

Flower Image Classification

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ABSTRACT :

This document describes the flower classification. We use this classification to predict the flower name by using image classification. This classification will help us to know the flower species and its class. We can do this by using deep learning techniques like convolutional neural networks. This will help us in various fields like botany, agriculture, pharmaceuticals and the beauty industry. It is very difficult to identify the flower to use for a specific purpose. This project makes it simple and easy to predict the flower name and its category by giving some images as input. I took a dataset of flowers consisting of 1360 images for the processing. It will take the dataset and process the given image and will give the result that we want. This model has achieved an accuracy of 100% by changing the epochs values and learning rate. My model can predict whether it is tulip, tiger lily, sunflower and snowdrop. We can attach some more in the future.

Introduction :

Flowers are one of the most beautiful and fascinating creations of nature. Flowers help us in various purposes. Flowers can be used for different purposes to create natural flavours and fragrances for food. Some flowers like rose, jasmine give natural fragrance. Flowers are a true marvel of nature, bringing beauty, joy, and significance to our lives. Flowers have been a symbol of life, love, and beauty across cultures and civilizations. Flowers play an important role in

human life, not only as a source of beauty and joy but also as a means of expression and communication. They are also used in preparation of deodorants and candle oil for giving good smell. Flowers are a true marvel of nature, bringing joy, beauty, and significance to our lives.

Flower image classification is a type of image classification task that involves identifying and categorising different types of flowers based on their images . By this prediction we can know the name of the flower by giving an input image.



TULIPS



SUNFLOWER



SNOWDROP



TIGERLILY

MATERIAL AND METHODS :

We have taken 4 classes: tulip, sunflower, tigerlily and snowdrop. Each class consists of 57 images. For the time being we have taken a smaller number of samples.

We have used the MobileNetV2 Model for our Project. Because while Testing our accuracy with the ResNet50 model we have got only 85.17% due to the large dataset, the model is unable to get good accuracy and the accuracy is fluctuating. MobileNetV2 gave the best result. We have experimented nearly over 20 times with different hyperparameters by performing hyperparameter tuning and noted the best accuracy result in the hyperparameter tuning spreadsheet.

Out of 40 experiments the hyperparameter which was set to

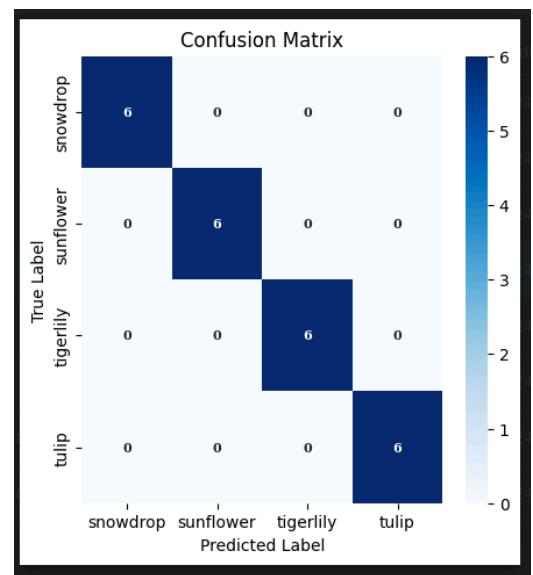
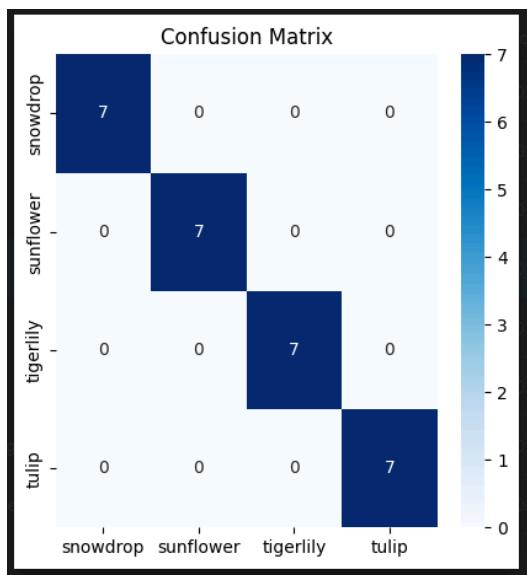
- Epoch == 10
- Learning rate == 0.01
- Optimizer == Adam , gave the best accuracy.

We have achieved 100% accuracy after using the MobileNetV2 model. By adding more hidden layers we can process more and can achieve more accuracy. You can know more about ResNet50 by searching it on the internet. The documentation of MobileNetV2 for reference is available on the internet. Resnet50 is a Keras Application and it is a widely used API. ResNet is mostly used in Deep Learning algorithms mainly in CNN's. MobileNetV2 is also used in deep learning algorithms.

Results :

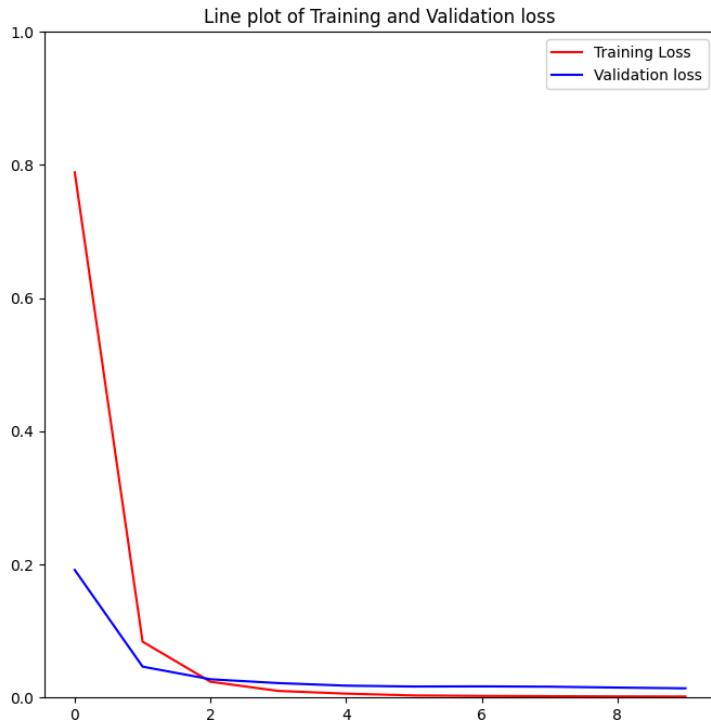
- We have noticed a significant change in the accuracy values after changing the model from ResNet50 to MobileNetV2.

- You can see the confusion matrix of our trained model given below, both are from same model :

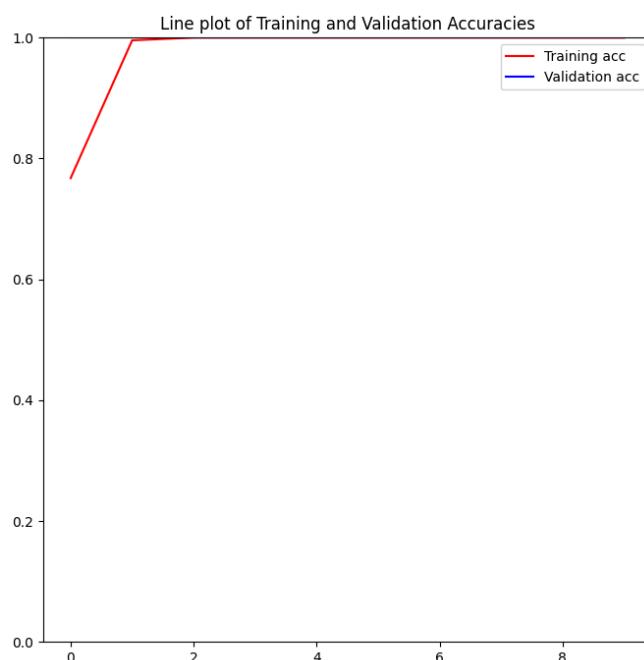


- The classification report is as follows :

	precision	recall	f1-score	support
0	1.00	1.00	1.00	7
1	1.00	1.00	1.00	7
2	1.00	1.00	1.00	7
3	1.00	1.00	1.00	7
accuracy			1.00	28
macro avg	1.00	1.00	1.00	28
weighted avg	1.00	1.00	1.00	28
	precision	recall	f1-score	support
0	1.00	1.00	1.00	6
1	1.00	1.00	1.00	6
2	1.00	1.00	1.00	6
3	1.00	1.00	1.00	6
accuracy			1.00	24
macro avg	1.00	1.00	1.00	24
weighted avg	1.00	1.00	1.00	24



These graphs are the measures of error that indicate the model's performance. Here training loss and validation loss are represented in loss curves. The loss curve shows the value of the model's loss over time. Initially, the loss is high and gradually decreases, indicating that the model is improving its performance.



References :

- You can read the documentation of MobileNetV2 and use it by referring to the following page :
<https://keras.io/api/applications/mobilenet/>
- You can use ResNet50 model for your future work by the help of following link
Link :
<https://keras.io/api/applications/resnet/#resnet50-function>
- For knowing about dataset i used , refer
<https://www.kaggle.com/datasets/alsaniipe/flowerdatasets>
- To know about complete details of my project, refer
https://github.com/Praneethvarma75/Flowers_Project