Face Mask Detection Using Deep Learning

Introduction

The outbreak of COVID-19 highlighted the importance of wearing masks to prevent the spread of the virus.

Face mask detection using deep learning is a powerful computer vision application that helps monitor and ensure safety compliance in public spaces.

This project uses a trained neural network to detect whether individuals in an image are wearing masks or not.

Abstract

This project aims to automate the process of detecting people wearing face masks in real-time or on images using deep learning and computer vision.

Using a convolutional neural network trained on a labeled dataset of masked and unmasked faces, the system accurately classifies faces and helps identify non-compliance.

Tools Used

- Python 3.x
- OpenCV
- Keras with TensorFlow backend
- Haar Cascade Classifier (for face detection)
- Trained CNN model (mymodel.h5)

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- Jupyter Notebook / Any Python IDE

Steps Involved in Building the Project

1. Data Collection: Gather a dataset of images with and without face masks.
2. Data Preprocessing: Resize images, normalize pixel values, and augment data.
3. Model Building: Build a CNN using Keras and train it on the dataset.
4. Face Detection: Use Haar Cascade to detect faces in an image.
5. Prediction: Feed each detected face into the trained CNN and classify as MASK or NO MASK.
6. Visualization: Display the image with bounding boxes and labels.

Conclusion

This face mask detection system is an effective tool for enforcing public health measures.

By combining classical computer vision techniques with deep learning, the system can accurately monitor mask compliance in a variety of settings.

Future improvements could include real-time video detection and mobile app integration.