Static and Live Video Feed Image Processing using Deep Learning- A Review

Dr.S.Deepa
Department of ECE Panimalar Engineering College
Chennai,India

Arulpreethi U P
Department of ECE Panimalar Engineering College
Chennai,India

Kaviya A B
Department of ECE Panimalar Engineering College
Chennai,India

Malathi V P
Department of ECE Panimalar Engineering College
Chennai,India

***Abstract*— One of the most intriguing uses of deep learning isimage processing. By doing this, we may teach a computer to perceive and comprehend visuals in a manner comparable to that of a human. It manages the picture class assignment task. One ofthe oldest problems in picture classification is image categorization. The purpose of this researchstudy is to use deep neural networks (DNN), also known as deep learning, to categorise an image using the framework tensor. Google created the open source package called Tensorflow specifically for use in deep learning applications. Traditional machine learning is also supported. Tensor recommends Python as a programming language because it offers a simple means of coupling high level abstractions. Therefore, Python will be used to build the system.**

Keywords—Recognization, Training Set, Customize, Accuracy.

INTRODUCTION

Images that just have one image that is recognised and examined are referred to as image classification. By giving the computers data to study, the difference between computer vision and human eyesight has shrunk. The practice of classifying images has recently gained popularity among technologyengineers. Deep learning is one of the key strategies for this technology. The discipline of artificial intelligence (AI), technically referred to as machine learning (ML), includes conventional picture classification techniques. The two components of machine learning are the feature extraction engine, which uses fewer resources to describe a vast amount of data by extracting crucial features like edges and textures, and the classification engine, which categorises the data based on the extracted features. Ifwe extract certain features from an image but not the defining features from the training dataset, machine learning can be separated, which is a severe drawback. Deep learning can be used to get around this. Artificial intelligence (AI) includes machine learning, which includes deep learning. Neural networks are used in deep learning to directly learn usable representations of features from input. Pretrained neural networks can be used, for instance, to spot and get rid of visual noise artefacts. In order to permanently divide information into a homogeneous structure that people can understand, deep learning models have been introduced. Deep learning does this using a hierarchical structure of many methods represented as an artificial neural network. The biological neural network of the humanbrain is used to replicate the architecture of artificial neural systems. As a result, deep learning is able to outperform traditional machine learning models. Deep learning investigates neural networks that support picture identification based on the image's attributes. This is accomplished in order to create a comprehensive feature extraction model that aids in resolving the issues that older approaches encounter. It should be possible for the integrated model extractor to master accurately extracting the discriminator from the training set of images.

I. METHODOLOGY

Understanding how networks operate and perform forboth static and dynamic movies is the core goal of ourwork. Transferring the learning

to networks with datasets containing picture data is the fundamental step in carrying out the aforementioned function. This includes several methods, few of them are listed below,

A. Artificial neural networks

A technique used in AI called a neural network instructs computers to analyse data in a manner that is similar to the way the human brain does. Artificial neural networks are another name for neural networks. A neural network is a grouping of hardware that is connected or kept apart by software that is controlled by a neuron, a microscopic part of the human brain. It can assist computers in making wise decisions with little support from humans. It develops an adaptive system that uses computers to examine mistakes, learn from them, and continuously advance. It is capable of resolving challenging issues like continuously recognising faces or summarising materials. An alternative layer multi-layered neural network can be suggested to get around this. More than nine times as many training image samples must be used as there are parameters needed to fine-tune the traditional classification in high resolution. Real-world implementation of a multi-layered neural network is challenging. The current term for a multi-layered neural network is "deep learning." We train the model by providing it with data, which is then routed via secret cycles that generate customised gridimages, collect data from each location, and alert the network to its output. The depth and the number of layers that go into creating inputs and outputs are terms used to define neural networks. Convolutional neural networks, which include pooling and padding data to prepare it for insertion into the training model using test data, are the most well-known application of genetic algorithms for hidden layers.

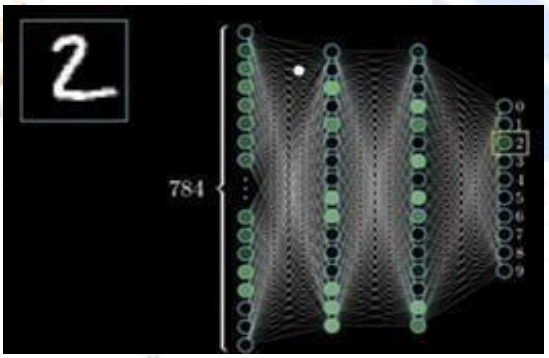


Figure 1.ANN

APPLICATIONS

The following are some of the different real-time applications of artificial neural networks:

1. Regression analysis, including time series modelling and function approximation.

2. Call control: while driving, answer an incoming call with the speaker on by waving your hand.

3.Classification, which includes novelty detection, pattern and sequence recognition, and sequential decision-making.

ADVANTAGES

1. Adaptive learning: The capacity to acquire new skills based on training or first-hand experience and the data provided.

2. Self-Organisation: An ANN may organise or represent the data it receives during learning time in its own way.

B. Convolutional neural networks

Convolutional neural networks are used in a varietyof applications to carry out diverse tasks. One of CNN's early uses was the effective implementationof handwritten digit recognition. After CNN's evolution, the networks have been continuously upgraded with the involvement of other computer techniques and the discovery of new layers. In the ImageNet challenge, convolutional neural networks are mostly used using various combinations of sketch datasets. There are few studies and studies that compare human and trained network detection abilities. According to the comparison's results, human accuracy on the dataset is 73.2%, whereas trained networks' accuracy is close to 65%.Similarly, when convolutional neural networks were used, they produced an accuracy rateof 74.9%, which was higher than that of humans. Strokes are employed in the approaches in order toincrease accuracy rates. Numerous studies are being conducted to comprehend how deep neural networks behave in diverse contexts. The experiments explain how a slight alteration to the image could have an impact on the grouping results. By using trained networks with a high accuracy rate, this technique enables the classification ofimages that humans are unable to recognise. There has been significant advancement in the field of feature detectors, descriptors, and different object- based algorithmic techniques. The object detector, texture filters, and filter bank frequently resemble one another, which is intriguing.

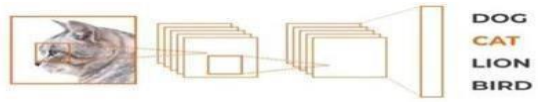


Figure 2.CNN

Thisis frequently done by examining the likelihood that a similar object will appear in video feeds and static photos.Checking if prediction accuracy varies across all of the CNNs utilised in this study is the third crucialcriterion for evaluating performance. It should be clearthat videos are used here as a testing dataset rather than a training dataset. Here, we're trying to identify the best image classifier, with objects serving as the primary factor in
scene classification. The CNN's many tiers include,

1) Input layer: The "Input layer," the first primary layerof the CNN, resizes the image before passing it to subsequent layers for feature extraction.

2) Convolution layer: The following layer is the "Convolutional layer," which functions as an image filter and enables us to determine the match feature points when testing and extract features from images.

3) The extracted feature is sent to the "Pooling layer" in step three. The Pooling layer tasks a large image andreduces it without omitting the crucial details.

4) Rectified linear measured layer: The following layer, known as "ReLU" or "Rectified linear unit," substitutes "0" for any negative values in the Poolinglayer.This makes the CNN mathematically stable.

5) Fully connected layer: The filtered photos are translated into several categories with labels by thislayer.

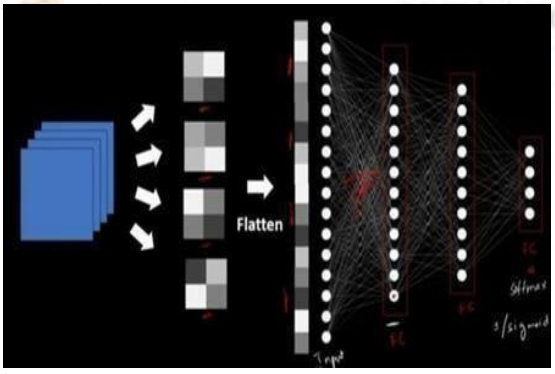
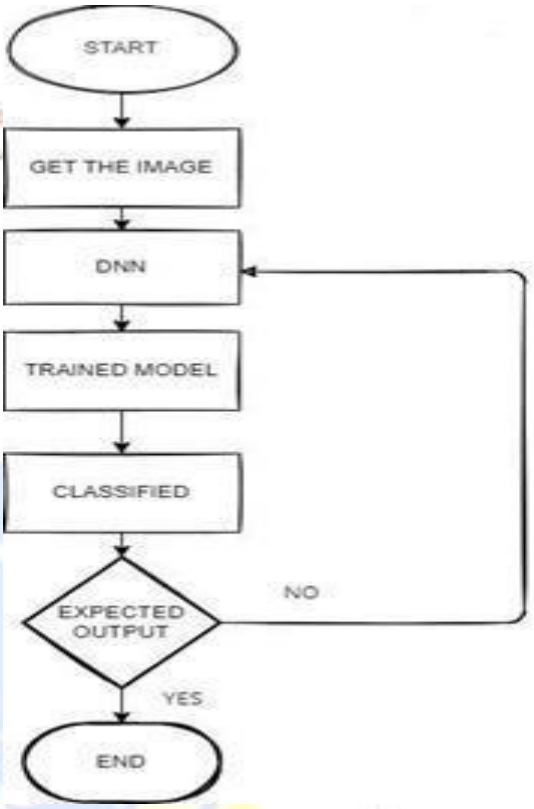


Figure 3.Layers

II. IMAGE CLASSIFICATION FLOWCHART

CNN is used in this technique to categorise the image.At first, an image acquisition is performed. Theimage is then contrasted or distorted using the trainedmodels. If the image does not match the anticipated output, the process continues; otherwise, it is completed.



III. PROPOSED SYSTEM

Our project works as mentioned in the below chart

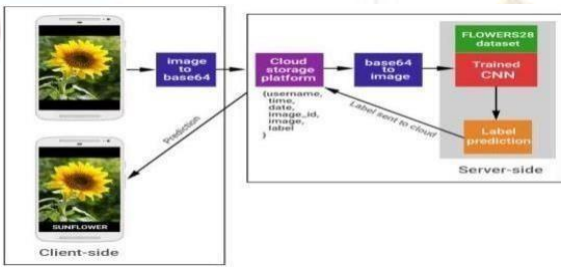


Figure 4.Classification

Artificial intelligence includes machine learning, one of which is deep learning. To develop usable representations of features directly from data, deep

learning uses neural networks. For instance, we can utilise a pretrained neural network to locate and eliminate noise artefacts. In order to permanently divide information into a homogeneous structure that humans can understand, deep learning structures have been proposed. Deep learning employs a layered structure of various algorithms depicted as an AN

system to achieve its goals. The biological neural network of the human brain is used to replicate the architecture of artificial neural systems. This is used to increase the utility of deep learning over basic machine learning structure. Deep learning investigates neural networks that support picture identification based on the image's attributes. This is accomplished in order to create a comprehensive feature extraction model that aids in resolving the issues that older approaches encounter. It should be possible for the integrated model extractor to master accurately extracting the discriminator from the training set of images.

IV. COMPARISON OF IMAGE CLASSIFICATION AND RESULT

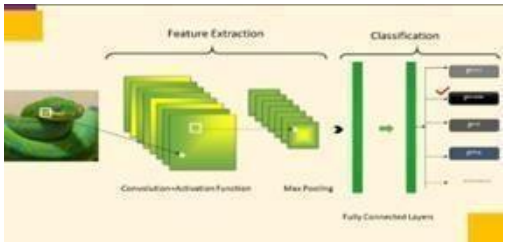
DNN:

A deep neural network is a sort of artificial neural network that consists of many layers of interconnected nodes. Each layer modifies the input data to produce more ethereal and sophisticated representations.

CNN:

In the ImageNet challenge, convolutional neural networks are frequently deployed with the aid of various dataset combinations. The comparison between human and trained network detection abilities is stated in a few papers and study. Accordingto the comparison's results, human accuracy on the dataset is 73.2%, whereas trained networks' accuracyis close to 65%.

A model that has been trained for one job is used as the starting point for a model on another task using the machine learning technique known as transfer learning. Transfer learning, where pre- trained modelsare used as the foundation for more specialised models, has been effectively applied in a number of disciplines. Advanced CNN is recommended since it offers greater benefits.



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V. CONCLUSION

In summary, This study utilises TensorFlow and deep learning to classify images. This study's three main objectives have all been accomplished. All of the study's findings have been really amazing, it may be said. Deep neural networks have taken centre stage in the field of picture classification. In- depth research has been done on the DNN, starting models, and assembly. The Epoches in DNN are in charge of regulating accuracy and avoiding problems like overfitting.TensorFlow was successful.

VI.REFERENCES

[1] https://in.mathworks.com/matlabcentral/fileexc hange/59133-neural-network-toolbox-tm--model- for-alexnet-networ

[2] H. Lee, R. Grosse, R. Ranganath, and A.Y. Ng. Convolutional deep belief networks for scalable unsupervised learning of hierar- chical representations. In Proceedings of the 26th Annual Interna- tional Conference on Machine Learning, pages 609–616. ACM, 2009 [3] Deep Learning with MATLAB – matlab expo2018

[4] Introducing Deep Learning with the MATLAB – Deep Learning E-Book provided by the mathworks.

[5] KISHORE, P.V.V., KISHORE, S.R.C. and PRASAD, M.V.D., 2013.

[6] RAMKIRAN, D.S., MADHAV, B.T.P., PRASANTH, A.M., HARSHA, N.S., VARDHAN, V., AVINASH, K., CHAITANYA, M.N. and NAGASAI, U.S., 2015. Novel compact asymmetrical fractal aperture Notch band antenna. Leonardo Electronic Journal of Practices and Technologies, 14(27), pp. 1-12.

[11] Eitz, M., Hays, J., & Alexa, M. (2012) “How do humans sketch objects?”ACM Trans. Graph., 31(4). [12] Ballester, P., & deAraújo, R. M. (2016, February)“On the Performance of GoogLeNet and AlexNet Applied to Sketches.” in AAAI.