Journal of Engineering Sciences
Vol 11, Issue 4 , April/2020
ISSN NO:0377-9254

PLANT LEAF RECOGNITION USING A CONVOLUTION NEURAL NETWORK

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ABSTRACT

There are hundreds of varieties of trees in the natural ecosystem, so it can be very difficult to differentiate between them. Nonetheless, botanists and those who research plants will identify the type of tree at a glance, using the features of the leaf. Machine learning is used to identify the leaf forms automatically. Extensively studied in 2012, this is a rapidly growing deep rooted field. Deep learning is itself a self-learning method used on vast volumes of data, and this methodology has been made more realistic by recent advances in hardware and big data. We suggest a method for classifying leaves using the CNN model, which is mostly used when applying profound learning to processing of images.

1. INTRODUCTION

Plants are important to humanity. Herbs, in particular, have been used by Indigenous people since ancient times as folk medicines. Herbs are usually identified by practitioners based on years of Experiences through personal sensor of factory sense. Recent advances analytical technology based on scientific data has greatly assisted in herbal identification. This ease a lot of people, particularly those who lack herbal recognition experience. Laboratory based research requires skills in sample care and data analysis, in addition to time consuming procedures. So a simple and reliable herbal recognition technique is required. Computing combined with statistical analysis would likely be an effective herbal recognition tool. This non - destructive technique is the method of choice for the rapid identification of herbs, especially for those who cannot apply expensive analytical tools. One of the common used nondestructive strategies for recognizing herbs is based on morphological photographs of their leaves. Plant leaves are sufficiently representative for high accuracy die rentiation of plant species or variety. At present , the specialty of plant taxonomists is still plant identification.

2. LITERATURE SURVEY

2.1 EXISTING SYSTEM:

There are about 100,000 species of trees nearth, representing about 25 per cent of all plants. Many of the trees are in tropical regions, and it is believed that there are many undiscovered species because only limited botanical research has been carried out in those areas. Lots of undiscovered species are believed to exist. It is clear that it is a complex process to classify large numbers of such trees. Plums and apricots can be seen as an indicator of the difficulty of tree identification. These are very similar in the form of the leaf, the form of the vine, and even the shape of the young fruit. The form of the flora is also very similar, and the type of tree can only be defined by deciding whet her the calyx is attached to the petal, or inverted. In addition, certain trees can't be easily, identified except at specific times. We make use of the CNN model in the proposed system.

Drawback:

- The variation between trees of the same form leaves is difficult to find.
- Because the learning and classification processes are carried out separately, they cannot obtain the optimal feature points.

2.2 PROPOSED SYSTEM:

Deep learning is itself a self learning method used on large volumes of data, and this technique has been made more realistic by recent advances in hardware and large data. We propose a system for classifying leaves using the CNN model, often used when applying profound learning to image processing. In this a colour input image was transformed to a binarized image to obtain the outline, and the two dimensional characteristics were then extracted using the out linee image. Such features were grouped using the classifier Moving Median Centers This study showed speeds of execution faster than those of previous studies, and accurate results were obtained using the combination of properties.

Advantages:

• The distinction between trees of the same form leaves is easy to find.

• We can identify the leaves quickly.

3. CNN MODEL

Photo cropping reduces how much processing the GPU uses to minimize the foreground component. It displays the input image used for learning, shows the cropping result using the input image, and displays an image obtained by resizing the cropped image to 229 pixels. They used the modified images as experimental images.

4. RESOURCES & METHODOLOGY

4.1 DATA SET:

Preparation of data collection and dataseting:In t his study, the BJFU100 dataset, which consists of 100 species of ornamental plants on campus at Beij ing Forestry University, may be used.

4.2 METHODS:

4.2.1 Training:

The ResNet-built plant recognition model will be trained by the stochastic gradient descent (SGD) algorithm, with the categori cal cross entropy loss function as an object
ive of optimization.

4.2.2 Evaluation Measures:

Measures such as precision, accuracy will be calculated for evaluating classifier effici ency.

4.2.3 Deployment And Analysis On Real Life Scenario:

The qualified and tested model of plant recognition will be applied in a real- life scen ario.

Block Diagram:

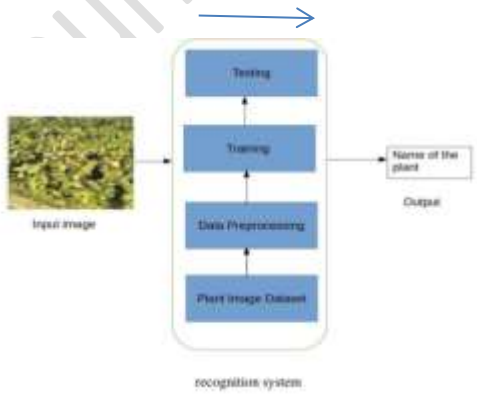


Fig. 1 Architecture Of Plant

5. METHOD LEAF RECOGNITION

5.1 Feature Extraction:

For previous studies, plants were categoriz ed using the colour, contour, texture, and form of the leaf. As shown in Figure 2, with the application of ect., the colour ima ge was converted into a grayscale image. The grayscale image was then transformed by linearization to binary, and the contour was then removed.

Grau=

$$0.299\times Ir+0.587\times I0+0.114\times I \qquad (1)$$

Additionally, transformation features of bri ghtness or shape can be used in cumulative histogram operations. Typical methods are the Oriented Gradient Histogram (OGH) and Scale-Invariant Feature Transform i.e. (SIFT).

The drawbacks of these extraction algorith ms are, first, that the rates of computation are high, and second, that generalization is difficult due to the reliance on specific data.

5.2 Machine Learning:

Machine learning is a process by which sa mple data are categorized after learning touse featur e points. For better performance, the data need to be generalised. Adaboost and support vector machine (SVM) are traditional machine learning models, and the output of these methods depends on the feature point of the inputs.

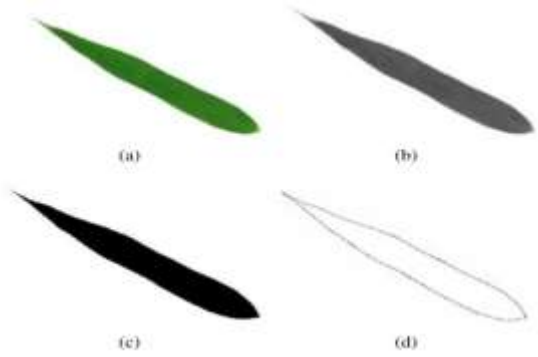


Fig. 2 Example of leaf contour extraction
(a) Input Image, (b) Gray scale image,
(b) Gray scale image,
(c) Binary image, and
(d) contour extraction.

6. SYSTEM REQUIREMENTS

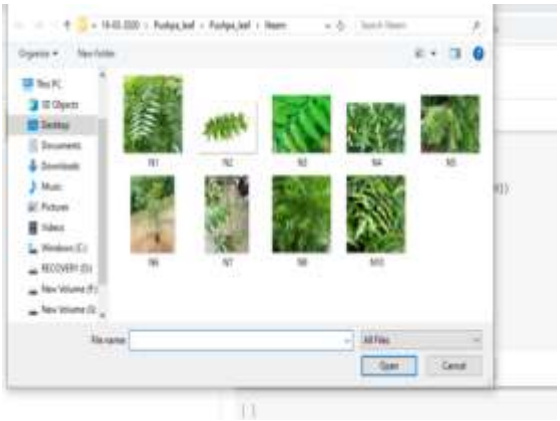
6.1 Hardware Requirements:

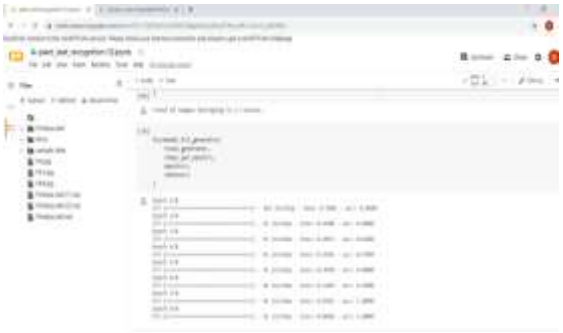
- Cpu - I3/Intel Processor
- RAM - 4GB (min)
- Hard Disk - 160GB
- Keyboard - Windows Regular Keyboard
- Mouse - Two or three mouse buttons
- Display – SVGA

6.2 Software Requirements:

- Python Operating System: Windows 10
- Front End: JavaScript, Jquery, HTML,CSS, BOOTSRAP Scripts.
- Script server side: Python
- Framework: Django, Flask
- Database: My SQL.

RESULTS:





Conclusion:

Many accurate, automated procedures are used to classify leaf patterns. This paper ad dresses primarily the advantages of each classifier and compares its consistency with the leaf application recognition process. Computer vision approach that can fully disregard the background of the image accelerates the identification process and is ideal for highly complex plant leaf samples. A tool that neglects distortion significantly enhances recognition technology and makes it much more feasible to recognize aquatic fauna, as aquatic plants or algae do not have a definitive form. The new image processing technique should be reliable at various light intensities. A latest approach can be established by changing the detection technique which can lead to accurate detection of disease. The benefit may also be applied to recognizing herbal plants in order to avoid adulteration in order to improve quality control, especially for healh and safety.

REFERENCES

[1] I. Friis and H. Balslev, "Plant diversity and complexity patterns: local, regional, and global dimensions," in Proceedings of an International Symposium, Held at the Royal Danish Academy of Sciences and Letters, Copenhagen, Denmark, 2003, pp.
25-28.

[2] Y. Nam and E. Hwang, "A representation and matching method for shape-based leaf image

retrieval," Journal of KIISE: Software and Applications, vol. 32, no. 11, pp. 1013-1021, 2005.
[3] Y. Nam, J. Park, E. Hwang, and D. Kim, "Shape-based leaf image retrieval using venation feature," Proceedings of 2006 Korea Computer congress, vol.33, no. 1D, pp. 346-348, 2006
[4] A. Krizhevsky, I. Sutskever, and G. E. Hinton. "ImageNet classification with deep convolutional neural networks," in Proceedings of the 25th International Conference on Neural Information Processing Systems, Lake Tahoe, NV, 2012, pp. 1097-1105.
[5] J. X. Du, X. F. Wang, and G. J. Zhang, "Leaf shape based plant species recognition," Applied Mathematics and Computation, vol. 185, no. 2, pp. 883-893,2007. http://dx.doi.org/10.1016/j.amc.2006.07.072