International Journal of Research Publication and Reviews

Journal homepage: www.ijrpr.com ISSN 2582-7421

Automated Detection of Deepfake Video Using Deep Learning Approaches

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ABSTRACT :

Information security fracture has increased video proposals in the digital world, and requires strong monitoring of the video material. The increase in harmful software has provided the plant for the production and distribution of fake videos. Deepfack technology creates serious threats to media integrity. This article suggests a Dypfech detection algorithm, especially the RSNET model, especially the Reset model to identify video. The method focuses on the accuracy and performance improvement by removing deep functions and implementing standard mathematical formulas.

Keywords: Deep learning, ResNet CNN model, Deepfake detection, Face recognition, Convolutional neural network, Forgery detection.

Introduction

The rise of video editing tools and deep learning has enabled the creation of highly realistic fake videos , posing threats across media, security and society. Deepfake videos , created using Generative Adversarial Networks (GANs), manipulate facial identities and expressions, making them hard to detect. These forgeries are increasingly used in malicious contexts, requiring effective detection mechanisms. This paper introduce a deep-learning solution focusing on extracting and analyzing frame-level features using CNN ResNet architetures.

Related works

Several studies have advanced Deepfake detection using various GAN-based models and datasets like Celeb-DF. Works include Cascade EF-GAN for facial expression editing, Interface GAN for semantic manipulation, and detection strategies involving landmark smoothing and face blending networks. Despite progress, challenges remain due to limited datasets and evolving Deepfake techniques.

Existing Methodology

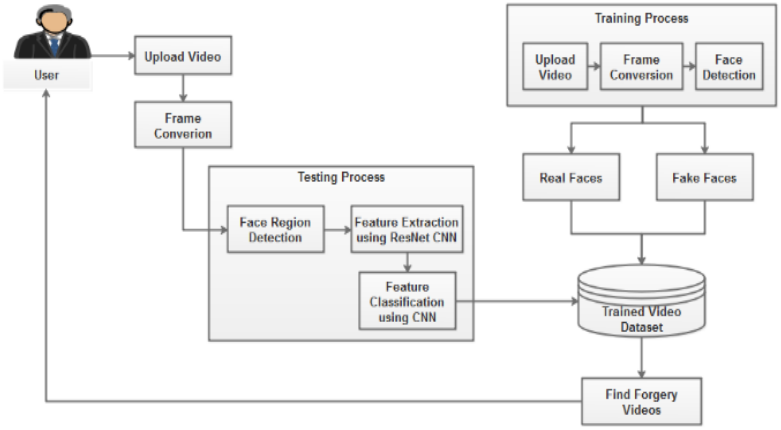
The Meta-Deepfake Detection (MDD) algorithm uses meta-learning to generalize across unseen domains. By splitting datasets into meta-train and meta-test sets, the model learns generalizable features to handle domain shifts, improving robustness without requiring updates for new domains.

Proposed Methodology

A hybrid CNN architecture is proposed for green Deepfake detection. It includes an in depth and incremental learning segment, followed by detection the usage of characteristic extraction and category degrees. The architecture makes use of inverted residual blocks and linear bottlenecks to maintain spatial capabilities whilst optimizing schooling time and memory usage. The spine CNN extracts capabilities which are categorised into real or faux via a secondary community.

5.Implementation

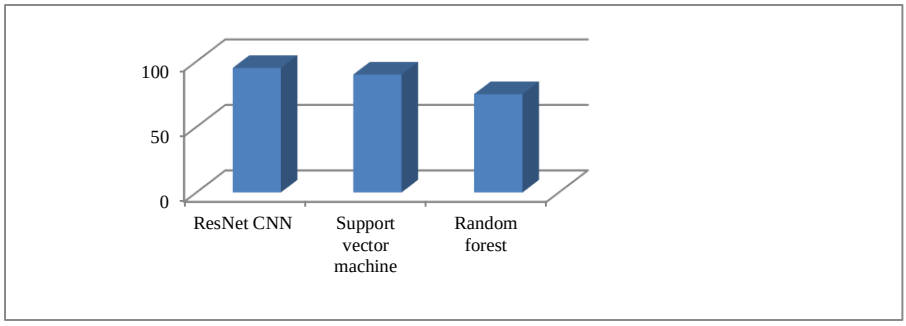
Using YOLO and ResNet architectures, the implementation entails training CNNs on labelled datasets. Residual connections in ResNet help mitigate vanishing gradients, permitting deeper and greater powerful fashions. Key steps include records preprocessing, architecture definition, training with various getting to know prices, and performance evaluation the usage of accuracy, precision, remember, and F1-rating

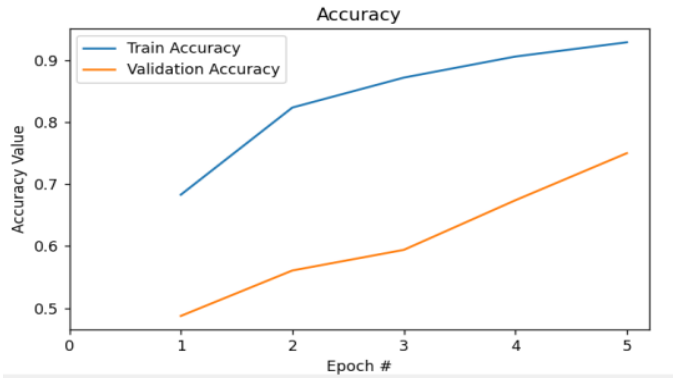


6.Experimental Results

1. The machine is tested on Deepfake datasets from Kaggle, accomplishing excessive accuracy. The proposed model outperforms SVM and conventional CNN techniques:

Algorithm	Accuracy
YOLO Algorithm	**95%**
Convolutional Neural Net	**90%**
Support Vector Machine	**75%**





Performance metrics like True Positive (TP), False Positive (FP), True Negative (TN), and False Negative (FN) were calculated. Precision, consider, and F1-score have been used to validate the version.

7.Conclusion

This study offers a strong Deepfake detection method the usage of hybrid CNN and Res Net architectures. The proposed approach successfully distinguishes real from forged films the usage of deep gaining knowledge of techniques. It gives a scalable solution for first-line protection against AI-generated forgeries, improving detection accuracy over traditional models.

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