INTERNATIONAL JOURNAL OF SCIENTIFIC RESEARCH IN ENGINEERING AND MANAGEMENT (IJSREM)
VOLUME: 05 ISSUE: 07 | JULY - 2021 ISSN: 2582-3930

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Flower Identifier

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Abstract

Improving the recognition of rare plant species will be of benefit to sectors such as the pharmaceutical, pharmaceutical, agricultural and commercial industries. And it has been a great challenge that there are so many different types of flowers and it is very difficult to distinguish them when they are not exactly the same. Therefore, this issue is already very important. In this context, this paper outlines a system for classifying flower images using Deep CNN and Data Augmentation. More recently, Deep CNN's strategies have become the latest technology for such issues. However, the fact is that finding the best performance with flower separation is delayed due to the lack of labeled data. In the study, there are three main contributions: First, we developed a differentiation model to develop the function of flower image classification using Deep CNN to extract various features and learning programs for different devices for segmentation purposes. Second, we have shown the use of the appendix to get better performance results. Finally, we compared the performance of machine learning classifiers such as SVM, Random Forest, KNN, and Multi-Layer Perceptron (MLP). In the study, we examined our classification system using two data sets: Oxford-17 Flowers, and Oxford-102 Flowers. We divided each database into training and test sets at 0.8 and 0.2, respectively. As a result, we obtained the best accuracy of the Oxford 102-Flowers Dataset as 98.5% using SVM segmentation. In the Oxford 17-Flowers Dataset, we found the best accuracy as 99.8% with Classified MLP. These results are better than others 'that separate similar data sets from texts.

I. Introduction

Flowers are the world's most important producers and can grow in a wide variety of climates. And they continue to play a vital role in the food chain by feeding almost all species of insects on earth. In addition they play an important role in the diet chain, and many drugs can be produced using their healing properties. For such reasons, a good knowledge of flowers and their variety can be very important when it comes to identifying new or unusual plants. Alternatively, many crops can be damaged because they are considered to be harmful to human farm or can be sold at very low prices. And all this is due to insufficient recognition of plant species. However, it is a fact that many plants grown in nature can be cultivated. In addition, increasing the recognition capacity of many existing plant species, such as elecampane, verbascum thapsus whose limited life is limited and grown only under special climatic conditions, will support the development of the pharmaceutical industry. Thanks to studies in this field, less well-known plants will be able to identify the true value.

Improving the recognition of rare plant species will be of benefit to sectors such as the pharmaceutical, pharmaceutical, agricultural and commercial industries. And it has been a great challenge that there are so many different types of flowers and it is very difficult to distinguish them when they are not exactly the same. Therefore, this issue is already very important. It is a realistic idea that many plants grown in nature can be cultivated. In addition, increasing the recognition capacity of many existing plant species, such as elecampane, verbascum thapsus whose limited life is limited and grown only under special climatic conditions, will support the development of the pharmaceutical industry. Flower photo segmentation system using Deep CNN and Data Augmentation. More recently, Deep CNN's strategies have become the latest technology for such issues. However, the fact is that finding the best performance with flower separation is delayed due to the lack of labeled data. In the study, there are three main contributions: First, we developed a differentiation model to develop the function of flower image classification using Deep CNN to extract various features and learning programs for different devices for segmentation purposes. Second, we have shown the use of the appendix to get better performance results. Finally, we compared the performance of machine learning classifiers such as SVM, Random Forest, KNN, and Multi-Layer Perceptron (MLP).

II. Literature Review

2.1. Gogul, V. Sathiesh kumar proposed a Flower Species Recognition System victimisation Convolution Neural Networks and Transfer Learning. The user captures a flower image victimisation smartphone (assuming the flower because the solely object in foreground with some random background). The captured image is then regenerate to a base64 string format. it's then sent to a cloud storage platform referred to as "Firebase" wherever it gets keep in an exceedingly JSON format (username, time, date, image_id and image). At the server aspect, the trained CNN system on FLOWERS28 dataset receives the

recent flower image in base64 kindat and converts it into a customary matrix form for process. The regenerate image is shipped to the CNN wherever its output category label is foretold. when prediction, the label name is shipped to constant username with same image_id, from wherever the smartphone receives an automatic response of the flower name from the cloud storage platform.

2.2. Jung-Hyun Kim, Rong-Guo Huang, Sang-Hyeon Jin and Kwang-Seok Hong bestowed this paper and suggests and implements a mobile-based flower recognition system victimisation distinction Image Entropy (DIE) and contour options of the flower from the first image with multiflower objects. In system framework includes 1) WiBro Net-based transmission and designation module of the relevantflower object by drawing the flower region of the user's interest, 2) contour feature extraction module, and 3) DIE based flower recognition module. The system was evaluated using ten species of flowers with each ten samples. Experimental results achieved an optimum average recognition rate of 95% and average response run-time of 9,033ms, for a set of ten images per species.

2.3. Tanakorn Tiay, Pipimphorn Benyaphaichit, and Panomkhawn Riyamongko proposed a system that uses edge and color characteristics of flower images to classify flowers. Hu's sevenmoment algorithm is applied to acquire edge characteristics. Red, green, blue, hue, and saturation characteristics are derived from histograms. K-nearest neighbor is used to classify flowers. The accuracy of this system is more than 80%. The first step is the image acquisition. The input image file can be a file, which is already downloaded in the computer memory or stored elsewhere and is readily available. A storage facility 'in the Cloud', such as Dropbox [7] enhances the mobility of this system. The image may be a photo downloaded from a smart phone or digital camera. The image data is pre-processed to prepare the image data for analysis. In the image analysis section, Hu's seven-moment algorithm of shapes together with RGB and HS data are used. After that, two information elements are combined as a vector and classified by the K-nearest neighbor algorithmic program. Our system returns the highest 3 most similar flower pictures. Finally, the output half shows input flower pictures, a collection of candidate flower pictures and flower data.

III. Methodology

Implementation

The implementation is one phase of software development. Implementation is that stage in the project where theoretical design is turned into working system. Implementation involves placing the complete and tested software system into actual work environment. Implementation is concerned with translating design specification with source code. The primary goal of implementation is to write the source code to its specification that can be achieved by making the source code clear and straight forward as possible. Implementation means the the process of changing a brand new or revised system style into operational one. The implementation is the final stage and it's an important phase. It involves the individual programming, system testing, user training and the operational running of developed proposed system that constitute the application subsystems. One major task of preparing for implementation is education of users, which should really have been taken place much earlier in the project when they were being involved in the investigation and design work. During this implementation phase system actually takes physical shape. Depending on the size of the organization and its requirements the implementation is divided into three parts:

3.1. Stage Implementation

Here system is implemented in stages. The whole system is not implemented at once. Once the user starts working with system and is familiar with it, then a stage is introduced and implemented. Also the system is usually updated, regularly until a final system is sealed.

3.2. Direct Implementation

The projected new system is enforced directly and therefore the user starts engaged on the new System. The disadvantage, if any, visaged square measure then corrected later.

3.3. Parallel Implementation

Was implemented on approach of prototype model whose functionality was in- creased day by day, as the client was given full liberty in choosing his needs and gets to the maximum benefit out of the system developed. Implementation is that process plan where the theoretical design is put into real test. All the theoretical and practical works are now implemented as a working system. This is most crucial stage in the life cycle of a project.

IV. Experiment and Results

The Resnet152 dataset is split into 6552 training images, 409 for validation and 409 for testing. The below screenshot shows the experiment result obtained by each epoch, at epoch 1 we have training loss is 2.994, test loss is 2.343 and the test accuracy we get is 42%, then we continued the process until we get a best accuracy result. It could be noted that at epoch 10 we got a better accuracy of 94.2% the training loss is 0.321 and test loss is 0.26, respectively from this it is clear that the test loss and training loss is decreased after each epoch and the test accuracy is increased.

```
  "https://pytorch.org/docs/stable/optim.html#how-to-adjust-learning-rate", UserWarning
Epoch: 1/10..  Training Loss: 2.994..  Test Loss: 2.343..  Test Accuracy: 0.423
test loss decreased (inf --> 2.343450).  Saving model ...
Epoch: 2/10..  Training Loss: 1.642..  Test Loss: 1.236..  Test Accuracy: 0.643
test loss decreased (2.343450 --> 1.236165).  Saving model ...
Epoch: 3/10..  Training Loss: 1.200..  Test Loss: 0.932..  Test Accuracy: 0.738
test loss decreased (1.236165 --> 0.932037).  Saving model ...
Epoch: 4/10..  Training Loss: 0.922..  Test Loss: 0.873..  Test Accuracy: 0.762
test loss decreased (0.932037 --> 0.872748).  Saving model ...
Epoch: 5/10..  Training Loss: 0.779..  Test Loss: 0.855..  Test Accuracy: 0.772
test loss decreased (0.872748 --> 0.854821).  Saving model ...
Epoch: 6/10..  Training Loss: 0.504..  Test Loss: 0.318..  Test Accuracy: 0.924
test loss decreased (0.854821 --> 0.317611).  Saving model ...
Epoch: 7/10..  Training Loss: 0.396..  Test Loss: 0.287..  Test Accuracy: 0.933
test loss decreased (0.317611 --> 0.286811).  Saving model ...
Epoch: 8/10..  Training Loss: 0.359..  Test Loss: 0.273..  Test Accuracy: 0.938
test loss decreased (0.286811 --> 0.273169).  Saving model ...
Epoch: 9/10..  Training Loss: 0.330..  Test Loss: 0.258..  Test Accuracy: 0.941
test loss decreased (0.273169 --> 0.257661).  Saving model ...
Epoch: 10/10..  Training Loss: 0.321..  Test Loss: 0.260..  Test Accuracy: 0.942
```

Fig: Epoch result

4.1. Functional Specifications and User Characteristics

- You can upload a *.jpg file to get the results.
- Provide a faster a faster way for flower identification.
- Simple and easy to understand web user interface with flask.
- An android application is also available for user convenience
- High Performance the loading time of it is extremely fast. Users used not have to wait for age to load a page anymore.
- The result in addition to identification provides user with information about the flower species.
- It could be noted that at epoch 10 we got a better accuracy of 94.2% the training loss is 0.321 and test loss is 0.26.

V. Conclusion & Future work

"Flower Identification web app" is a Machine Learning project developed using python. We use dataset including different types of flower mostly common in United Kingdom. It's pre-trained resnet152 model and then trained to classify flower images. The algorithms used in the project is Convolutional Neural Networks (CNN) and Back propagation algorithms is aimed to recognize flower species with high accuracy. These algorithms are trained using the data collected from pre-trained resnet152 and are capable of identifying flower. The objective of the project is to predict the flower based on the picture we are uploading. We are developed a user interface in such a way that the users can easily upload the images into the web-app

Future scope of the project

The projected work could be a quicker thanks to train a Convolutional Neural Network (CNN) with a smaller dataset and restricted procedure resource like CPU. As there area unit countless flower species round the world, this net app may simply be tailored by coaching additional variety of flower species pictures to acknowledge totally different species round the world. Thus, the long run work would be to construct a bigger information with not solely flower pictures, however conjointly with leaves, fruits, bark etc., collected from different sources around different elements of the planet. This web-app would even be helpful to spot plants for healthful functions like just in case of aid. The user will quickly take a picture of the plant species and acquire info regarding it to make a decision whether or not or not it are often used for aid. The crucial half in building such a system is that the coaching dataset that has to be ready either by manually taking footage of the plants round the town or by using public datasets.

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