Facial Expression Recognition in Dynamic Environments:Using Hybrid Approach

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PROBLEM STATEMENT

Developing an advanced enhances Facial Expression Recognition (FER) in real-world scenarios by leveraging advanced techniques like transfer learning, data augmentation, and ensemble modeling.

ABSTRACT

This project advances Facial Expression Recognition (FER) by implementing deep learning models, achieving a groundbreaking 75.8 percent accuracy on the FER2013 test set. We also developed a mobile web application that runs FER models on edge devices in real-time, ensuring their applicability in dynamic, resource-constrained environments. Our work bridges the gap between academic research and real-world deployment, focusing on robustness in varying conditions like lighting, occlusions, and multi-person scenarios.

OBJECTIVES

1. Achieve top FER accuracy and deploy models in real-time on edge devices.
2. Enhance model robustness for dynamic conditions like lighting variations and occlusions.

METHODS

Implement deep learning models, including CNNs, for improved FER accuracy. Utilize transfer learning, data augmentation, and ensemble modeling for enhanced performance

RESULTS

Achieved accurate emotion recognition for expressions such as Surprise and Disgust. Demonstrated robust performance across dynamic environments, including lighting variations and occlusions.

RESULTS

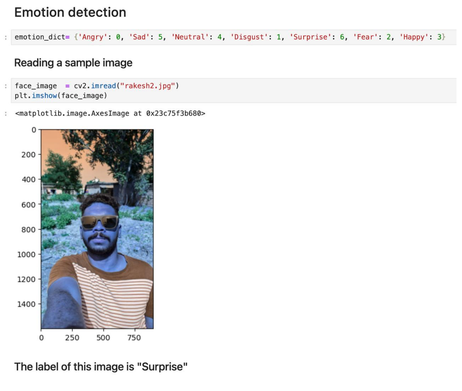

Figura 1:EMOTION DETECTION

SAMPLE EXPRESSIONS USED

Figura 2:TYPICAL FACIAL EXPRESSIONS

CONCLUSION

This project successfully advances FER by achieving high accuracy and enabling real-time deployment on edge devices in dynamic environments.

CHALLENGES

The main challenges include ensuring high accuracy in real-world scenarios with varying lighting, occlusions, and multiple subjects. Additionally, deploying FER models in real-time on edge devices with limited computational resources posed significant hurdles.

APPROACHES

CNNs, Transfer Learning, Data Augmentation, Ensemble Modeling

FUTURE WORKS

CNNs, Transfer Learning, Data Augmentation, Ensemble Modeling The futher work will focus on improving model accuracy through facial landmark detection, integrating the arousal-valence emotional model, and expanding the dataset for better real-world applicability. Additionally, further exploration of multi-label classification and addressing ethnicity bias in FER datasets will be prioritized