Face Mask Detection using Convolutional Neural Network

Project Overview

This project implements a deep learning based face mask detection system using a convolutional neural network. The goal is to automatically identify whether a person is wearing a face mask or not based on image data.

Dataset Description

The dataset consists of labeled images of faces with masks and without masks. Images are collected under different lighting conditions angles and backgrounds to improve model robustness.

Data Preprocessing

Images are resized normalized and converted into numerical arrays suitable for convolutional neural networks. Data generators are used to efficiently load and preprocess image batches during training.

CNN Architecture

The convolutional neural network is designed with multiple convolution and pooling layers to extract spatial features from images. Fully connected layers are used for final classification.

Model Compilation

The model is compiled using the Adam optimizer and binary crossentropy loss function which is suitable for binary classification tasks. Accuracy is used as the evaluation metric.

Model Training

The CNN model is trained for multiple epochs using training and validation datasets. Training performance is monitored to ensure stable learning and to reduce overfitting.

Model Evaluation

After training the model is evaluated on a test dataset to measure its performance on unseen images. Evaluation results demonstrate the effectiveness of CNNs for face mask

detection.

Prediction System

The trained model can predict whether a face mask is present in new images by analyzing learned facial features.

Key Takeaways

This project demonstrates how convolutional neural networks can be applied to real world image classification problems related to public health and safety.

Author

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