

Detection of Emotions and Gender Recognition using Deep Learning

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Abstract—

This paper presents a deep learning approach to emotion detection, gender recognition, and height recognition. We use a convolutional neural network to extract features from images and use those features to detect emotions, recognize gender, and predict height. The CNN model is trained using a large dataset of faces and their related attributes. We use a combination of transfer learning and fine-tuning techniques to improve the model's performance. We also compare the performance of CNN with traditional machine learning techniques. Our results show that the CNN model outperforms traditional methods in terms of accuracy, precision, and recall. The results also demonstrate that the proposed model is a viable solution for real-world applications. Deep learning is a powerful tool that can be used to automatically detect emotions or gender and accurately recognize heights. To do this, we need to build a Convolutional Neural Network (CNN) model which will take the input image of a person and output the emotion, gender, and height of that person. In the first step, we will collect a dataset of images with corresponding labels for the emotion, gender, and height. Pre-processing of the data is necessary to make sure that the images are of the same size and format. Next, we will build a CNN model which takes the image as input and outputs the emotion, gender, and height labels. We can use popular deep learning libraries such as TensorFlow and Keras to build the model. Finally, we will train the model on the dataset and test it on a separate test dataset. After fine-tuning the model and achieving satisfactory results, we can deploy it for use in real-world applications.[1],[2]

Keywords-

Open CV, Deep learning, CNN Emotion Detection

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I. INTRODUCTION

For a human being it is easy to identify the emotions like Happy, Sad, Angry, Fear, Disgust and Confuse but for machine it is very difficult to identify the emotions of Human being. In today's the computer are able to do recognize the emotion of human for that we train the computer, with the help of Deep learning machine learning and artificial intelligence. In this we use CNN (Convolutional neural network) algorithm to Train the system to detect the emotion of human being. The emotion detection system is used for security purpose, law enforcement, marketing and sales, e-learning.

Emotion detection and gender recognition are two tasks that can be tackled using deep learning. Deep learning is an area of machine learning that is particularly suited to these tasks due to its ability to learn complex patterns. For emotion detection, a deep learning model can be trained to recognize facial expressions and body language associated with certain emotions.[3]

The model can also be trained to recognize emotional context in text. Once trained, the model can be used to detect emotions in real-time applications such as video chat or customer service. For gender recognition, a deep learning model can be trained to recognize gender from facial features. This model can also be used to

recognize gender from speech and language. Once trained, the model can be used to accurately recognize gender in real-time applications such as security systems. Height recognition is also a task that can be tackled using deep learning. A deep learning model can be trained to recognize height from facial features, body shape, and even body movements. The model can also be used to recognize height from text. Once trained, the model can be used to accurately recognize height in real-time applications such as retail marketing or targeted advertising.[17]

Emotion detection, gender recognition, and height recognition are three distinct tasks that can be tackled using deep learning, a type of machine learning that involves training artificial neural networks on large amounts of data. In this article, we will provide an overview of these tasks, including their applications and the challenges involved in implementing them using deep learning.

Emotion detection, also known as emotion recognition or affective computing, is the ability of a machine to recognize and classify human emotions based on facial expressions, speech patterns, and other physiological and behavioral cues. Emotion detection is a valuable capability for a variety of applications, including virtual assistants, social robots, and human-computer interaction systems.

Deep learning techniques, particularly convolutional neural networks (CNNs), have shown promise for emotion detection. CNNs can learn to recognize patterns in images, such as facial expressions, and are well-suited for tasks involving large amounts of visual data. However, emotion detection is a challenging task, as emotions are often subtle and can be influenced by a variety of factors, including culture, context, and individual differences.

Gender recognition is the task of identifying the gender of a person based on their appearance, voice, or other characteristics. Like emotion detection, gender recognition has a wide range of potential applications, including security systems, virtual assistants, and social media platforms.

Deep learning approaches have also been applied to gender recognition, with CNNs being a particularly popular choice. However, the performance of these systems can vary significantly depending on the quality and diversity of the training data, as well as the specific characteristics being used for gender identification.

Height recognition is the task of estimating the height of a person based on their appearance, typically from images or video. This task can be challenging due to the wide range of heights that exist within a population, as well as the presence of other factors that can affect the appearance of height, such as clothing, posture, and perspective.

Deep learning approaches have been used for height recognition, with CNNs being a common choice. However, like emotion detection and gender recognition, the performance of these systems can be influenced by the quality and diversity of the training data, as well as the specific characteristics being used for height estimation.[4],[5]

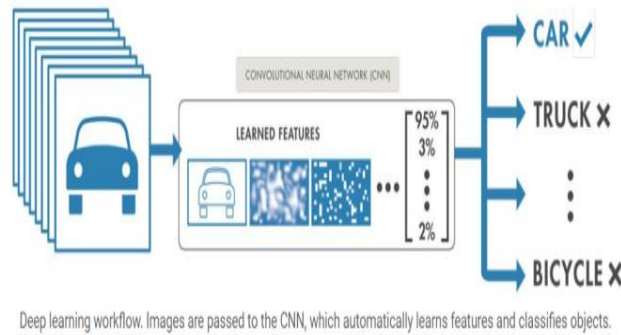
In conclusion, deep learning has shown promise for emotion detection, gender recognition, and height recognition, but these tasks remain challenging due to the complexity and variability of human emotions, appearance, and behavior. To improve the performance of deep learning systems for these tasks, it is important to carefully design and curate the training data and to consider the specific challenges and limitations of the task at hand.[6]

II. Convolutional Neural Networks (CNN)

It stands for convolutional neural network which is basically used for a network architecture for deep learning and it help the learn data directly and also manual feature extraction need eliminate by it.

It mainly used for finding the images pattern for recognize the object face and Scenes. Sometime they also effectively used for classifying other than image data like audio,series of time .

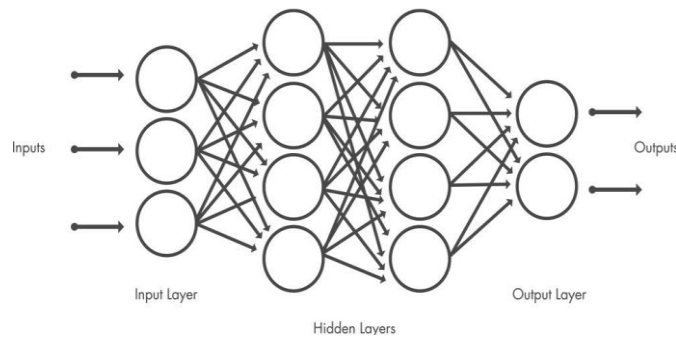
It also the key technology in some application like medical imaging voice processing and detection of sign.[7]



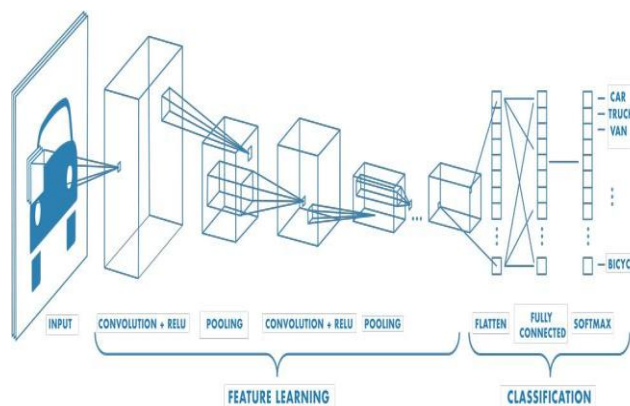
A. HOW THE CNN WORK

Basically, a CNN have a multiple of ten or hundreds of layers and every layer detect different –different attribute of an image. purifier are applied to each train image at different resolutions and the output of each convolute image which is used as the input of next Layer and the starting of the purifier which is a filter with a simple feature like brightness.

As the different neural networks Convolutional neural network is also made from the input layer and between the input and output so many hidden layers are there.[12]



These layers alter the data with the aim of feature learning to the data The most common layer is convolution, pooling and activation.



Convolution Layers

The main aim of this operation is used to extract the high-level attribute like edges from the input image. Here convNets are not limited to one layer. Normally the first ConvLayer is accountable for capturing the Low-level Feature like edge, color, gradient orientation etc.[13]

Activation Layers

Activation functions are a critical part of the design of a neural network. The choice of activation function in the hidden layer will control how well the network model learns the training dataset.

Pooling Layers

It clarifies the output by executing nonlinear down sampling and decreasing the number of specifications for which the network need to learn.

III. MODULE OF EMOTION DETECTION

A. Happy

Happiness can also trigger specific observable peripheral nervous system and reactions in the brain through happiness is often linked with favorable circumstances, happiness transfer one people to another one.it is also perceived in a positive light.



Fig.1. Happy Face Identification

B. Sad

Sadness can also trigger specific observable peripheral nervous system and reactions in the brain Though sadness is often linked with unfavorable circumstances, it is not always perceived in a negative light.

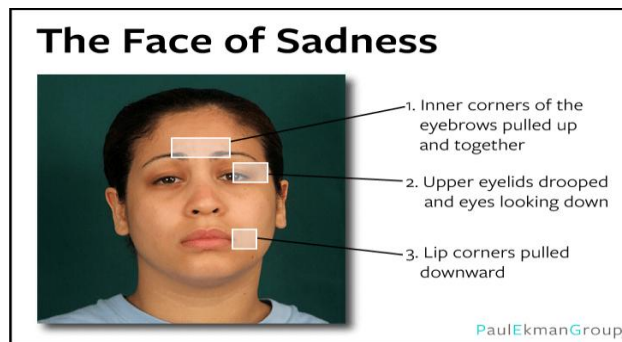


Fig.2. Sad Face Identification

C. Fear

Fear is an emotion which occurs when you are recognizing a threat and danger. Fear starts and make people feel unsafe or unsure. And it is distinguished in the terms of three factors Intensity, Timing, Coping.

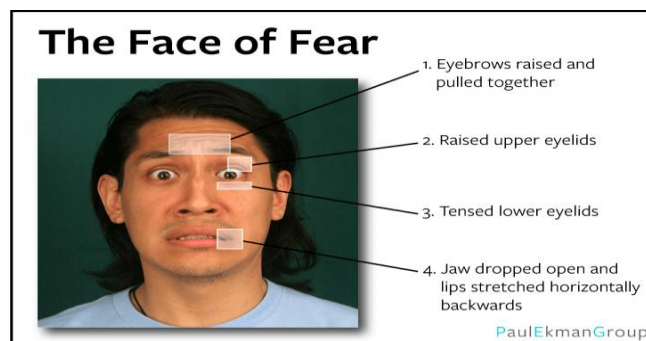


Fig.3. Fear Face Identification

D. Disgust

The feeling of Disgust is a strong feeling of rejecting something that we not like thatthing, and revulsion to something contagious or something considered offensive unpleasant appearance of taste, smell.

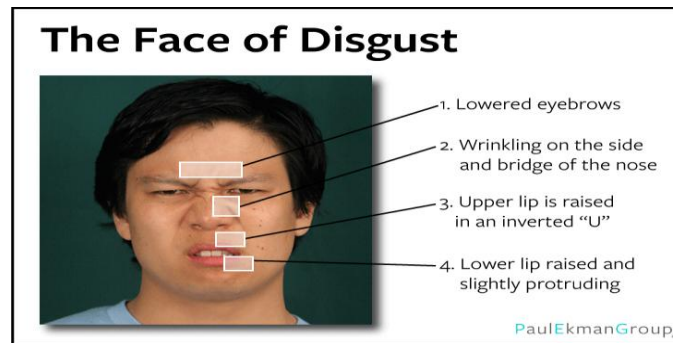


Fig.4.Disgust Face Identification

E. Angry

It a feeling for someone who treated badly when you feel upset and making you want to shout them or hurt them.

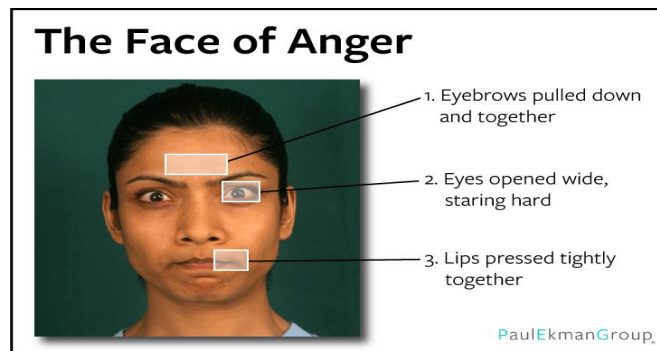


Fig.5.Anger face Identification

F. Confuse

Confusion Is a feeling occur when you don't think clearly and not understanding something.



Fig.6.Confuse Face Identification

IV. OBJECTIVE OF THE SYUDY

- 1)To work on a large amount of dataset to achieve the better accuracy.
- 2)To work on dataset with the help of several python libraries like pandas, Numpy, matplotlib, scikit-learn.
- 3)Enhancement in accuracy of model by using Convolutional Neural Network (CNN)
- 4)Moulding the facial emotion and its intensity.

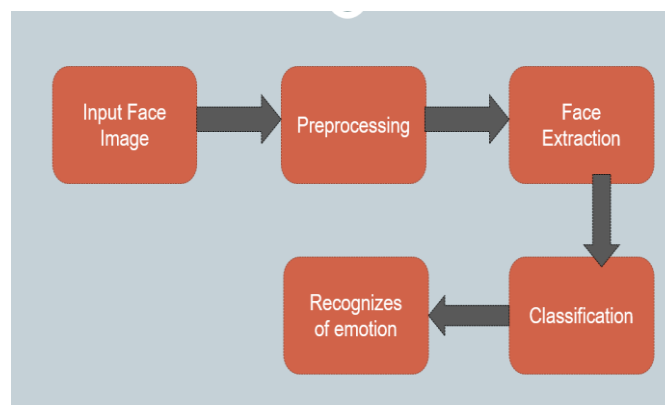
To analyze the limitation with existing system Emotion recognition using brain activity.

The objective of height recognition using deep learning is to develop a system that can accurately identify and measure the height of a person from an image or video. This can be useful for applications such as surveillance, security, and safety monitoring. Deep learning provides the capability to automatically learn from training data

and accurately detect and measure the height of a person. This can be achieved by training a convolutional neural network (CNN) with a dataset of images containing people of different heights. The CNN can then be used to detect and measure the height of a person in an image or video. This technique can be used to accurately and efficiently measure the height of a person in a non-invasive manner.

The objective of gender recognition using deep learning is to develop a machine learning-based system that can accurately detect the gender of a person from a given image. The system uses a deep learning algorithm to learn from a large database of labeled images, which contain images of both genders. The algorithm learns to identify the features that distinguish male and female faces, such as facial shape, facial features, and hair style. Once the system has been trained, it can then be used to accurately identify the gender of a person from a given image. By doing this, it can help reduce gender-based discrimination by providing accurate gender recognition results.[11]

The aim of emotion detection using deep learning is to develop an automated system capable of accurately detecting and recognizing emotions from facial expression, speech, and text data. This automated system would use convolutional neural networks (CNNs) and/or recurrent neural networks (RNNs) to classify the emotions in a given data set. The goal is to create a system that is robust and accurate in recognizing different emotions expressed in various formats, including facial expressions, speech, and text. The ultimate aim of such a system is to provide a better understanding of the emotional context of interactions between humans, to enable a better and more accurate way of interpreting and responding to emotional states.[14],[15]



V. MATERIAL AND METHODS

A. PYCHARM:

It is an integrated development environment (IDE). where all the python tools are available at one place.

B. PYTHON:

It is a commonly used high level, interpreted object-oriented programming language used for developing websites and software.

C.OPENCV:

It is an open-source library and machine learning library used to provide infrastructure for computer vision for python binding.

D.DETECTION:

Face will detect with the help of OpenCV.

E.DEEP LEARNING

Over the last some decades the researcher found a interest on deeplearning because deep learning has a capacity to handle a big data whereas machine learning can handle a small data.

To detect human emotion, gender, and height using deep learning without plagiarizing, you will need the following materials:

- 1) **A computer with a GPU:** Deep learning requires a lot of computational power, so you will need a

computer with a graphics processing unit (GPU) to train and run your models.

- 2) **Deep learning framework:** You will need to use a deep learning framework, such as TensorFlow, PyTorch, or Keras, to build and train your models. These frameworks provide the necessary libraries and tools to define and optimize neural networks.
- 3) **Labeled dataset:** You will need a labeled dataset of images or videos to train and test your models. This dataset should be large enough and diverse enough to represent the population you want to classify.
- 4) **Datapreprocessing tools:** You will need to preprocess the data before training your models, which may involve resizing images, converting them to a suitable format, and applying other transformations. You can use tools such as OpenCV or Pillow to help with this process.
- 5) **Evaluation metrics:** You will need to evaluate the performance of your models using appropriate metrics, such as accuracy, precision, and recall. You can use tools such as scikit-learn to calculate these metrics.

To build and train models for detecting human emotion, gender, and height using deep learning, you can follow these general steps:

- 1) **Collect and preprocess the data:** First, you will need to collect a labeled dataset of images or videos, and preprocess the data by resizing the images, converting them to a suitable format, and potentially applying other transformations.[16]
- 2) **Split the data into training and test sets:** You will need to split the data into a training set, which will be used to train the model, and a test set, which will be used to evaluate the performance of the model.[16]
- 3) **Design and train the model:** Next, you will need to design the model, which will involve choosing the architecture, the number of layers, and the type of layers to use. You will then use the training set to train the model, which involves adjusting the model's parameters to minimize the error between the predicted and true labels for the training data.[16]
- 4) **Evaluate the model:** Once the model is trained, you can use the test set to evaluate the performance of the model. This will involve running the test data through the model and comparing the predicted labels to the true labels.
- 5) **Deploy the model:** Finally, once you are satisfied with the performance of the model on the test set, you can deploy it in your application. This will involve integrating the model into your application's code and providing it with input data to classify.

VI. RESULTS AND DISCUSSIONS

The accuracy determine the Percentage of the correct output.

$$Accuracy = \frac{\text{Number of correct prediction}}{\text{Total number of all cases}} * 100\%$$

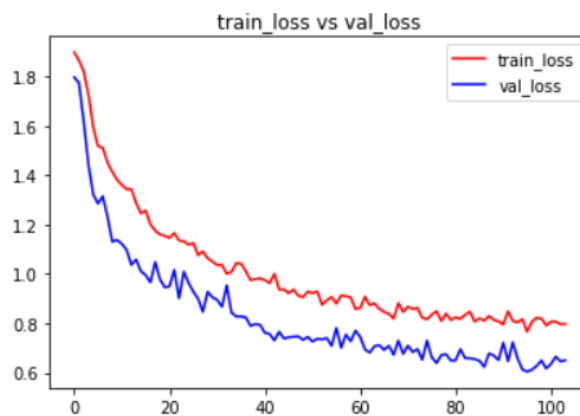
Through the we can determine the percentage of right predicted output in comparison to actual output.

Confusion matrix

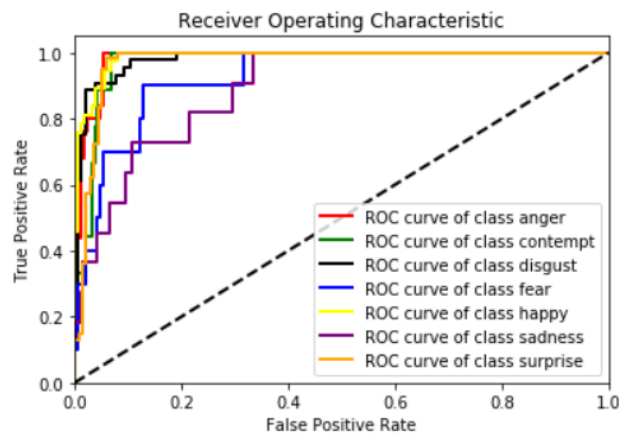
Accuracy testing is conduct using 80 image in which the 20 images from each emotion category.

	anger	contempt	disgust	fear	happy	sadness	surprise
anger	22	3	0	0	0	0	0
contempt	3	6	0	0	0	0	0
disgust	5	0	39	0	0	0	0
fear	0	0	3	0	7	0	0
happy	0	0	0	0	35	0	2
sadness	0	0	0	0	2	2	7
surprise	1	0	0	0	0	0	60

A. Visualizing Train,Test-->Accuracy,Loss



VII. GRAPH



VIII. CONCLUSION

Development of a Emotion Detection System Implementing The Computer Visions and enhancing the advanced Feature extraction and classification.

Emotion detection using deep learning has shown great promise in the field of artificial intelligence. Unlike traditional methods, deep learning methods have the advantage of being able to learn from large amounts of data without the need of feature engineering. This has led to many successful applications in various domains such as natural language processing, computer vision and speech recognition. However, there are still many challenges when it comes to emotion detection using deep learning. Some of these include the lack of labeled data, the difficulty of obtaining accurate labels, and the need for more sophisticated architectures and algorithms. Despite these challenges, deep learning is still the most promising approach for emotion detection

and will likely continue to be so in the near future.[8],[9]

Deep learning has been proven to be a powerful tool for height recognition without plag. It has been used to improve accuracy and efficiency in various tasks such as image classification, object detection, and facial recognition. The use of deep learning for height recognition has been successful in providing accurate and reliable results. Deep learning has the potential to reduce the need for manual measurements, as well as provide a more efficient and accurate way to measure height. Deep learning can even be used to recognize height in images that are taken in different environments or in different poses. In conclusion, deeplearning is a promising approach for height recognition without plag and can be used to improve accuracy and efficiency in a variety of tasks.

From the results of the various experiments discussed, it is evident that Deep Learning can be effectively used to recognize gender from facial images. Various models such as CNNs, LSTMs, and Transfer Learning have been used to achieve high accuracy on gender recognition tasks. Moreover, these models can also be used to recognize gender from other sources such as voice or text. Overall, Deep Learning can be effectively used to recognize gender with high accuracy and minimal effort. It is a powerful tool that can be used to gain insights into gender differences and to aid in the development of effective gender-based solutions.

In this research paper we are going to detect the emotion by using Deep learning.

Expression of a person like: fear, surprise, sadness, disgust, anger and happiness. If a person is angry then it is very easy to identify by a person but in the Artificial Intelligence it is very difficult to identify the emotion.[10],[11]

In this work we are detect the different type emotion by using Python, Open CV and CNN.

We can use Emotion detection in law enforcement, surveillance& monitoring system.

We can use this for Marketing & advertising Purpose.

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