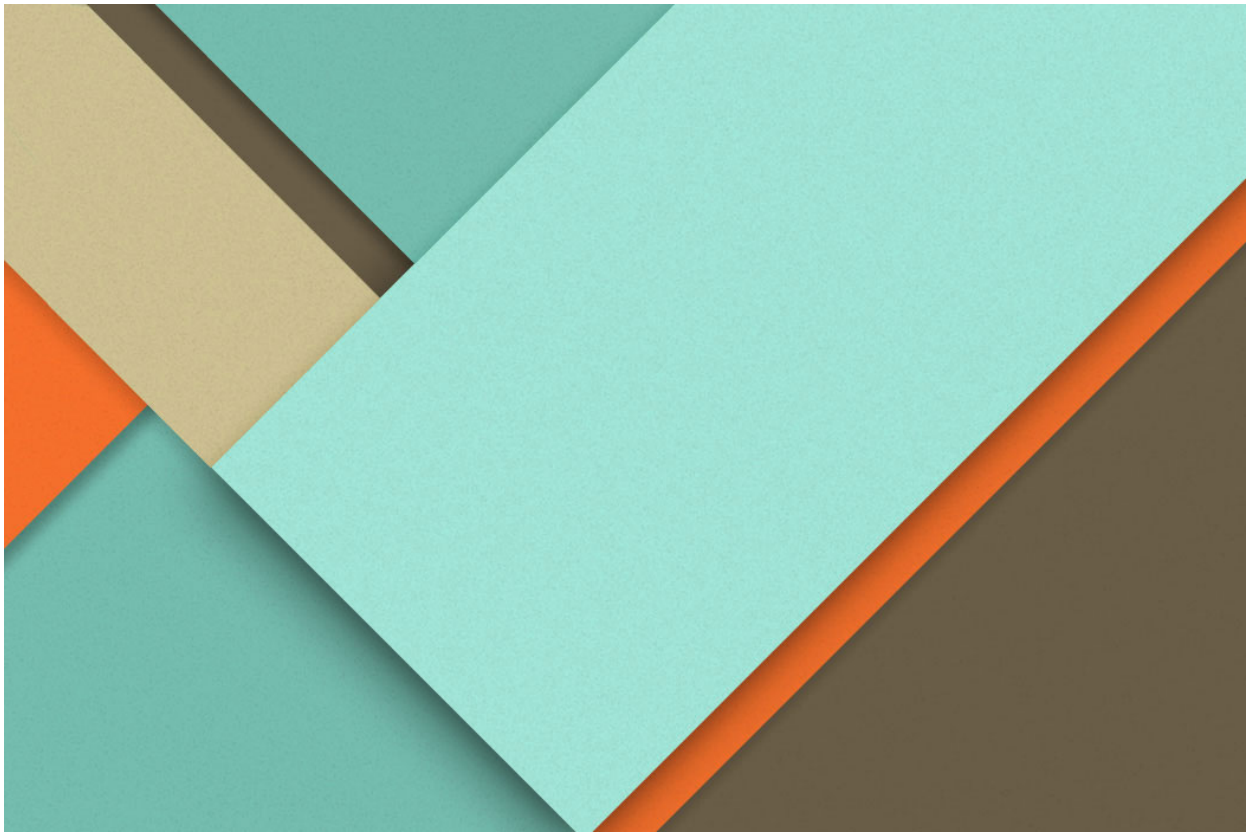

Masked face recognition

—

Abhishek Kumar

JNU, new delhi -110067

Overview

A contactless delivery cabinet is an important courier self-pickup device, for the reason that COVID-19 can be transmitted by human contact. During the pandemic period of COVID-19, wearing a mask to take delivery is a common application

scenario, which makes the study of masked face recognition algorithm greatly significant. A masked face recognition algorithm based on attention mechanism is proposed in this paper in order to improve the recognition rate of masked face images. First, the masked face image is separated by the local constrained dictionary learning method, and the face image part is separated. Then, the dilated convolution is used to reduce the resolution reduction in the subsampling process. Finally, according to the important feature information of the face image, the attention mechanism neural network is used to reduce the information loss in the subsampling process and improve the face recognition rate. In the experimental part, the RMFRD and SMFRD databases of Wuhan University were selected to compare the recognition rate. The experimental results show that the proposed algorithm has a better recognition rate.

intoduction

1. The contactless delivery scene is becoming increasingly normal, since COVID-19 can be transmitted by contact. In the scene of contactless express delivery, a self-pickup cabinet is an important piece of terminal express delivery equipment, and face recognition is one of the effective ways to achieve contactless express delivery. During the pandemic of COVID-19, nearly everyone wears masks, which makes the traditional face recognition technology almost ineffective on face recognition self-pickup cabinets. Therefore, it is greatly urgent to improve the performance of existing face recognition technology for face mask recognition.

Milestones

Face Recognition Algorithm Using Attention Mechanism

The overall network structure proposed in this paper uses two paths for secondary sampling, rather than the traditional U-shaped structure. Dilated convolution is used to obtain more detailed information. ResNet is used to extract features from feature context information, so as to obtain a larger sensory field of vision. Meanwhile, attention modules are designed to improve accuracy by imitating human visual mechanisms. Finally, a feature

fusion module is designed to integrate the collected features of different sensory fields to obtain better results.

(1) Dilated Convolution. In order to improve the resolution while maintaining a fixed field of view, the algorithm in this paper uses dilated convolution in the spatial information path.

(2) Attention Mechanism. An attention mechanism is adopted in this paper in order to make up for the loss of details caused by subsampling and better guide model training. It can enhance the target features and suppress the background through the weighted processing. The target features here are the contour and texture information of the eyes, eyebrows, and face due to the features of the face of the mask. The attention mechanism is mainly composed of spatial attention mechanism, channel attention mechanism, and pyramid attention mechanism,

(3) Spatial Attention Mechanism. The mechanism of spatial attention is mainly put forward by imitating human visual mechanisms. When the human eye sees an image, it automatically gives greater attention to key locations. When you see a rabbit, for example, you pay more attention to the rabbit's ears. Therefore, different parts of the image feature map should have different weights

4) Channel Attention Mechanism. Each channel of the feature map extracted by convolutional neural network (CNN) represents an image feature, such as texture and shape. The target features here are the contour and texture information of the eyes, eyebrows, and face due to the features of the face of the mask. In the image, each feature contains different information, and its contribution to image segmentation is also different. Therefore, different attention should be paid to each different feature. and different weights should be assigned. Channel attention mechanism is designed to assign weight to features so that the network can focus on important features.

5)Pyramid Attention Mechanism. Human vision tends to integrate a variety of information when discriminating objects. For example, distinguishing a rabbit from a cat pays more attention to the shape of its ears, and distinguishing a panda from a bear pays more attention to its color. It can be seen that different features in different positions on the feature map should receive different attention. In order to obtain different information of different positions of image better, a pyramid type attention model is proposed. By

Python Code using data science and machine learning

Implementing a complete masked face recognition system with an attention mechanism in Python is a complex task that requires expertise in deep learning and computer vision. Below is an outline of the code structure for such a system, but please note that the implementation details can vary based on your specific approach and chosen libraries.Extracting the feature map of different perceptual fields, the image information under different perceptual fields is obtained. This information was fused to obtain the final weight coefficient,