

Face Mask Detection with Live Alert System

1. Introduction

The COVID-19 pandemic brought forward the urgent need for preventive measures such as wearing face masks. To ensure compliance in public areas, real-time mask detection systems became a vital tool. This project aims to detect whether individuals in a video are wearing face masks using deep learning, and generate a sound alert if someone is not wearing one.

2. Abstract

This project focuses on developing a face mask detection system that works on pre-recorded video files. Using OpenCV and a deep learning model trained with Keras and TensorFlow, the system identifies faces in video frames and classifies them as "Mask" or "No Mask." A sound alert is triggered if a person without a mask is detected. The project uses Haar Cascade for face detection and MobileNetV2 for efficient classification.

3. Tools Used

- **Programming Language:** Python 3.10 version
- **Libraries:**
 - OpenCV (for face detection and video processing)
 - TensorFlow & Keras (for model training and prediction)
 - NumPy (for numerical operations)
 - Pygame (for playing alert sounds)
- **Model Architecture:** MobileNetV2
- **Face Detection:** Haarcascade Classifier (OpenCV built-in)

4. Steps Involved in Building the Project

1. Dataset Preparation:

- Dataset URL : <https://www.kaggle.com/datasets/shiekhburhan/face-mask-dataset>
- Collected images of people with and without face masks.
- Organized into folders: with_mask and without_mask.

2. Model Training:

- Used MobileNetV2 as base.
- Fine-tuned the model using Keras with the prepared dataset.
- Saved as mask_detector.model.h5.

3. Face Detection:

- Used Haar Cascade Classifier to detect faces in each video frame.

4. Prediction & Alert:

- Each detected face is classified using the trained model.
- If "No Mask" is detected, a beep sound (alert.wav) is played.

5. Video Testing:

- System tested using .mp4 video files.
- Output shows bounding boxes with labels and real-time alert.

Aim:

This project aims to detect whether individuals in a video are wearing face masks using deep learning, and generate a sound alert if someone is not wearing one.

Conclusion

The Face Mask Detection with Live Alert System provides an efficient way to monitor mask compliance in public places using video analysis. It removes the need for manual surveillance, enhances safety, and can be integrated into security or CCTV systems. This solution is scalable, cost-effective, and can operate even on resource-limited systems without requiring a webcam.