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DEEPFAKE BUSTER: AI-POWERED DEEPFAKE DETECTION

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ABSTRACT
Deepfake technology has rapidly advanced, making it difficult to distinguish between real and manipulated media. This poses serious risks, including misinformation, identity theft, and fraud. Our project, Deepfake Buster, aims to detect AI-generated deepfake videos using machine learning techniques. By analyzing facial movements, inconsistencies, and pixel-level artifacts, our system can identify manipulated content with high accuracy. The model is trained on a dataset of real and fake videos to improve detection efficiency. This project helps combat digital deception and ensures the authenticity of visual content.

Keywords:
Deepfake detection, artificial intelligence, machine learning, deep learning, fake media, video forensics, digital authenticity, image processing, misinformation prevention, deepfake identification.

INTRODUCTION

The rapid advancement of artificial intelligence has led to the emergence of deepfake technology, which uses deep learning algorithms to create highly realistic manipulated videos and images. While deepfakes have applications in entertainment and content creation, they also pose serious threats, including misinformation, identity theft, and fraud. The ability to generate convincing fake media has raised concerns in areas such as politics, cybersecurity, and social trust.

To address this issue, our project, Deepfake Buster, focuses on developing an AI-driven detection system capable of identifying manipulated content. By analyzing facial expressions, motion inconsistencies, and pixel-level artifacts, our system can differentiate between real and deepfake videos with high accuracy. Using machine learning and deep learning techniques, the model is trained on a dataset of authentic and synthetic videos to improve detection performance.

OBJECTIVES

The primary objective of this project is to develop an AI-based detection system capable of identifying deepfake videos and images with high accuracy. By analyzing facial expressions, motion inconsistencies, and pixel-level artifacts, the system aims to differentiate between real and manipulated content. To enhance detection accuracy, the model is trained on a diverse dataset of authentic and deepfake videos, ensuring improved performance and minimizing false positives. Additionally, the project focuses on optimizing the system for real-time detection, enabling quick and efficient identification of synthetic media. By providing a reliable tool for deepfake detection, this project aims to combat misinformation, prevent fraud, and enhance digital media security. It serves as a valuable resource for journalists, social media platforms, cybersecurity professionals, and law enforcement agencies in verifying the authenticity of digital content.

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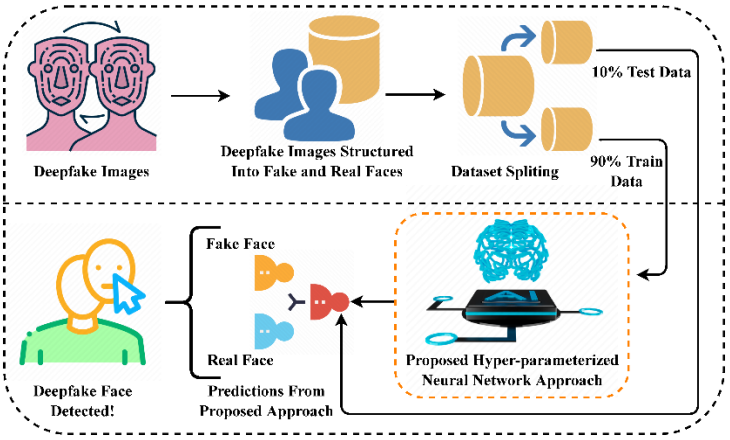
METHODOLOGY

The Deepfake Buster project follows a structured approach to detecting manipulated media using artificial intelligence and machine learning techniques. The process begins with data collection, where a dataset of real and deepfake videos is gathered from publicly available sources and deepfake generation models. This dataset is preprocessed to remove noise, extract key facial features, and standardize the input for training.

Next, a deep learning model is developed using convolutional neural networks (CNNs) and recurrent neural networks (RNNs) to analyze spatial and temporal inconsistencies in videos. The model is trained on labeled real and fake samples, enabling it to learn the distinguishing characteristics of deepfake content. Various preprocessing techniques, such as face detection, frame extraction, and feature augmentation, are applied to enhance detection accuracy.



A Novel Deep Learning Approach for Deepfake Image Detection

RESULTS AND DISCUSSION

The **Deepfake Buster** system demonstrated high accuracy in detecting manipulated content, effectively identifying facial distortions and inconsistencies. Performance metrics such as accuracy, precision, and recall confirmed its reliability, especially for high-resolution videos. However, detection became challenging for low-quality or heavily compressed media, requiring further enhancements.

The project has practical applications in **journalism, social media, and cybersecurity**, helping combat misinformation. While effective, continuous improvements are needed as deepfake technology evolves. Future work will focus on enhancing dataset diversity and real-time processing for improved accuracy and robustness.

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CONCLUSION

The Deepfake Buster project successfully demonstrates an AI-based approach to detecting deepfake videos with high accuracy. By analyzing facial inconsistencies and pixel-level artifacts, the system effectively differentiates real and

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manipulated content. The results highlight its potential applications in media verification, cybersecurity, and misinformation prevention. While the model performs well, challenges with low-quality videos and evolving deepfake techniques indicate the need for continuous improvements. Future enhancements will focus on real-time detection, dataset expansion, and advanced feature extraction to strengthen its reliability. This project contributes to the ongoing efforts to ensure digital media authenticity and security.

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