



CNN BASED DETECTION OF EMOTION, AGE, GENDER

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Abstract— Face is one of the most dominant points in our body. We can get many statistics like age, gender, and many others by means of inspecting the face of a human. In today's world, laptop imaginative and prescient is been used to teach machines to know and recognize the actual world. Using numerous digital pix from webcam, videos, cameras and with the assist of deep learning, computer systems can efficiently determine out and classify objects and then reply to what they “see” in actual world. There are a number of uses of figuring out age and gender from face like forensic testing, limiting get entry to of alcohol from wending computing device and person content material for younger people. Emotion from a face can be used to predict human laptop interaction, students/teacher's activity in class, commercial bots etc.

I. INTRODUCTION

Face detection is a technique of recognizing if there is a face in an picture or now not which is additionally referred to as as object detection. OpenCV is broadly used for object detection. The intention of face emotion evaluation is to discover and perceive the distinctive kinds of thoughts of a man or woman such as happy, sad, anger, confused, surprise, etc. A gender categorizing mannequin makes use of face from a given photograph to predict the gender (male or female) primarily based on their look like baldness, lengthy hair, beard and mustache .In age classification, we classify primarily based on wrinkles, hair colour and additionally measurement of face etc. Deep mastering which is a subset of laptop studying that makes use of various layers neural community to again and again achieve greater stage of facets from the given enter images. The notion of deep studying used to be stimulated via how neurons characteristic in our Genius consequently it's additionally known as deep neural network. A neural community is a sequence of technique that is succesful to perceive hidden relationships in a set of information and the manner is comparable to the operation of human brain. We use a deep studying mannequin referred to as convolutional neural network which takes enter pictures and allocate significance (learnable weights and biases) to distinctive aspects/objects in an

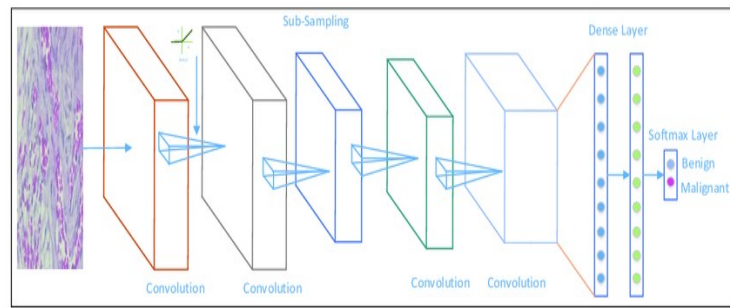
picture and additionally succesful of differentiating one from the other. When in contrast to different classification algorithms, the pre-processing required in a ConvNet is comparitively lesser.

II .LITERATURE SURVEY

Imane et al. [2] proposed a face detection machine the use of HAAR cascades, normalization and emotion detection the usage of CNN on FER 2013 (KNN) for classifying and Uniform Local Gabor Binary Pattern Histogram Sequence (ULGBPHS) for sample scanning. The mannequin used four distinctive computer mastering techniques (SVM, KNN, Random Forest and Classification & Regression Trees) and precise accuracy prices i.e. 70% at 106 epochs was once got via the use of KNN and SVM algorithms. This model can be made higher with the aid of the use of no laptop language algorithms as well. A higher proposition is achieved through Rajesh et al. [4]. Here, actual time emotion detection used CNN with 9 layers for coaching and categorizing 7 exclusive sorts of feelings which offers an accuracy of round 90%. Sepidehsadat et al. [3] proposed that the use of a Gabor filter will make it simpler for the community to center of attention on the face as the output orientations fit the face wrinkles flawlessly which in flip will be an enter to the CNN. The community focuses on the beneficial elements giving a 7 percentage age-accuracy and two percentage gender accuracy. Ari Ekmekji [4] developed a mannequin that built-in inter-relationships linking age and gender to bind these architectures to enhance general outcome. The shortcomings had been the subject in dividing the facts into folds, instruct every classifier, cross-validate, and merge the ensuing classifiers into a test-ready classifier.

III.WORKING

Keras library is a neural community library and additionally a high level API which is open supply written the usage of python and which is constructed on tensor flow. Keras has a variety of features which is commonly used for neural-network constructing blocks such as optimizers, objectives, layers and has in-built equipment which makes processing of the photograph a whole lot less difficult and additionally to decrease the coding section which is required for imposing deep neural community code.



Workflow of convolutional neural network

A. EMOTION DETECTION:

FER2013 is a Kaggle dataset that incorporates labeled 3589 check images, 28709 educate images. We don't have to do information augmentation due to the fact the dataset has been constructed with vast vary of images. The database holds grayscale pics of human faces. We don't use switch mastering due to the fact our dataset consists of grayscale photos and doesn't healthy in three channels pre-trained Models. We use three convolutional layers. Input [48x48x1] includes the pixel values of given image. Hence snap shots have width equal to 48, peak equal to 48, and with one colour channel.

- Step 1: Normalizing the data between 0 and 1.
- Step 2: We use 3 layers of convolution. for each layer, we do Batch Normalization, RELU activation function and use MaxPooling. In fully connected layer we use RELU activation function and SOFTMAX function.
- Step 3: By using Adam optimizer we calculate the loss function.
- Step 4: to use the trained model later, save the weights in fer.h5.

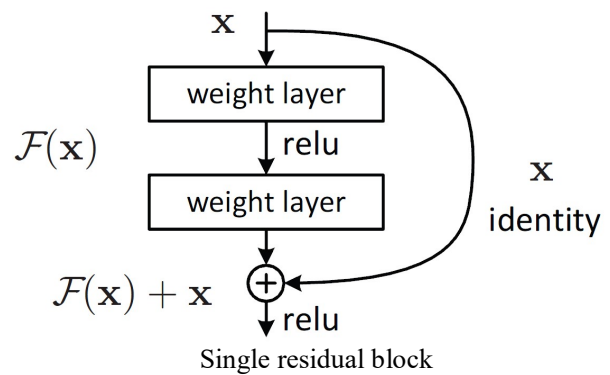
B. FACE DETECTION:

Haar cascade XML file which is a classifier used to become aware of a precise object from the webcam. The haarcascade_frontalface_default.xml furnished by way of OpenCV used to understand frontal face. OpenCV connects to the webcam which consumer can use to scan their faces for classification of age, gender and emotion.

C. AGE AND GENDER CLASSIFICATION:

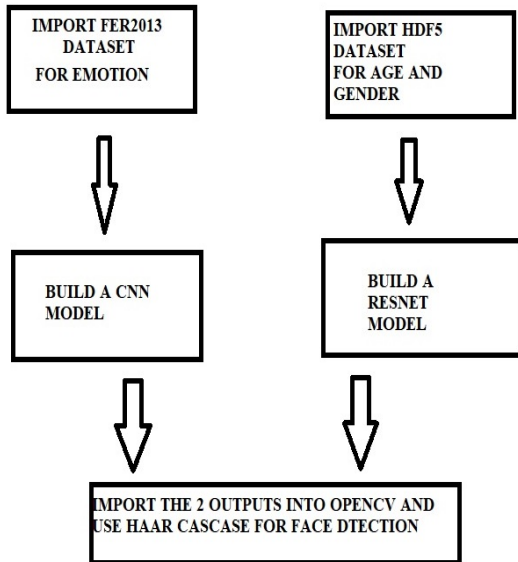
Here we use an hdf5 file as dataset which has 10,000 images.

The photographs have been labeled and labeled into male, woman and a number of age groups. Here we use resnet neural community structure to instruct this model. ResNet is used to add a giant wide variety of layers with sturdy performance.



A community containing residual blocks, every layer is an enter to the subsequent layer and also inputs into the layers about 2-3 hops away. If the wide variety of layers maintains increasing, we will word that the accuracy will have a tendency to saturate at sure factor and after a factor it will step by step decrease. This is now not simply due to the fact of over fitting. It idicates that shallow networks are higher at studying than deeper networks. So the skip-connections skips the coaching of few layers and are additionally referred to as residual connections as proven in above image. By such as omit connections in our community architecture, we are making the community to pass by education for the layers which are no longer useful and don't add a whole lot cost in common accuracy.

Blueprint of our model implementation



IV. CONCLUSION

Analysis of age, gender and emotion of face used to be completed on actual time the usage of webcam.

1. Bogdan Kwolok, "Face Detection Using Convolutional Neural Networks and Gabor Filters", Conference Paper- September 2005, Pg.No. - 1 to 5
2. Imane Lasri, Anouar Riad Solh & Mourad El Belkacemi, "Facial Emotion Recognition of Students using Convolutional Neural Network", IEEE-2019
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Training the mannequin at greater epoch cost yields better result. We have used resnet structure as an alternative of VGG16 for age or inception v3 for gender classification. Resnet helps in coping with the education error generated as the networks get deeper. We have been in a position to obtain 95% accuracy rate. Replacing VGG-16 layers in Faster R-CNN with ResNet, we can study a relative enhancement of 28%.

V. FUTURE SCOPE

1. Further, this mannequin can be used to classify sufferers and their drugs based totally on age groups.
2. It can additionally be used for film advice gadget in order to predict the frequency of a variety of age organizations who come to watch films the most and additionally to classify films into distinct genres primarily based on the viewers' emotion.

VI. REFERENCE

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