

Face Mask Detection with Live Alert System

Introduction

Face Mask Detection with Live Alert System is a real-time computer vision project that aims to monitor mask compliance in public or private spaces. Using machine learning, particularly CNNs, the system detects faces through webcam and classifies them as 'with mask' or 'without mask'. This project is crucial in the post-pandemic era for health safety and monitoring.

Abstract

This project utilizes a Convolutional Neural Network (CNN) to classify whether individuals are wearing a mask in a live video stream. The model is trained on a labeled dataset of face images and deployed using OpenCV for real-time webcam integration. An alert (visual or sound) is triggered when a person without a mask is detected.

Tools Used

- Python
- TensorFlow & Keras
- OpenCV
- NumPy & Matplotlib
- Haar Cascades (for face detection)
- Optional: Streamlit or Flask for deployment

Steps Involved in Building the Project

1. Dataset collection (with_mask and without_mask images).
2. Preprocessing: resizing, normalizing images.
3. Model building using Keras (CNN architecture).
4. Training and validation of model.
5. Real-time detection using webcam and OpenCV.
6. Sound alert integration for 'no mask' detection.
7. Optional: Web-based deployment using Streamlit/Flask.

Conclusion

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The Face Mask Detection project provides a practical solution for monitoring mask usage in real-time. With the use of deep learning and computer vision, it demonstrates an impactful application of AI for public safety. The system is scalable and can be enhanced with features like cloud deployment and mobile integration.