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Flower Image Classification Using CNN

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ABSTRACT: Image classification is growing and becoming a trend among the recent year technology developers especially with the growth of data in different organization such as e- commerce, automotive, healthcare, and gaming. Image classification is the one of most critical use case in digital image analysis. The image classification problem is to categorize all the pixels of a digital image into one of the define class. Flower classification is a challenge task due to the wide range of flower species, which have a similar shape, appearance or surrounding objects such as leaves and grass. In this project proposes the classification of flower images using a powerful convolutional neural networks (CNN) algorithm. A flower image database with 20 images is considered for the experimentation. The entire database is categorized into 3 classes a CNN is used to image classification method. The CNN training is initiated in three classes and the validation is carried out on all the datasets and tested with flower image data to obtain better accuracy to flower classification.

KEYWORDS: Flower image classification, CNN (Convolutional neural network, ReLu activation function.

I. INTRODUCTION

IMAGE CLASSIFICATION

Image classification plays an important role in computer vision, it has a very important significance in our study, work and life. Image classification is the localization means you not only classify the image as one of the class but you have find the location of that object within the image is called image classification.

Image classification using python programming language and tensor flow packages. Image classification using two methods. One is the Supervised method and unsupervised methods. Supervised classification is used to classify the labeled from data to dataset. Unsupervised method used to classify the unlabeled data into the dataset. In this project used to supervisedmethod.



Figure 1. Structure of image classification Preprocessing

The aim to this process is to improves theimage data (features) by suppressing unwanted distortions and enhancement of some important image feature so that the computer vision model can benefit from this improved data to work on.



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Step for image pre-processing include the Reading image, Resizing image, and Data Augmentation (Gray scaling of image, Reflection, Gaussian Blurring, Histogram, Equalization, Rotation, and Translation).

Detection of object

Detection refers to the location of an object which means the segment of the image and identifying the position of the object of interest.

Feature extraction and training

This is a crucial step wherein statistical method or deep learning methods are used to identify the most interesting patterns of the image, features that might be unique to a particular class and that later on, help the model to differentiate between different class. This process where themodel learns the features from the dataset is called modeltraining.

Classification of the object

This step categorizes detected objects into predefined class by using a suitable classification technique that compare to the image patterns with the target patterns.

Collecting the dataset

It is split into the 3 classes of flower images. Roses, sunflower, daisy of the flower dataset. Training is the 80% of the dataset and test is of 30% of dataset to be split to the dataset.



II. LITERATUREREVIEW

Dr.MohdAzlan Abu, Nurul Hazirah Indra, Abdul Halim Abd Rahman, Nor Amalia Sapiee and Izanoordina Ahmad proposed the image classification using deep neural network and framework using tensorflow. This method is used to compare the one flower class accuracy result to another flower accuracy level predict it. The results for type flowers of Roses are shown in the accuracy of the image classification for Roses is 90.585% when it was simulated and compared to other types of flowers. The results for type flowers of Daisy are shown in that the accuracy of the image classification for Daisy is 99.626% compared to other flowers types. The results for type flowers of Dandelion are shown in that the accuracy of the image classification for Dandelion is 99.823% and compared to other types of flowers. The results for type flowers of the image classification for Tulips are shown in that the accuracy of the image classification for Tulips is 99.0% when it was simulated and compared to other types of flowers.



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III. PROPOSED METHODOLOGY

Cnn used to three five layer.in this projet used to mainly for three layers. Convolutional layer Pooling layer Flatten layer Dense layer Convolutional layer

It is first layer of cnn. The input of first layer. It is used to extract the feature mapping. The feature mapping produce the output to the next max pooling layer.

Pooling layer

The max pooling layer is used to produce the maximum values of the layer.

Flatten layer

Flatten layer used to convert the 2*2 matrix into single row and single column of vector to modify the feature extraction. The combinations of the two layers convert into the single vector.

Dense layer

It is the final layer of Cnn architecture. All the layer combined to each and every layer connected to all other layers. Produce the output of layer.



Figure 3.1 Proposed method of CNN architecture

PROPOSED METHOD OF WORK FLOW

Layer-1 consists of the convolutional layer with ReLu (Rectified Linear Unit) activation operate that is that the initial convolutional layer of our CNN architecture. This layer gets the pre-processed image because the input of size n*n=32*32. The convolutional filter size (f*f) is 5*5; padding (p) is 0(aroundallthesidesoftheimage),stride (s) is 1, and also the range of filters is 32. when this convolution operation to get feature maps of size 32@28*28 wherever 32 is that the range of feature maps that is equal to the amount of filters used, and 28 comes from the formula ((n+2p-f)/s) +1=((32+2*0-5)/1) +1=28. Then the ReLu activation is completed in each feature map.



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Layer-2 is the max pooling layer. This layer gets the input of size 32@28*28 from the previous layers. The pooling size is 2*2; padding is zero and stride is 2. After this max pooling operation to get feature maps of size 32@14*14. Max pooling is the every feature map independently and then get same number feature maps as the previous layer, and 14 comes from the same formula ((n+2p-f)/s) + 1 = ((28+2*0-5)/2) + 1 = 14. This layer has no activation function.

Layer-3 is the second convolutional layer with ReLu activation of the function. This layer gets the input of size 32@14*14 from the previous layers. The filter size is 5*5; padding is 0, the stride is 1, and also range of filters is 32. After this convolution operation to get feature maps of size 32@10*10. The constant formula is ((n+2p-f)/s) +1 = ((14+2*0-5)/1)+1=(9)+1=10 and then activation of the is done in each feature map

Layer-4 is that the average pooling layer. This layer gets the input of size 32@10*10 from the previous layers. The pooling size is 2*2; padding is zero and stride is 2. After this max pooling operation to get a feature map of size 32@5*5. The same formula is ((n+2p-f)/s)+1=((10+2*0-5)/2)+1=(4)+1=5.

Layer-5 is that the third convolutional layer with ReLu activation function. This layer gets the input of size 32@5*5 from the previous layers. The filter size is 4*4; padding is 0, the stride is 1, and also the range of filters is 64. When this convolution operation to feature maps of size 64@1*1.

The same formula is ((n+2p-f)/s) +1 = ((5+2*0-4)/1) +1 = 1. This layer acts as a totally connected layer and produces a one-dimensional vector of size 64 by being flattened.

Layer-6 is that the last layer of the network. It's a totally connected layer. This layer to reckon the flower accuracy, leading to a vector of size 3, to every of the 3 numbers corresponds to a category accuracy, similar to among the 3 classes of flower dataset. For final outputs to use the softmax activation function. During this way, CNN transforms the initial image layer by layer from the most picture element values to the ultimate flower accuracy. In particular, the convolution/fully connected layers perform transformations that are a operate of not solely the activations within the input volume however conjointly of the parameters (the weights and biases of the neurons). On the opposite hand, the Relu/pooling layers to implement a set function. To the parameters within the convolutional/fully connected layers with random gradient descent. To arrange the trained model accustomed acknowledge the image within the check data. Soto will classify the photographs as Class- daisy,roses,sunflowers.



Figure 3.2 ReLu activationfunction

IV. RESULT AND DISCUSSION

The result have been achived the convolutional neural network using classification techniques. The model was trained with the 32 and then with 6 epochs. The classification report obtained after the training and validation phase and then graph plots the training loss and validation loss, training and validation accuracy for each epochs. It is used to input images 35 in my project. It is dependent on the total number of flower in dataset to display the accuracy and loss values of the graph.



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Figure 4.2training& validation loss plot graph

This model attained an overall accuracy and loss is 92%. First upload the image path. Then generated random number to random values to predict the flower images. The used to google image to predict the accuracy is 95% accuracy is obtained. Low accuracy of result in images. The result for flower of daisy and accuracy of the image classification for daisy is0.375.

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Figure 4.3 prediction of flower and accuracy value

This model attained an overall accuracy and loss is 92%. Second change the path upload the image directory. Then generated random number to random values to predict the flower images. But used to real time image to capture images to predict the accuracy is 98.1% accuracy is obtained. The high level of accuracy values. The result for the type of flowers daisy and accuracy of the image classification for daisy is 0.875. It is based on the cnn model to predict the accuracy values of flowers.



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The accuracy and loss of training and validation

The training and samples of the accuracy of loss and accuracy of theepochs.

It used to the 6 epoch of training dataset The used to batch size is 32 number of samples processed before the model is dataset. The batch is equal or more than to number of samples in the training dataset. To check accuracy and loss of epochs of tables to view the values. Other paper compared to cnn algorithm used better accuracy of the tables. The predict the high accuracy of loss and accuracy.

Epoch	Loss	accura cy	Val_loss	Val_accuracy
0/0				
Epoc	1.35	0.1071	5.457	0.3750
h 1/6	63		5	
Epoc	5.50	0.6786	0.566	0.6250
h 2/6	48		4	
Enoc	2.60	0.5000	0.755	0.3750
h 3/6	81	0.5000	2	0.3750
Epoc	1.09	0.7143	0.734	0.3750
h 4/6	95		4	
Enoc	0.81	0.6786	0 814	0.6250
h 5/6	24	0.0700	8	0.0250
Epoc	0.48	0.7143	0.874	0.8750
h 6/6	48		2	

Table 4.5 training and loss of epochs

V.CONCLUSION AND FUTURE SCOPE

CNN is a powerful in classification updated. Epochs passes through the training technique. It can be conclusion that all results that have been obtained, showed quite impressive outcomes. The convolutional neural network (CNN) becomes



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the main agenda for this research, especially in image classification technology. CNN technique is the studied in more details starting from assembling, training model and to classify images into categories. The roles of epochs in CNN was able to control accuracy and also prevent any problems such as overfitting. Training accuracy and validation accuracy for this CNN architecture are used to better than the other models. A least amount of training and validation loss is observed with the proposed CNN architecture. The average classification rate of proposed CNN model is 98.71 % and is higher compared with the other classifiers. Proposed method used to image to classify the flowers but real time used IOT related to capture the images to live video to classify the flower used to future of my project. CNN is easy to predict the flowers and also predict the leaf detection of flowers. In future enhancement used to real video and images to classification of method.

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