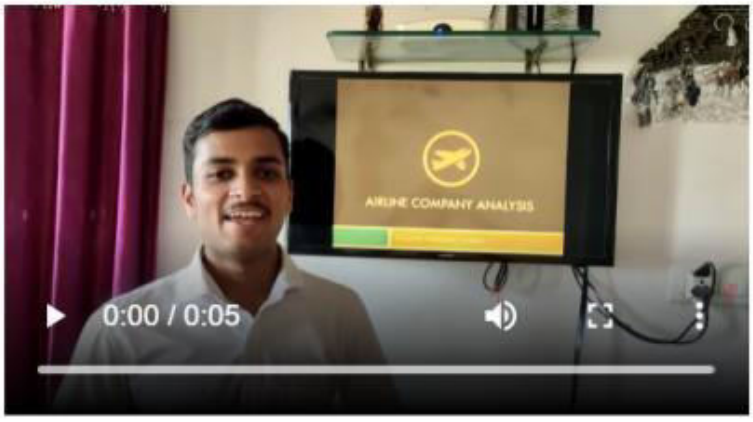
The training dataset is a subset of the overall dataset that is used to train the machine learning model. The model learns from the patterns in the training dataset to make accurate predictions.


Upload video
Training Flow
Prediction Flow
Preprocessing
Spliting video into frames
Face Detection
Face Cropping
Saving the face cropped video
Data-set (Fake / Real) videos
Processed Data-set
Contains only face video
Data Splitting
Train / Test data split
Data Loader
Loading the Train videos and labels
Train / Test the Model
Model Evaluation
Confusion Matrix
Deepfake detection Model
LSTM
Video classification
ResNext
Feature extraction
Load Trained Model
Export Trained Model
REAL / FAKE

**SNAPSHOTS**

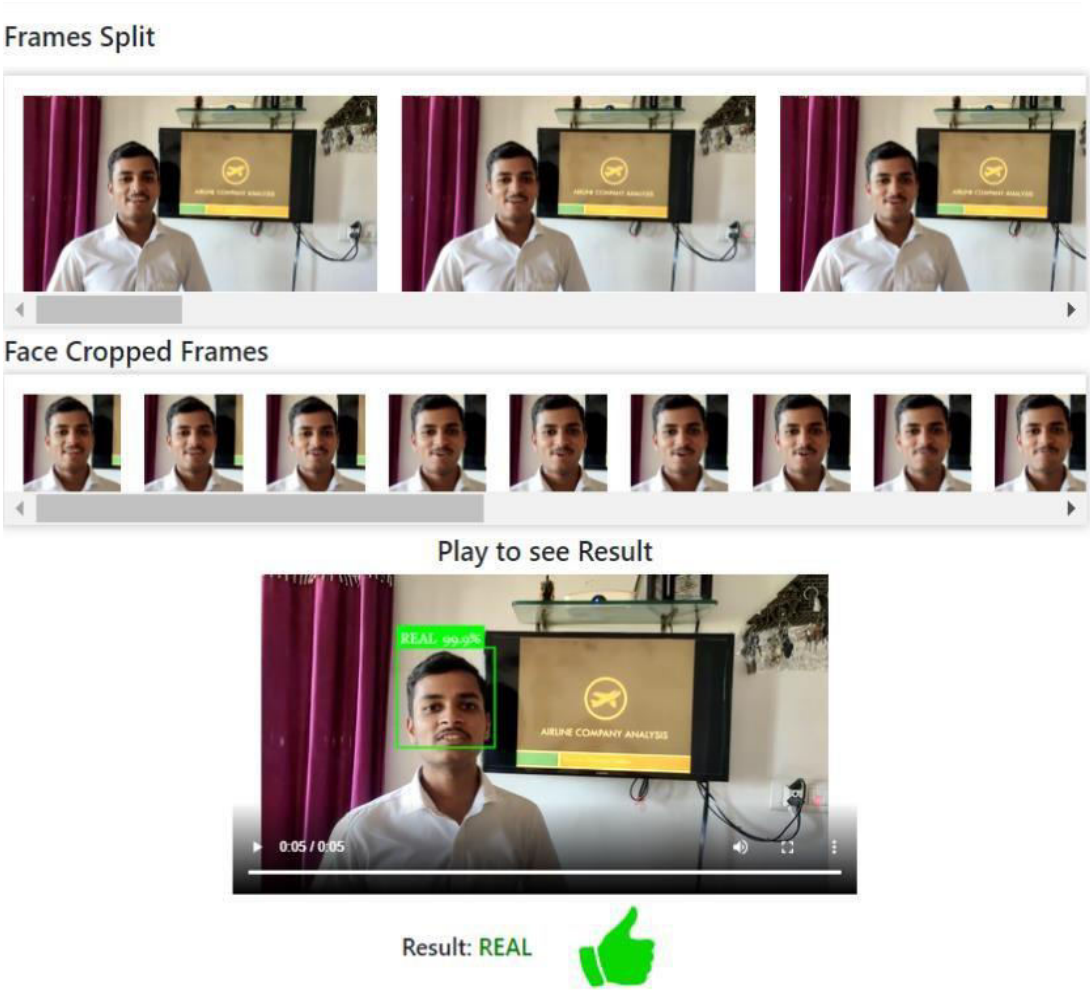

Deepfake Detection
Choose File
No file chosen
Sequence
Please select a file.
Upload

# Deepfake Detection




Sequence Length:20

Upload




## Conclusion

We presented a neural network-based approach to classify the video as deep fake or real, along with the confidence of proposed model. Our method is capable of predicting the output by processing 1 second of video (10 frames per second) with a good accuracy.

We implemented the model by using pre-trained Res Next CNN model to extract the frame level features and LSTM for temporal sequence processing to spot the changes between the t and t-1 frame

## References

[1] Andreas Rossler, Davide Cozzolino, Luisa Verdoliva, Christian Riess, Justus Thies,Matthias Nießner, “FaceForensics++: 10 Jun, 2023.

[2] Deepfake detection challenge dataset: https://www.kaggle.com/c/deepfake-detectionchallenge/data Accessed on 26 March, 2022.

[3] Yuezun Li , Xin Yang , Pu Sun , Honggang Qi and Siwei Lyu “Celeb-DF: A Large-scale Challenging Dataset for DeepFake Forensics”.

[4] Deepfake Video of Mark Zuckerberg Goes Viral on Eve of House A.I. Hearing : https://fortune.com/2019/06/12/deepfake-mark-zuckerberg/ Accessed on 26 March, 2023.

[5] 10 deepfake examples that terrified and amused the internet : https://www.creativebloq.com/features/deepfake-examples Accessed on 26 March, 2023.

## AUTHOR 1

Ms. SUNITHA. A M.E , Assistant Professor ,Department of Computer Science and Engineering at St. Joseph College of Engineering, Sriperumbudur, Chennai, Tamil Nadu.

## AUTHOR 2

Mr. Santhosh. A B.E., Student of Computer Science and Engineering at St. Joseph College of Engineering, Sriperumbudur, Chennai, TamilNadu. I had attended many Workshops, Seminars in Python, Machine Learning and Web Development .

## AUTHOR 3

Mr. P. Praveen Kumar B.E., Student of Computer Science and Engineering at St.Joseph College of Engineering, Sriperumbudur, Chennai, TamilNadu. I had attended many Workshops and Seminars in the area of Python and Machine Learning.