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AI Based Fake Images and Videos Detection Using Deep Learning Model

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Abstract: *The rapid growth of artificial intelligence has led to the development of advanced technologies capable of generating highly realistic fake images and videos, commonly known as deepfakes. Although these technologies have useful applications in entertainment, education, and digital media, they can also be misused for spreading misinformation, identity theft, fraud, and other cybercrimes. This paper presents an AI-based fake image and video detection system using deep learning models such as InceptionV3, EfficientNet, and a Hybrid model. The proposed system preprocesses input images and video frames through resizing, normalization, and data augmentation to improve model performance. The trained models extract meaningful visual features and classify the uploaded media as real or fake. The Hybrid model combines the strengths of InceptionV3 and EfficientNet to achieve improved feature extraction and higher classification accuracy. The performance of the proposed system is evaluated using standard metrics such as accuracy, precision, recall, and F1-score. Experimental results demonstrate that the Hybrid model outperforms the individual models in detecting manipulated media. The proposed approach provides an efficient, accurate, and reliable solution for identifying AI-generated content and helps improve the authenticity, security, and trustworthiness of digital media across various online platforms.*

Keywords: Artificial Intelligence, Deep Learning, Deepfake Detection, InceptionV3, EfficientNet, Hybrid Model, Image Classification, Video Analysis

1. INTRODUCTION

Artificial Intelligence (AI) has revolutionized digital media by enabling the creation of highly realistic images and videos using advanced deep learning techniques. These AI-generated media, commonly known as deepfakes, are widely used in entertainment, education, advertising, and digital content creation. However, the increasing misuse of deepfake technology for spreading misinformation, identity theft, digital fraud, and fake news has become a serious challenge. As the quality of AI-generated content continues to improve, distinguishing manipulated media from authentic content has become increasingly difficult through manual inspection.To overcome this challenge, automated detection systems based on deep learning have gained significant attention. Deep learning models can identify hidden visual patterns and inconsistencies that are often difficult for humans to recognize. This research proposes an AI-based fake image and video detection system using InceptionV3, EfficientNet, and a Hybrid model. The proposed system preprocesses the input data through resizing, normalization, and data augmentation before extracting meaningful features for classification. The Hybrid model combines the strengths of InceptionV3 and EfficientNet to improve feature extraction and classification accuracy. The trained system analyzes uploaded images and video frames and classifies them as real or fake. This approach provides an efficient, accurate, and reliable solution for detecting AI-generated media, helping improve digital security, content authenticity, and user trust across various online platforms.

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METHODOLOGY

This research presents an AI-based fake image and video detection system using deep learning models such as **InceptionV3, EfficientNet, and a Hybrid model**. The methodology begins with collecting a dataset containing both real and AI-generated images and videos from publicly available sources. The dataset is divided into training, validation, and testing sets to ensure accurate model learning and evaluation. Before training, the data is preprocessed by resizing images and video frames, normalizing pixel values, and applying data augmentation techniques such as rotation and flipping. These preprocessing steps improve image quality, reduce overfitting, and enhance the model's ability to recognize manipulated content. The processed dataset is then used to train the InceptionV3 and EfficientNet models individually. The trained model extracts meaningful visual features and classifies the uploaded media as either **real** or **fake**. The system performance is evaluated using standard metrics, including **accuracy, precision, recall, F1-score, and confusion matrix**. The proposed methodology provides an efficient, accurate, and reliable approach for detecting AI-generated images and videos, making it suitable for real-world digital media verification.

MODELING AND ANALYSIS

Sr.no	Materials/Tools	Purpose/Usage
1	Python	Core programming language for developing the AI Detection application.
2	Django	Builds the web application.
3	HTML, CSS, JavaScript	Designs the User Interface.
4	SQLite3	Stores user and predicted data.
5	InceptionV3, EfficientNet, and Hybrid Deep Learning Models	Detects and classifies fake images and videos with high accuracy.

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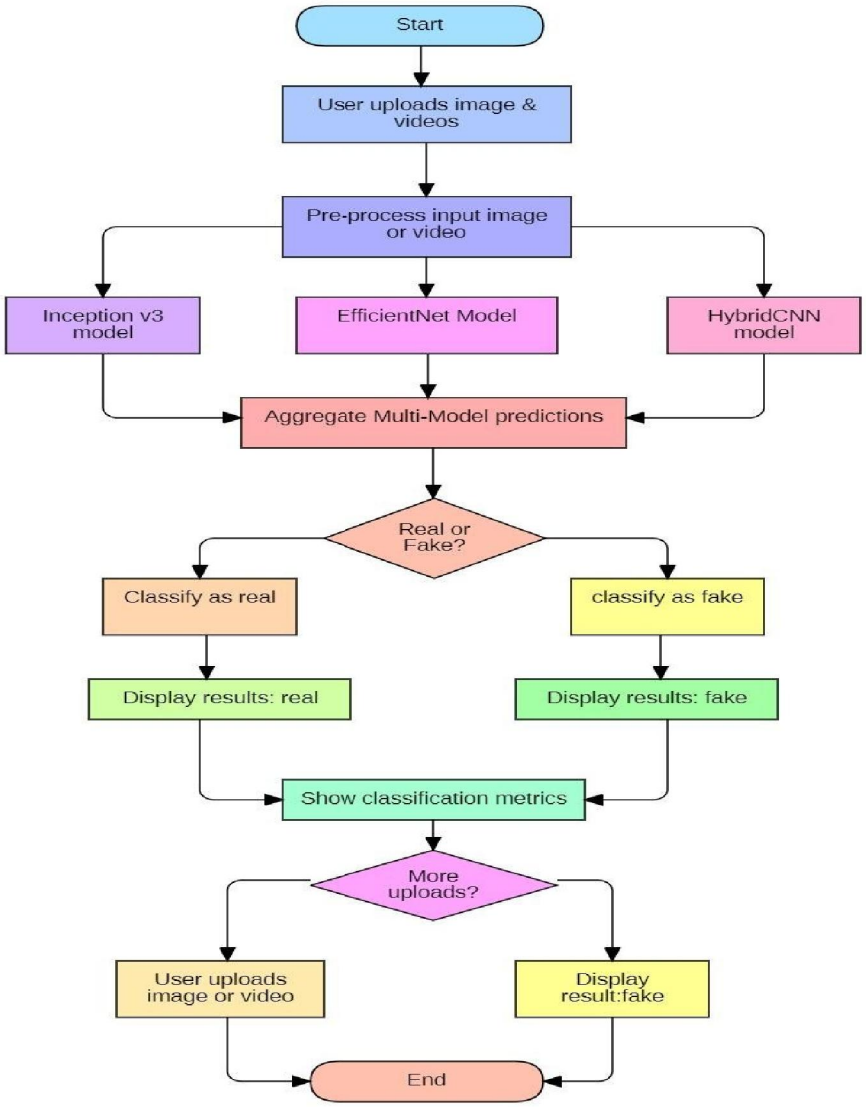
FLOW DIAGRAM



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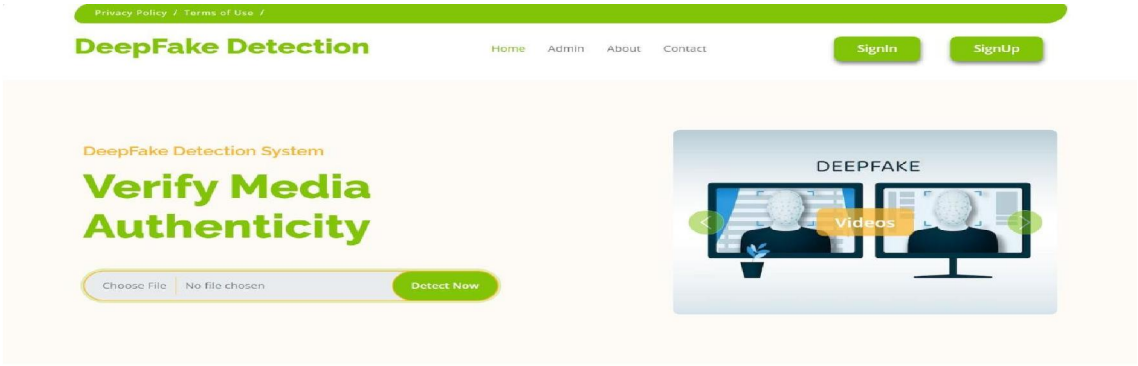
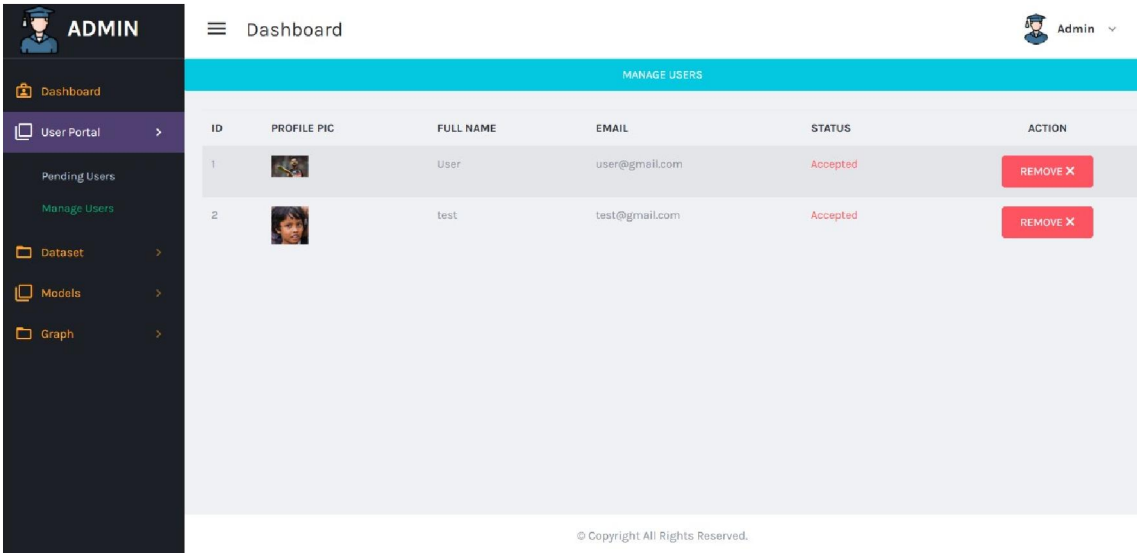
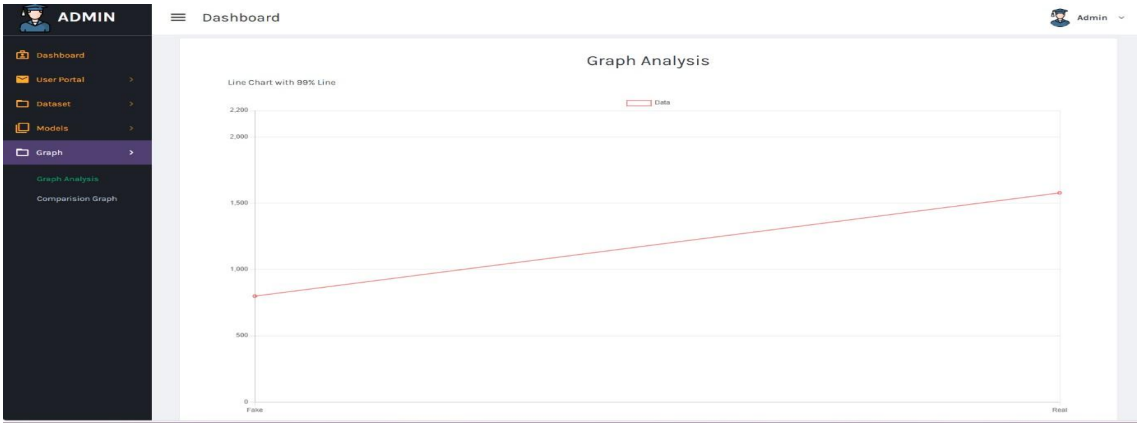
SNAPSHOTS







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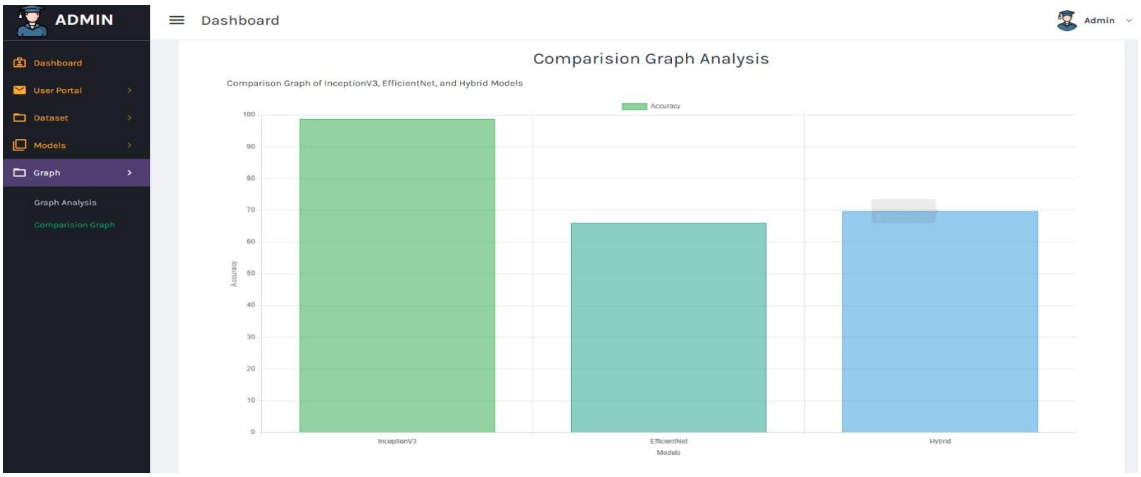

II. CONCLUSION

This research presented an AI-based fake image and video detection system using deep learning models, namely InceptionV3, EfficientNet, and a Hybrid model. The proposed approach effectively identifies manipulated digital media by extracting meaningful visual features and classifying content as real or fake. Comparative analysis showed that the Hybrid model achieved better performance than the individual models in terms of detection accuracy and robustness. The developed system provides a reliable and efficient solution for detecting AI-generated media through a user-friendly interface. This work contributes to improving the authenticity and security of digital content and can support applications in social media, digital forensics, journalism, and online content verification.

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