IDENTIFICATION OF LOCAL FLOWERS THROUGH IMAGE PROCESSING

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This Report Presented in Partial Fulfillment of the Requirements for the Degree of Bachelor of Science in Computer Science and Engineering

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DHAKA, BANGLADESH

3 JUNE 2021

APPROVAL

This Project titled "**Identification of local flowers through image processing**", submitted by Tanu Sarkar, ID No: 171-15-8907, MD.Maruf Khan Masum, ID No: 171-15-8898, and MD. Tanvir Ahamed Robin, ID No: 171-15-8738, to the Department of Computer Science and Engineering, Daffodil International University, has been accepted as satisfactory for the partial fulfillment of the requirements for the degree of B.Sc. in Computer Science and Engineering and approved as to its style and contents. The presentation has been held on 3 June 2021.

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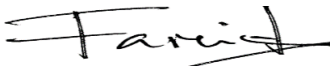

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DECLARATION

We hereby declare that, this project has been done by us under the supervision of **Rubaiya Hafiz, Sr. Lecturer, Department of CSE** Daffodil International University. We also declare that neither this project nor any part of this project has been submitted elsewhere for award of any degree or diploma.

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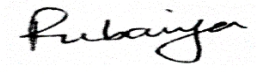

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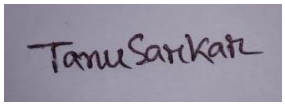

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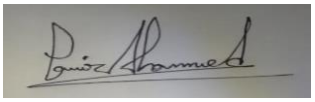

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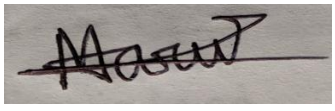

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ACKNOWLEDGEMENT

First we express our heartiest thanks and gratefulness to almighty God for His divine blessing makes us possible to complete the final year project/internship successfully.

We really grateful and wish our profound our indebtedness to **Rubaiya Hafiz**, **Sr. Lecturer**, Department of CSE Daffodil International University, Dhaka. Deep Knowledge & keen interest of our supervisor in the field of "Deep learning" to carry out this project. Her endless patience ,scholarly guidance ,continual encouragement , constant and energetic supervision, constructive criticism , valuable advice ,reading many inferior draft and correcting them at all stage have made it possible to complete this project.

We would like to express our heartiest gratitude to **Mr. Dr. Touhid Bhuiyan, Professor and Head** Department of CSE, for his kind help to finish our project and also to other faculty member and the staff of CSE department of Daffodil International University.

We would like to thank our entire course mate in Daffodil International University, who took part in this discuss while completing the course work.

Finally, we must acknowledge with due respect the constant support and patients of our parents.

ABSTRACT

Flowers are one of the most beautiful creation of almighty. Bangladesh is the land of flowers. There are lots of flower in our country. There are many different kinds of flower in our country. Every flowers have its own color, shape and name. There are many seasonal flowers in this country. Now a days flowers are used in every occasion like wedding, birthday party etc. In our everyday life, we can see many different kinds of flowers around us while we walking beside roads, rail line even in our garden. But most of our people don't have any knowledge about that flowers. Even they don't know the flowers name. But many of them wants to know about the flowers. For that reason we choose this topic to research and develop our system. Through our system people will be known about that unknown flowers which they see but don't know about that flowers. Our system based on neural networks to create an image classification by Tensorflow. CNN is the most popular platform of machine learning and it is extensively used for image classification. We used some CNN models like Inception-v3, VGG-19, MobileNet and ResNet-50 for detecting and classifying flowers. From all of the model we got best accuracy (98.76%) by using MobileNet model.

We have collected six types of flower for our project. Each flower have 400 images and in total 2400 image in our dataset. We kept 60% image in training set for train the dataset. 20% kept in validation set and another 20% in test set for testing purpose. In this system we use six types of flower but in future we have plan to add more flower for upgrading our system.

Keywords: CNN, Resnet-50, VGG-19, Augmentation, Inception-v3, Mobilenet.

TABLE OF CONTENTS

LIST OF FIGURES

List of Tables

CHAPTER 1
Introduction

1.1 Introduction

Without flowers we cannot think of beauty of our nature. We can identify a plant through its flower. Huge amount of flowers are in our world but day by day new kinds of flower has been discovered. As an ordinary people it is very tough to identify a flower accurately with his short knowledge. They cannot identify a flower accurately because a flower has many different types of color and shape. Sometimes they search on Google or other website to identify their expected flowers. Sometimes while we are walking on road side or park we notice a flower that we have never seen before. But we get curious to know about that specific flower. Only an image, a common people without enough knowledge could not tell which species that flower belong to.

Tensorflow is an open source dataflow and machine learning library and we use this for classifying flowers image .In our research we work with four different types of algorithm such as Resent 50, MobileNet, VGG 19 and inception v3. Among these algorithm we work with only one algorithm from which we can get better accuracy from others algorithm.

1.2 Motivation

We have tried to build a system which can be recognized and classify some local flower. Because most of the people of our country specially our city people unknown about many local flowers. Even many students of our institutes are interested to work with local flowers but they have no knowledge about that kind of local flowers. It will also be helpful for our young generation who have a little knowledge about local flower. For that reason we work with flowers and try to develop a system that can be helped people to classify and recognize a flower.

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1.3 Objective

- Our main objective is to develop a system that will help people to identify and recognize some Bangladeshi flower.
- Another objective of our system is to identify from which algorithm we can get better accuracy for our dataset.
- Especially our city people do not know about some local flower and we work with some local flower. So that they will be helped from our developed system.

1.4 Expected Outcome

This system will help people to classify and recognize some Bangladeshi local flower. Especially our city people do not know about local flower. So they will be helpful from our system and will know about some local flower. On the other hand our young generation have no idea about local flower so they will also know about some local flower. From the very beginning of our research we expected to get good accuracy for our dataset.

CHAPTER 2

Background Study

2.1 Introduction

In this section we will discuss about some research that are similar to our project and was done by some researchers. In our research we used Convolution Neural Network (CNN). CNN is a popular platform for image classifying and it is mostly used for flower classification. In our dataset we have total 2400 image and each flower has 400 images. We works with 6 types of flower. We used some machine learning algorithm for training our dataset.

2.2 Related works:

Since flowers come in such a wide range of colors and shapes, classifying them is a difficult task. Knowing how to classify a flower without the assistance of a botanist would be extremely beneficial to industries such as pharmaceutical and cosmetics. As a result, a great deal of research has been done on this topic. A paper published by Hiary and his friends in (2018) [1]. They developed a good binary segmentation method for the flower recognition. Their proposed method is very accurate and only 168 out of more than 10000 images were misclassified from all dataset. Another paper published by Liu, Tang and zohu in (2016) [2] and they build a large dataset of flower images in the wide with 79 categories and propose a novel framework based on convolutional neural network (CNN) to solve this problem. Their approach achieved 76.54% classification accuracy on their challenging flower dataset. Their approach achieve quite good in flower classification. A paper published by Mete and Ensari in 2019[3] and they classify the flower image by using DEEP CNN and data augmentation. First they proposed a classification model to cultivate the performance of classifying of flower and secondly they used image augmentation for achieving better result. They compared the performances of the machine-learning

classifiers such as SVM, Random Forest and get good accuracy. For the purpose of flower image classifying Prasad, Lakshmamma, Chandana with some of their friends published a paper in (2018) [4] and for image classifying they used CNN. The CNN training is initiated in five batches and the testing is carried out on all for the datasets and they got 97.78% accuracy. One of the most defining characteristics of a flower is its color. This was taken into consideration by Avishiktha Lodh and Ranjan Parekh in their paper published in 2017[5]. For classifying the input image, they used color and GIST features. Busra Rumeysa Mete and Tolga Ensari(2019)[6] compared various models in flower image classification, including SVM, Random Forest, KNN, and multi-layer perceptron. The KNN classifier was used by D S Guru, Y H sharath, and S Manjunath (2010) to classify a flower image [7]. For classification, the model used a gray level co-occurrence matrix and Gabor responses to extract texture features. Yuning Chai [8] developed and created a system that classifies a flower image automatically for hundreds of organisms.

2.3 Research Summary:

Basically in this project we use Tensorflow and it is an open source data flow to create an image for classifying. Tensorflow provides a simple way to build neural network layer. Our project based on convolutional neural network for classifying image. In our research we used four CNN model for training our dataset and got a satisfiable accuracy. For our dataset we collect almost 2400 images and we worked with 6 types of flower. After collecting data we pre-processed our image. For input data we use keras library and use CNN algorithms for training and testing our dataset.

2.4 Scope of Our Research:

If any developer wants to make an android application he can use our dataset. By using python or any other languages a developer can make an android application that can detect a flower and may be given a short description about that flower. There is a big scope to improve the dataset and CNN architecture may be improved. Anybody who wants to work with CNN and android development can be helped from our work.

2.5 Challenges:

Collecting dataset was a huge challenging task for our research. Most of the image of our dataset is not collected from internet. Almost 80% of our dataset was captured by us. So it was a big challenge for us to collect the dataset.

Duplicate flowers identification was our challenge. We know there are lots of flower that's are same look by its size and shape. In this case to get a high accuracy always challenging for us.

Color identifying was a challenge. Some flowers have multiple color such as red rose, pink rose, white rose. That was challenging to identify color by using CNN.

CHAPTER 3

RESEARCH METHODOLOGY

3.1 Introduction

In this part we are going to discuss about some procedure that we are followed to complete our research. There are many step that we are followed.

Data collection, data pre-processed, noise reduction that's are some step that we have followed. For training our dataset we use Tensorflow. After that we take a look for testing our whole dataset. In our research we mainly used convolutional neural network for implementing our project. To get accuracy for our dataset we used some model such as MobileNet , Inception v3 , VGG19 , RseNet50.

3.2 Data Collection Procedure

Most of the image of our project captured by us through our phone. Some other image we collected from google. We have collected six types of Bangladeshi local flowers such as joba, noyontara, rose, gada, dalia and jarbera. Totally we collected 2400 image for our project. Each flower have 400 image. We kept 1440 image in training set for train our dataset, 480 image in testing set and we used 480 image for validation set in six classes.The following figure shows the sample dataset of joba flower.

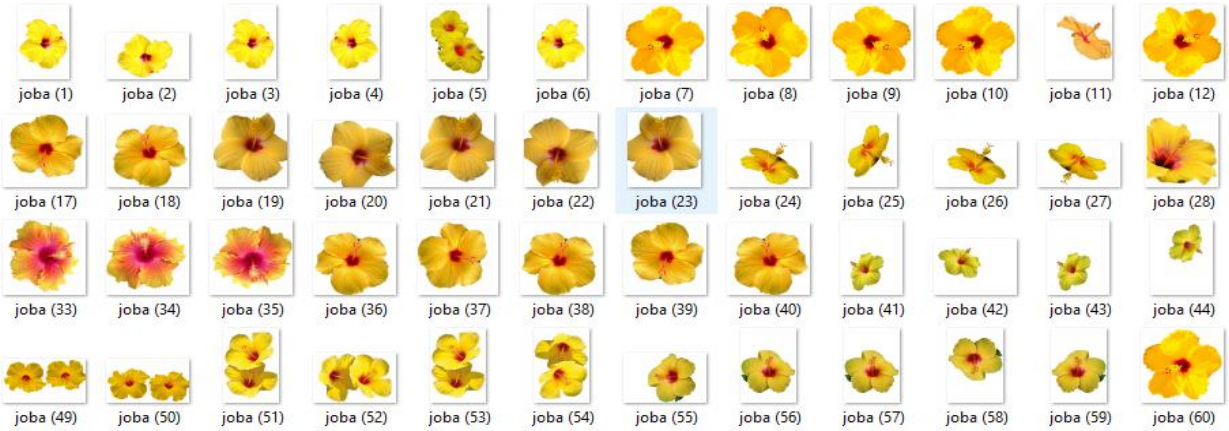


FIGURE 3.2.1: SAMPLE DATASET OF JOBA

3.3 Statistics of Data

TABLE 3.3.1: TRAINING DATASET

Flower Name	Quantity
Joba	240
Gada	240
Noyontara	240
Jarbera	240
Dalia	240
Rose	240

TABLE 3.3.2: VALIDATION DATASET

Fruit Name	Quantity
Joba	80
Dada	80
Noyontara	80
Jarbera	80
Dalia	80
Rose	80

TABLE 3.3.3: TESTING DATASET

Fruit Name	Quantity
Joba	80
Dada	80
Noyontara	80
Jarbera	80
Dalia	80
Rose	80

3.4 Image Preprocessing:

Most of the time we didn't get expected outcome from raw dataset and also get low accuracy. Because raw data have some unnecessary or noisy data. So, to get proper outcome and best accuracy result we need image pre-processing. That's why image pre-processing is one of the most important part of research.

3.5 Training Model:

For training our dataset we have chosen four types of convolutional neural network model.

Models are given below:

1) Inception v3

2) MobileNet

3) ResNet 50

4) VGG-19

3.6 Implementation Requirements:

We have chosen Google Colab because it is a free platform and everyone can write python programming language in it. It has pre-installed libraries. It provides us free GPU and TPU access.

Software

- Windows 10
- Tensorflow

Hardware

- Intel i5 processor
- 4 GB ram
- 1 TB hard disk

CHAPTER 4
EXPERIMENTAL RESULTS AND DISCUSSION

4.1 Introduction:

Here we will discuss about two types of result one is model's accuracy analysis and another one is confusion matrix. We also show plot diagram for each model. For classifying result we used four types of CNN model like MobileNet, Inception-v3, ResNet-50 and VGG-19. For each of the model we have tested our dataset individually to find out which model is best for our dataset.

Confusion Matrix

A confusion matrix is a table that is often used to describe a classification model's output on a collection of test data for which the true values are known. It shows the visualization of the performance of an algorithm.

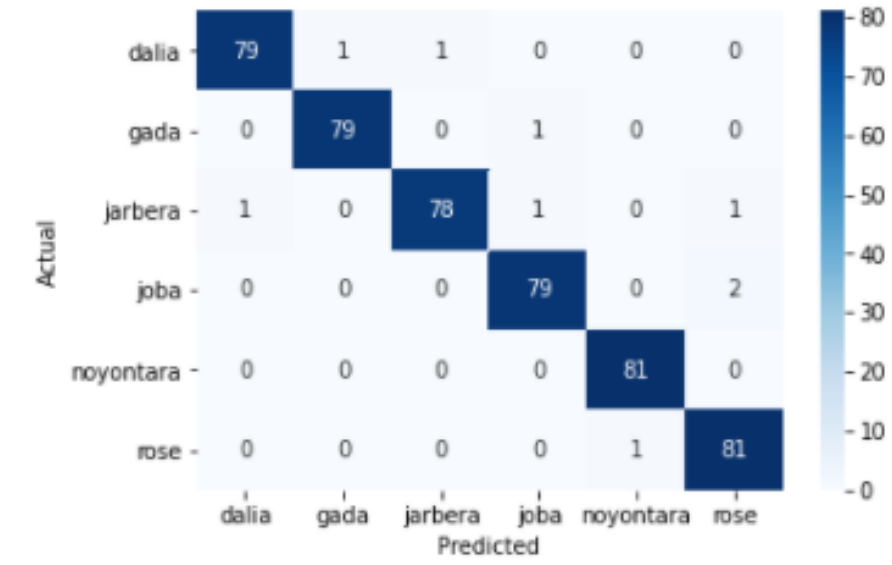
4.2 Experimental Result and Analysis for Inception v3 Model:

Accuracy level for every epoch:
We got best accuracy 97.53% in epoch number 11.

```
Epoch 1/15
45/45 [==============================] - 585s 13s/step - loss: 28.1551 - accuracy: 0.5949 - val_loss: 1.7217 - val_accuracy: 0.9443
Epoch 2/15
45/45 [==============================] - 228s 5s/step - loss: 0.8722 - accuracy: 0.9479 - val_loss: 1.1567 - val_accuracy: 0.9402
Epoch 3/15
45/45 [==============================] - 228s 5s/step - loss: 0.2899 - accuracy: 0.9692 - val_loss: 0.7668 - val_accuracy: 0.9567
Epoch 4/15
45/45 [==============================] - 229s 5s/step - loss: 0.6500 - accuracy: 0.9475 - val_loss: 0.7529 - val_accuracy: 0.9485
Epoch 5/15
45/45 [==============================] - 228s 5s/step - loss: 0.3086 - accuracy: 0.9725 - val_loss: 0.7328 - val_accuracy: 0.9649
Epoch 6/15
45/45 [==============================] - 225s 5s/step - loss: 0.1346 - accuracy: 0.9825 - val_loss: 0.4601 - val_accuracy: 0.9691
Epoch 7/15
45/45 [==============================] - 231s 5s/step - loss: 0.2019 - accuracy: 0.9858 - val_loss: 0.7218 - val_accuracy: 0.9608
Epoch 8/15
45/45 [==============================] - 228s 5s/step - loss: 0.0860 - accuracy: 0.9891 - val_loss: 0.7003 - val_accuracy: 0.9732
Epoch 9/15
45/45 [==============================] - 227s 5s/step - loss: 0.2268 - accuracy: 0.9791 - val_loss: 0.4809 - val_accuracy: 0.9649
Epoch 10/15
45/45 [==============================] - 225s 5s/step - loss: 0.1695 - accuracy: 0.9815 - val_loss: 0.4689 - val_accuracy: 0.9691
Epoch 11/15
45/45 [==============================] - 226s 5s/step - loss: 0.1842 - accuracy: 0.9760 - val_loss: 0.5216 - val_accuracy: 0.9753
Epoch 12/15
45/45 [==============================] - 227s 5s/step - loss: 0.1626 - accuracy: 0.9837 - val_loss: 0.5313 - val_accuracy: 0.9588
Epoch 13/15
45/45 [==============================] - 226s 5s/step - loss: 0.1613 - accuracy: 0.9849 - val_loss: 0.5854 - val_accuracy: 0.9649
Epoch 14/15
45/45 [==============================] - 225s 5s/step - loss: 0.0537 - accuracy: 0.9952 - val_loss: 0.5887 - val_accuracy: 0.9588
Epoch 15/15
45/45 [==============================] - 221s 5s/step - loss: 0.1902 - accuracy: 0.9807 - val_loss: 0.6854 - val_accuracy: 0.9629
```

FIGURE 4.2.1: ACCURACY FOR INCEPTION-V3 MODEL

Confusion Matrix:




```
test accuracy : 98.14814814814815
```

FIGURE 4.2.2: CONFUSION MATRIX FOR INCEPTION V3 MODEL

Plot Diagram:

Train accuracy and Validation accuracy:

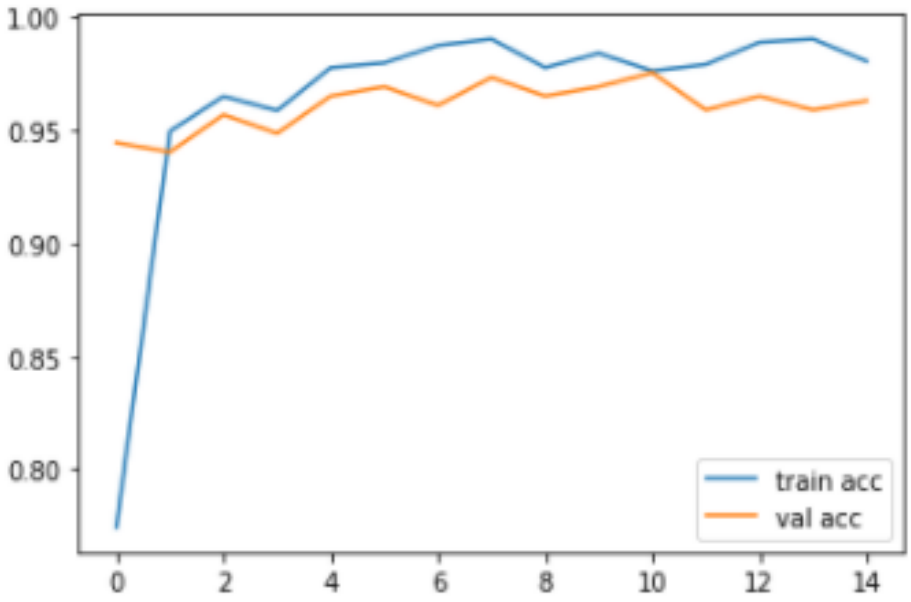


FIGURE 4.2.3: TRAIN AND VALIDATION ACCURACY FOR INCEPTION V3 MODEL

Train loss and validation loss:

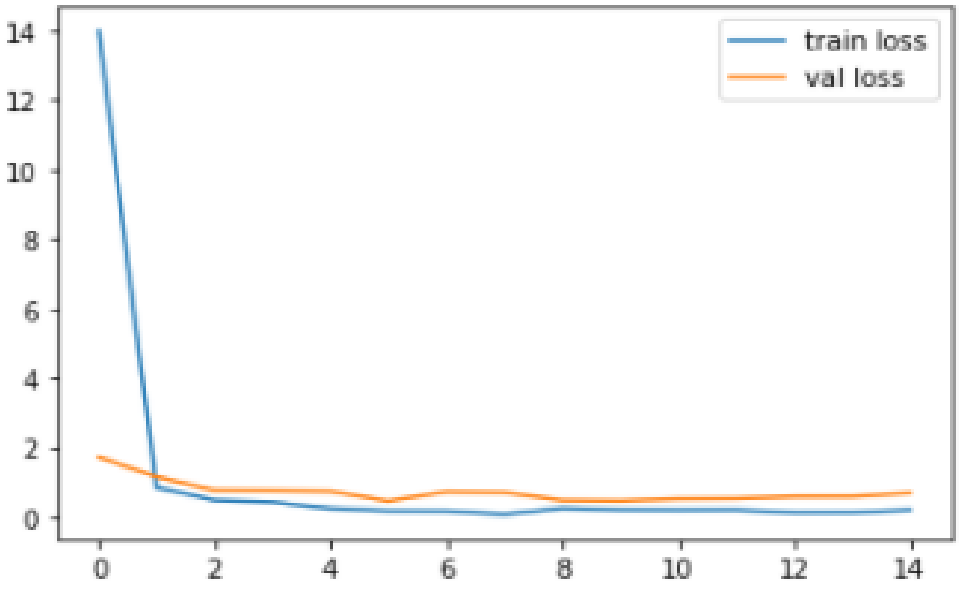


FIGURE 4.2.4: TRAIN AND VALIDATION LOSS FOR INCEPTION V3 MODEL

4.3 Experimental Result and Analysis for MobileNet Model:

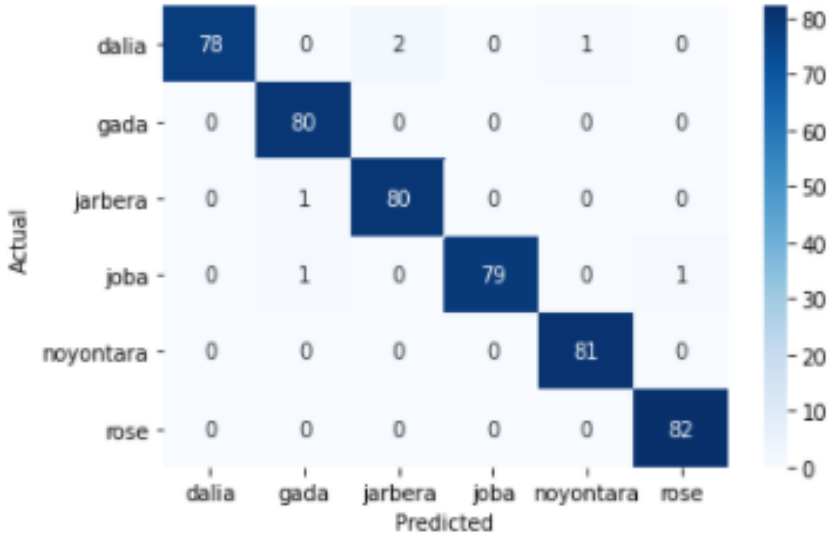
Accuracy level for every epoch:

We got best accuracy 98.56% in epoch number 6 & 9.

```
Epoch 1/15
45/45 [==============================] - 682s 15s/step - loss: 20.7450 - accuracy: 0.6917 - val_loss: 0.4298 - val_accuracy: 0.9649
Epoch 2/15
45/45 [==============================] - 116s 3s/step - loss: 0.4516 - accuracy: 0.9796 - val_loss: 0.3758 - val_accuracy: 0.9794
Epoch 3/15
45/45 [==============================] - 116s 3s/step - loss: 0.3332 - accuracy: 0.9732 - val_loss: 0.5660 - val_accuracy: 0.9753
Epoch 4/15
45/45 [==============================] - 115s 3s/step - loss: 0.1139 - accuracy: 0.9891 - val_loss: 0.3884 - val_accuracy: 0.9711
Epoch 5/15
45/45 [==============================] - 115s 3s/step - loss: 0.0784 - accuracy: 0.9949 - val_loss: 0.3020 - val_accuracy: 0.9814
Epoch 6/15
45/45 [==============================] - 116s 3s/step - loss: 0.1218 - accuracy: 0.9916 - val_loss: 0.3048 - val_accuracy: 0.9856
Epoch 7/15
45/45 [==============================] - 115s 3s/step - loss: 0.0676 - accuracy: 0.9915 - val_loss: 0.4538 - val_accuracy: 0.9773
Epoch 8/15
45/45 [==============================] - 116s 3s/step - loss: 0.0964 - accuracy: 0.9920 - val_loss: 0.5349 - val_accuracy: 0.9773
Epoch 9/15
45/45 [==============================] - 115s 3s/step - loss: 0.1646 - accuracy: 0.9924 - val_loss: 0.3872 - val_accuracy: 0.9856
Epoch 10/15
45/45 [==============================] - 116s 3s/step - loss: 0.0606 - accuracy: 0.9952 - val_loss: 0.4938 - val_accuracy: 0.9649
Epoch 11/15
45/45 [==============================] - 116s 3s/step - loss: 0.0335 - accuracy: 0.9960 - val_loss: 0.6459 - val_accuracy: 0.9711
Epoch 12/15
45/45 [==============================] - 116s 3s/step - loss: 0.1024 - accuracy: 0.9930 - val_loss: 0.6845 - val_accuracy: 0.9794
Epoch 13/15
45/45 [==============================] - 124s 3s/step - loss: 0.2347 - accuracy: 0.9880 - val_loss: 0.5334 - val_accuracy: 0.9814
Epoch 14/15
45/45 [==============================] - 118s 3s/step - loss: 0.0520 - accuracy: 0.9955 - val_loss: 0.5754 - val_accuracy: 0.9835
Epoch 15/15
45/45 [==============================] - 118s 3s/step - loss: 0.0505 - accuracy: 0.9974 - val_loss: 0.6836 - val_accuracy: 0.9794
```

FIGURE 4.3.1: ACCURACY FOR MOBILENET MODEL

Confusion Matrix:




```
test accuracy : 98.76543209876543
```

FIGURE 4.3.2: CONFUSION MATRIX FOR MOBILENET MODEL

Plot Diagram:

Train accuracy and Validation accuracy:

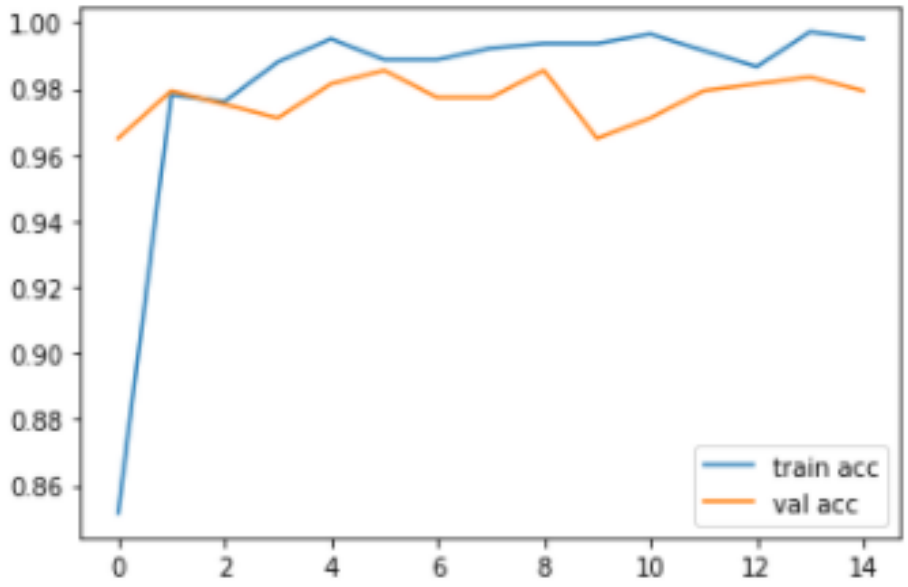


FIGURE 4.3.3: TRAIN AND VALIDATION ACCURACY FOR MOBILENET MODEL

Train loss and validation loss:

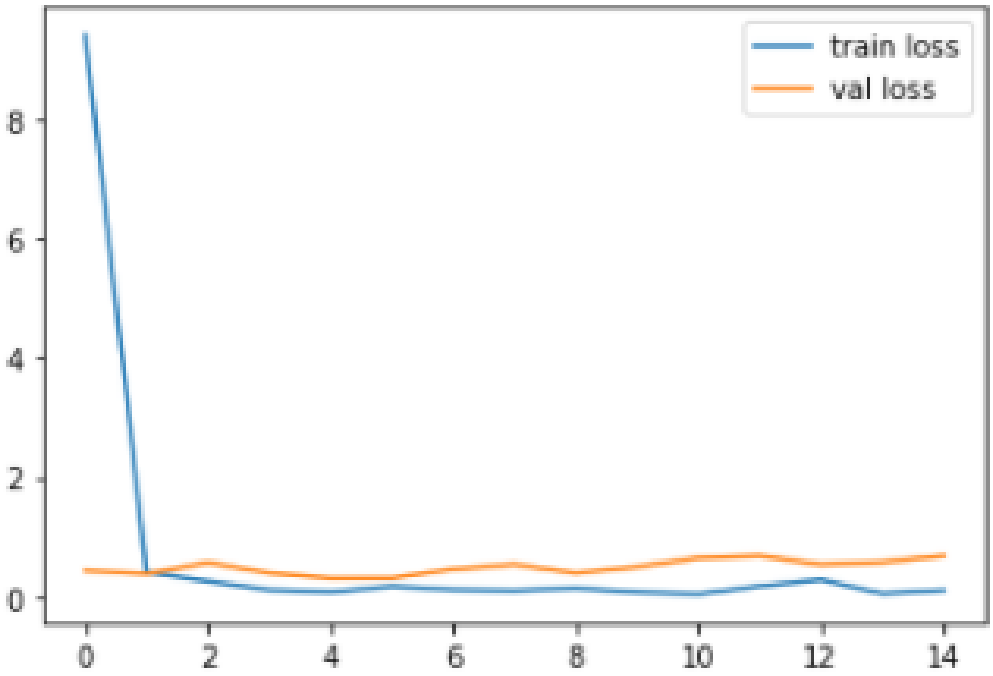


FIGURE 4.3.4: TRAIN LOSS AND VALIDATION LOSS FOR MOBILENET MODEL

4.4 Experimental Result and Analysis for VGG-19 Model:

Accuracy level for every epoch:

We got best accuracy 97.94 in epoch number 10.

```
Epoch 1/10
45/45 [==============================] - 1261s 28s/step - loss: 7.8970 - accuracy: 0.3942 - val_loss: 0.2856 - val_accuracy: 0.9052
Epoch 2/10
45/45 [==============================] - 1238s 28s/step - loss: 0.1671 - accuracy: 0.9410 - val_loss: 0.1802 - val_accuracy: 0.9443
Epoch 3/10
45/45 [==============================] - 1236s 28s/step - loss: 0.0923 - accuracy: 0.9750 - val_loss: 0.1613 - val_accuracy: 0.9505
Epoch 4/10
45/45 [==============================] - 1240s 28s/step - loss: 0.0532 - accuracy: 0.9887 - val_loss: 0.1605 - val_accuracy: 0.9567
Epoch 5/10
45/45 [==============================] - 1237s 28s/step - loss: 0.1001 - accuracy: 0.9641 - val_loss: 0.1938 - val_accuracy: 0.9464
Epoch 6/10
45/45 [==============================] - 1237s 28s/step - loss: 0.0662 - accuracy: 0.9765 - val_loss: 0.1863 - val_accuracy: 0.9485
Epoch 7/10
45/45 [==============================] - 1230s 27s/step - loss: 0.0606 - accuracy: 0.9754 - val_loss: 0.1477 - val_accuracy: 0.9670
Epoch 8/10
45/45 [==============================] - 1226s 27s/step - loss: 0.0387 - accuracy: 0.9901 - val_loss: 0.1370 - val_accuracy: 0.9670
Epoch 9/10
45/45 [==============================] - 1223s 27s/step - loss: 0.0217 - accuracy: 0.9956 - val_loss: 0.1341 - val_accuracy: 0.9670
Epoch 10/10
45/45 [==============================] - 1230s 27s/step - loss: 0.0171 - accuracy: 0.9968 - val_loss: 0.1165 - val_accuracy: 0.9794
```

FIGURE 4.4.1: ACCURACY FOR VGG-19 MODEL

Confusion Matrix:


```
test accuracy : 98.14814814814815
```

FIGURE 4.4.2: CONFUSION MATRIX FOR VGG-19 MODEL

Plot Diagram:

Train accuracy and Validation accuracy:

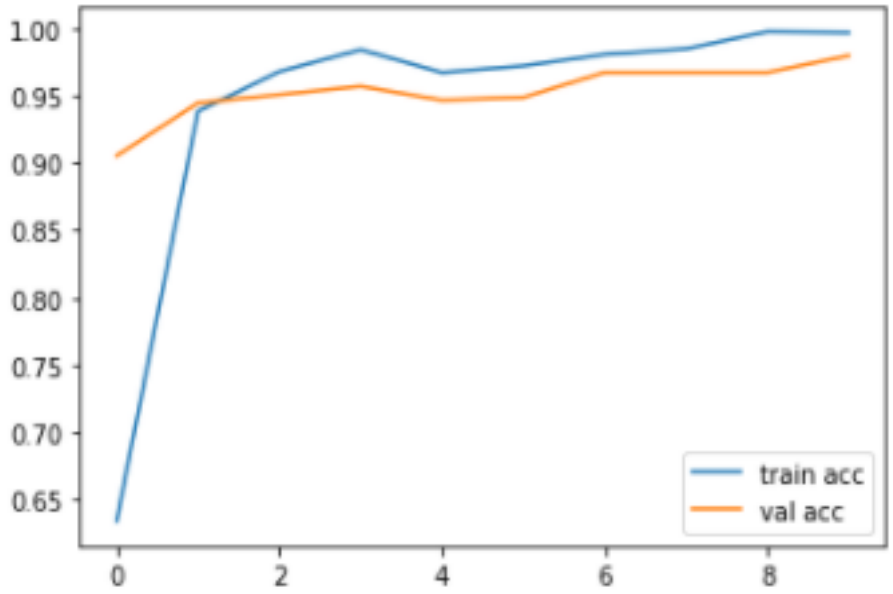


FIGURE 4.4.3: TRAIN AND VALIDATION ACCURACY FOR VGG-19 MODEL

Train loss and validation loss:

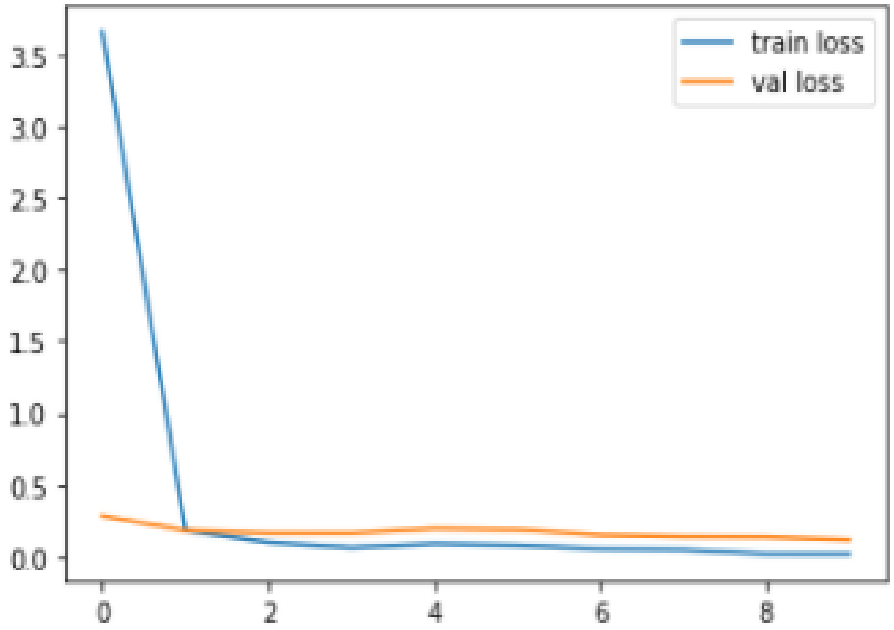


FIGURE 4.4.4: TRAIN AND VALIDATION LOSS FOR VGG-19 MODEL

4.5 Experimental Result and Analysis for ResNet-50 Model:

Accuracy level for every epoch:

We got best accuracy 72.16% in epoch number 7.

```
Epoch 1/10
45/45 [==============================] - 662s 15s/step - loss: 23.2223 - accuracy: 0.2022 - val_loss: 1.7471 - val_accuracy: 0.4309
Epoch 2/10
45/45 [==============================] - 347s 8s/step - loss: 1.9966 - accuracy: 0.4024 - val_loss: 1.2265 - val_accuracy: 0.5175
Epoch 3/10
45/45 [==============================] - 342s 8s/step - loss: 1.1782 - accuracy: 0.5606 - val_loss: 1.0570 - val_accuracy: 0.6247
Epoch 4/10
45/45 [==============================] - 341s 8s/step - loss: 1.2250 - accuracy: 0.5488 - val_loss: 1.8638 - val_accuracy: 0.3938
Epoch 5/10
45/45 [==============================] - 342s 8s/step - loss: 1.1255 - accuracy: 0.5779 - val_loss: 1.1266 - val_accuracy: 0.5670
Epoch 6/10
45/45 [==============================] - 350s 8s/step - loss: 0.9922 - accuracy: 0.6374 - val_loss: 0.9123 - val_accuracy: 0.7031
Epoch 7/10
45/45 [==============================] - 348s 8s/step - loss: 0.8576 - accuracy: 0.6788 - val_loss: 0.8214 - val_accuracy: 0.7216
Epoch 8/10
45/45 [==============================] - 349s 8s/step - loss: 0.9820 - accuracy: 0.6547 - val_loss: 1.3416 - val_accuracy: 0.5856
Epoch 9/10
45/45 [==============================] - 350s 8s/step - loss: 1.0784 - accuracy: 0.6104 - val_loss: 1.2776 - val_accuracy: 0.6103
Epoch 10/10
45/45 [==============================] - 347s 8s/step - loss: 0.9937 - accuracy: 0.6460 - val_loss: 0.9534 - val_accuracy: 0.6515
```

FIGURE 4.5.1: ACCURACY FOR RESNET-50 MODEL

.

Confusion Matrix:

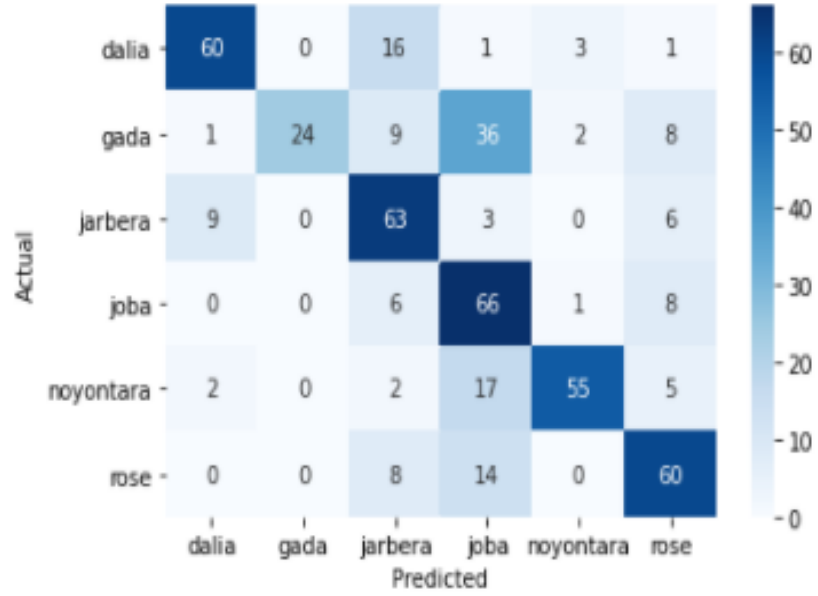


FIGURE 4.5.2: CONFUSION MATRIX FOR RESNET-50 MODEL

Plot Diagram:

Train accuracy and Validation accuracy:

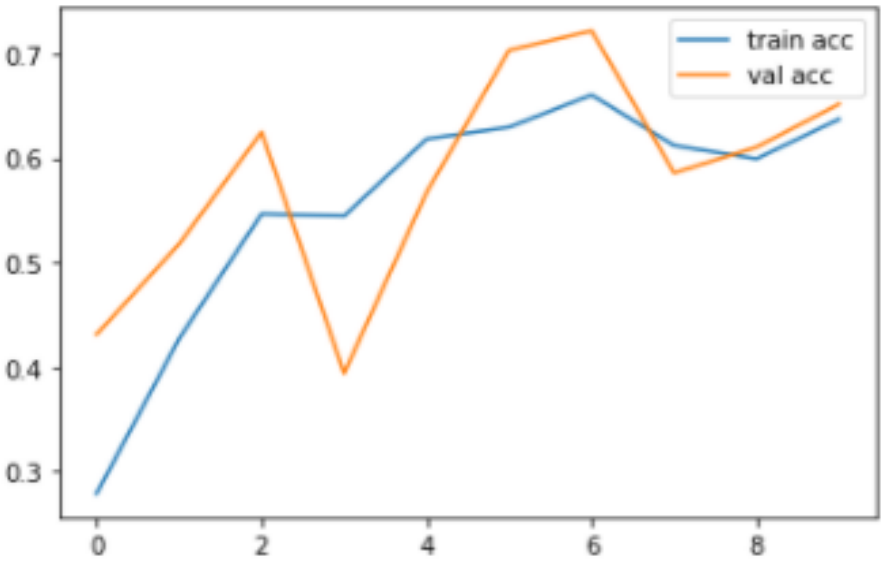


FIGURE 4.5.3: TRAIN AND VALIDATION ACCURACY FOR RESNET-50 MODEL

Train loss and validation loss:

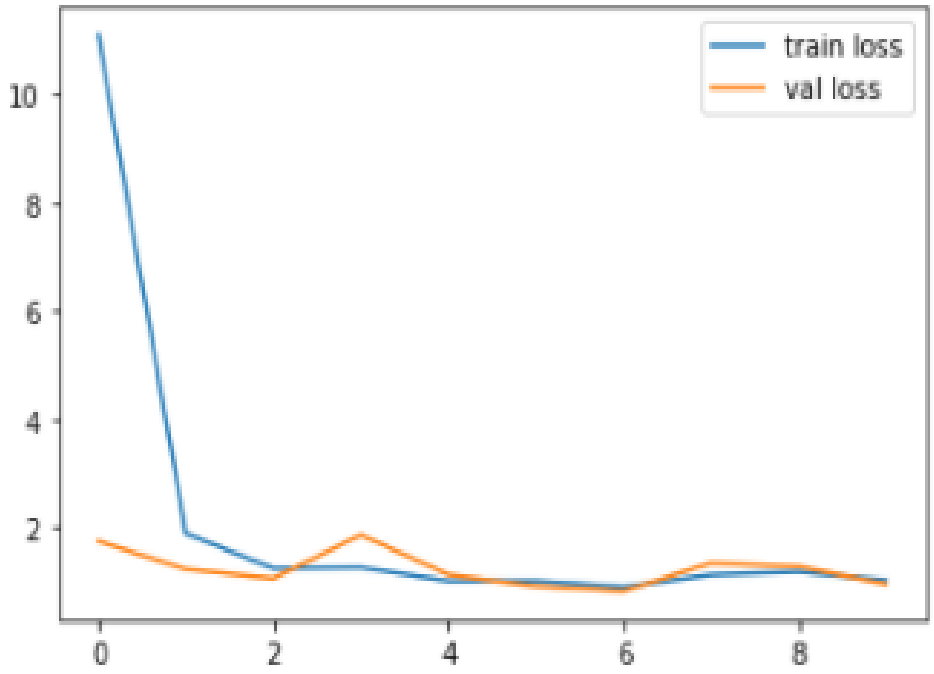


FIGURE 4.5.4: TRAIN AND VALIDATION LOSS FOR RESNET-50

4.6 Experiment Summary

In this project we have classified some Bangladeshi local flower. We focused on accuracy level. Accuracy rate depends on the amount of data. We used 400 data for every flower and our whole dataset contain 2400 image. We used 4 types of CNN model to find out the accuracy. We got our best test accuracy 98.76% by using MobileNet model. We got lower test accuracy 67.49% by using ResNet-50 model. As we know that accuracy depends on the amount of data. If we increase our data and preprocess the data carefully then accuracy level would be better.

CHAPTER 5

CONCLUSION, LIMITATIONS AND RUTURE WORK

5.1 Conclusion

The most beautiful aspect of a plant is its flower, which is the easiest way to recognize it. As a result recognizing the flower will assist in learning more about the plant. The proposed framework is highly accurate since the model is a convolutional neural network, which has proved to be one of the most effective image classification methods. The project's ultimate aim is to develop and optimize a convolutional network for flower classification. To get best outcome, flowers in the input should be transparent and of good quality with a variety of background colors. The training data determines how effective flower classification is. The system is more robust when the training dataset has a large number of variables.

5.3 Limitations

1. Due to this covid-19 pandemic situation we could not enough data for our project.
2. We work with only four algorithms but there are so many algorithms that can be used for our project.

5.2 Future Work

This project has a lot of potential for future growth. In our proposed system we only classifying the flower but we don't make any application that can recognize flowers. It would be possible to make an android application that can recognizes the flower in real time by using mobile camera. Other characteristics of the flowers will be used in classification in the future like texture, size. To improve accuracy, other classification methods may be investigated. The database should be expanded to hold more information. In our system we work with only six flower. So we can be added more item of flower to enrich our dataset.

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