International Journal of Research in Engineering and Science (IJRES)
ISSN (Online): 2320-9364, ISSN (Print): 2320-9356
www.ijres.org Volume 11 Issue 6 ǁ June 2023 ǁ PP. 457-462

Accurate Identification of MedicinalPlants for Better Environment

Swathi, S.
Assistant Professor Department of Computer Science and Engineering
Sri Sairam Institute of Technologylaxmiswathiks@gmail.com

Pavithra S
Department of Computer Science andEngineering
Sri Sairam Institute of TechnologyChennai sit21cs055@sairamtap.edu.in

Harini A
Department of Computer Science andEngineering
Sri Sairam Institute of TechnologyChennai sit21cs149@sairamtap.edu.in

Hemasri P
Department of Computer Science and Engineering
Sri Sairam Institute of TechnologyChennai sit21cs122@sairamtap.edu.in

Abstract—*In Ayurveda, folk, and herbal medicine industries, it is crucial to identify the proper medicinal plants used in the manufacturing of a treatment. A medicinal plant can be recognized primarily by its leaf shape, color, and texture. The accurate study and management of biodiversity depend on being able to identify plant species. Deterministic parameters to identify the species are present in the color and texture of the leaf on both sides. In this study, we investigate morphological features, feature vectors from the front and backof a green leaf, and feature vectors to find a special best combination of features that increases the recognition rate. Scanned photos of the front and back of the leaves of frequently used medicinal plants are used to build a database of medicinal plant leaves. The form and dimension combination is used to categorized leaves. It is anticipated that this approach will considerably contribute to the production of pharmaceutical drugs, aid taxonomists in the development of more effective species identification methods, and aid community members in expanding their understanding of medicinal plants.*
Keywords*—Convolutional neural network, visually challenged, virtual assistant, facial expression, machine learning,emotion detection*

Date of Submission: 13-06-2023 Date of acceptance: 28-06-2023

I. INTRODUCTION

There are thousands of different plant species in the globe, many of which have medical uses while others are in danger of going extinct. The manufacture of herbal, ayurveda, and folk medicines makes the most use of the medicinal plants. Natural alternatives to conventional medicine can be found in herbal plants. Over 80% of people in the globe still rely on conventional medicine. Herbal plants, on the other hand, are regarded as plants whose plant parts (leaves, stems, or roots) have qualities that can be employed as raw materials in the creation of contemporary or conventional medications. Man relied on the therapeutic effects of medicinal plants before chemical medications were developed. Due to the enduring myth that plants were intended to provide man with food, medical care, and other benefits, some people place a high value on these plants. Forests are a common place to find these medicinal plants. In herbal treatments from various Indian medical traditions, 1500 of these plants are mixed. Ayurvedic medications sold commercially use 500 of these plants explicitly. Over 80% of the plants used in ayurvedic formulations are taken from forests and wastelands; the remaining 20% are produced on land utilized for farming. There are around 8000 plants with Indian heritage that have been shown to have medicinal benefits.

II. AIM OF THE PROJECT

The main goal of pre-processing data in the context of medicinal plants is to present it in a way that the system can easily understand and process. Specifically, the pre-processing stage focuses on extracting the features of various medicinal plants and then matching these features to images for recognition purposes. It is worth noting that plants have been used as a way of curing human diseases for thousands of years and have been a substantial source of medicines. With a long history of consumption, medicinal plants come in hundreds of classes. This is the reason why pre-processing data plays a crucial role in recognizing the images of these plants, helping researchers to better understand their properties and potential benefits for human health.

III. EXISTING SYSTEM

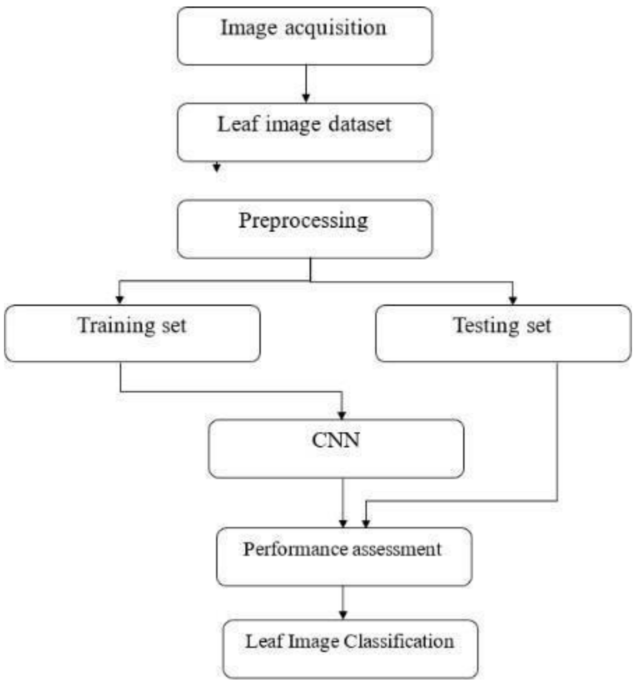
The proposed automated classification strategy based on leaf photos of medicinal herbs to address the issues with standard classification algorithms in recognizing medicinal plants. The procedure starts by preprocessing photos of medicinal plant leaves, then computes 10 shape features and 5 texture features, and then classifies medicinal plant leaves using a support vector machine (SVM). Twelve different medicinal plant leaf photos were classified using the classification model, with an average success rate of 93.3%. The results show that it is possible to automatically classify medicinal herbs using multi-feature analysis of leaf images in conjunction with SVM. The article offers a helpful conceptual framework for the study and development of classification models for medicinal herbs.

IV. PROPOSED SYSTEM

It has been suggested a novel technique for identifying medicinal plants using photos taken from various angles of both the front and back of the leaves. The project's foundation is a database of illustrations of medicinal plant leaves. It has been discovered that specific texture and shape combinations of morphological traits maximize the identification rate of green leaves. When a plant leaf image is entered into the system via this manner, the system displays the leaf's image, its local name, its scientific name, whether it comes from a medicinal plant or not, its qualities, and any diseases it can treated and replaced. set of gestures are predefined in the system.

A. System Design and Architecture

1. Two methods of input are used: the camera and the pictures.
2. Using a scanner with the highest resolution available, the front and back of the leaves are scanned. The leaf image dataset contains these pictures.
3. They have already been processed. The dataset's image dimensions are predetermined to be the appropriate size.
4. The pre-processed dataset has now been split intotraining and testing dataset.
5. The Convolutional neural network is now fed with thetraining data set.

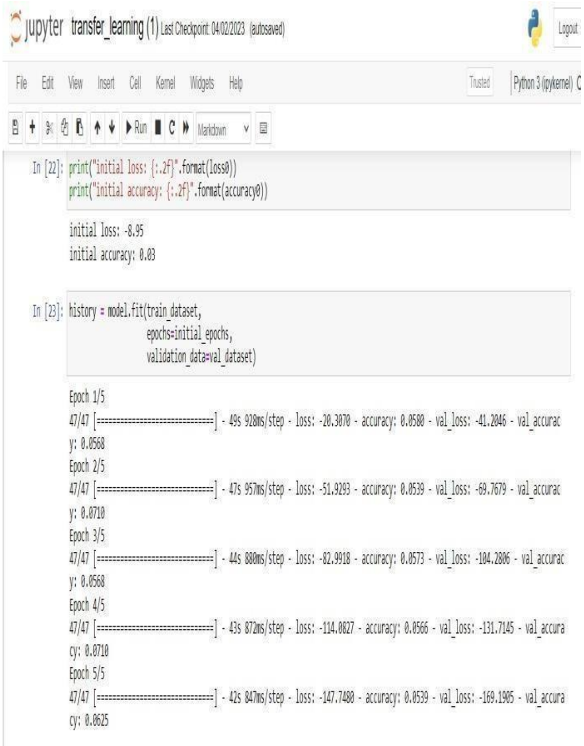


B. Methodology

1. Training the Data:

The accuracy and loss are calculated for each epoch used to train the 3777 picture dataset under consideration. The quantity of epochs determines how frequently a learning algorithm views the entire dataset. A single epoch is the single forward and reverse pass through the neural network of the complete dataset. Loss is the amount of all model errors, while accuracy is the proportion of accurate predictions to all predictions. Back propagation is how this process happens.

2.* Displaying the Training Images*:



During the training process, some of the images are displayedthat are used for training.

***3.* Input and Output:**

Fig 5.2 Displaying some of the training images

The path of the image from the test data is given in the path and the program is run. The output image is displayed with its local name, scientific name and the properties of the leaf or the diseaseit cures is displayed along with its image.

```
    return np.expand_dims(x, axis=0)
path=r"D:\Lahari\project\major\Identification of medicinal plants\ayurvedic_leaf_classification\test_data\img1.jpg"
result = model.predict([prepare(path)])
d=image.load_img(path)
plt.imshow(d)
x=np.argmax(result,axis=1)
print (leaf_name[int(x)])
```

Balloon vine-Cardiospermum halicacabum-treats nervous diseases and stiffness in limbs

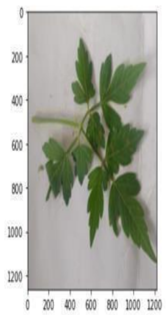


Fig 5.3 Displaying the output

4. **Example Output**

1. Local name – Butterfly pea Scientific name – Clitoria ternateaUses – rich antioxidants

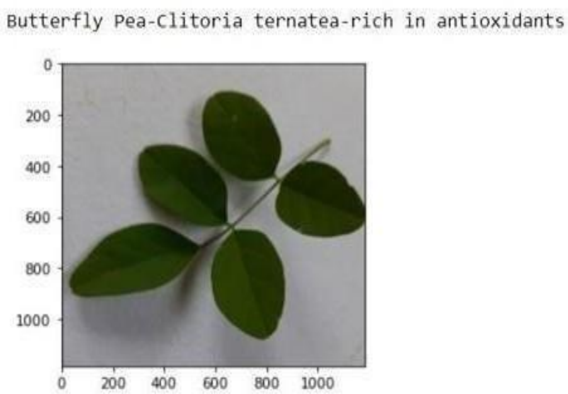


Fig 5.4 Butterfly pea

2. Local name – Balloon vine
Scientific name – Cardiospermum halicacbumUses – cures limb stiffness and nerve problems

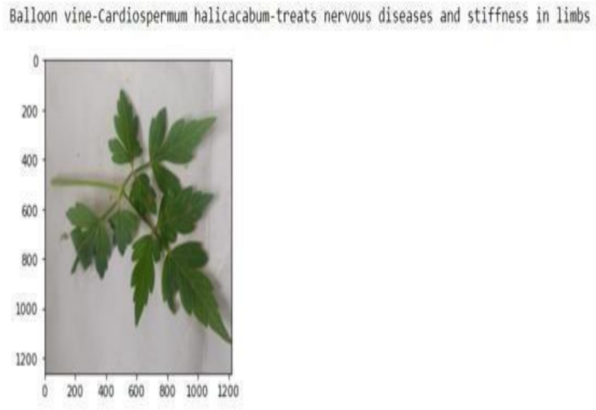


Fig 5.5 Balloon vine

V. TECHNOLOGY USED

The programme used is Python 3.9, and Jupyter Notebook is the IDE. The model is trained with Keras. It is a high- level neural network library that uses back propagation and epochs to train the deep learning model. Epochs refers to grouping the data into iterative batches and training them while ensuring maximum accuracy and little loss. The CNN type employed is called Dense Net, and Tensorflow is the library used for the numerical calculations in Dense Net. Tensorflow can determine whether a plant is medicinal or not, as well as its attributes and any disorders it can treat. The system has a predefined set of gestures.

It is an open source software library that offers numerous application interfaces while performing computations using dataflow graphs. ReLU is the input activation function utilised in the first layer of CNN, and Softmax is the output activation function. ReLU is a piecewise linear function that, if the input is positive, outputs the input directly; otherwise, it outputs zero. Softmax is used to normalise the output by scaling the input values between 0 and 1. Adam is the chosen optimizer type, and the learning rate is 0.001. The estimation of first order and second order moments serves as the foundation for the stochastic gradient descent technique known as the Adam optimizer.

A. System testing

System testing is a type of testing that verifies a fully integrated, finished piece of software. A system test's objective is to assess the complete system requirements. A system's compliance with its stated requirements is assessed through system testing, which is testing done on an entire integrated system. In essence, testing is done to find errors. It is employed for quality control. The purpose of testing during this stage is to confirm that the specification has been included into the design accurately and thoroughly as well as to guarantee the accuracy of the design itself. The detection of design flaws can be accomplished through inspection andwalkthrough.

B. Software testing strategies

Software testing is a form of investigation to determine if there are any flaws or defects in the software so that they can be fixed to improve the software's quality and determine whether or not it satisfies the criteria.

These are the goals of software testing:
Testing is the process of looking into and examining a programme to determine whether there are any errors and whether it complies with the requirements.

- A good test case and successful testing are both indicated by a significant number of errors discovered during the testing.
- A successful and thorough test will reveal an undiscovered error that hasn't been found yet.

VI. CONCLUSION

Human survival depends on plants. Indigenous peoples have used herbs in particular as folk medicines for a long time. Clinicians frequently identify herbs based on years of personal sensory or olfactory experience. Herb identification based on scientific data has become much simpler thanks to recent advancements in analytical technologies.

Many people benefit from this, especially those who are not accustomed to identifying herbs. Laboratory-based analysis also requires knowledge in sample healing and data explanation for time-consuming procedures. Therefore, a quick and accurate method of detecting herbs is needed. Combining computation and statistical analysis is expected to be beneficial for herbal identification. The most effective method for quickly identifying herbs will be this non- destructive method.

VII. FUTURE ENHANCEMENTS

For plants lacking proper leaves or leaves that are too small, the suggested treatments are inappropriate. To identify these kinds of plants, procedures may be developed. On a single board computer that is standalone and connected to a scanner, the algorithms may be implemented. For use in the field, a portable system might be designed. Improved machine learning classifiers with some pre-processing and feature selection models will be employed in next research in the field of plant identification to address accuracy-related problems and increase performance.

REFERENCES

[1]. Simplifying VGG-16 for Plant Species Identification Juan Campos, Arturo Yee, and Ines F. Vega 2022
[2]. DeepHerb: A Vision B based system for Medicinal Plants UsingXception Features ROOPASHREE 2021
[3]. Alex Olsen, Dmitry A. Konovalov, Bronson Philippa, Peter Ridd, Jake C. Wood, Jamie Johns, Wesley Banks, Benjamin Girgenti, Owen Kenny, James Whinney, Brendan Calvert, Mostafa Rahimi Azghadi, and Ronald D. White. DeepWeeds: A Multiclass Weed Species Image Dataset for Deep Learning. Scientific Reports, December 2019.
[4]. Automated Real-Time Identification of Medicinal Plants Species in Natural Environment Using Deep Learning Models—A Case Study from Borneo Region. A. Malik, Nazrul Ismail Burhan R. Hussein Umar Yahya. 27 July 2022
[5]. Trung Nguyen Quoc and Vinh Truong Hoang. Vnplant-200–a public and large-scale of vietnamese medicinal plant images dataset. In International Conference on Integrated Science. Springer, 2020.
[6]. Tuan Le-Viet and Vinh Truong Hoang. Local binary pattern based on image gradient for bark image classification. In Kezhi Mao and Xudong Jiang, editors, Tenth International Conference on Signal Processing Systems, page 39, Singapore, Singapore, April 2019. SPIE.
[7]. Shervan Fekri-Ershad. Bark texture classifification using improved local ternary patterns and multilayer neural network. Expert Systemswith Applications, 158:113509, November 2020.
[8]. Shanwen Zhang, Chuanlei Zhang, Zhen Wang, and Weiwei Kong. Combining sparse representation and singular value decomposition for plant recognition. Applied Soft Computing, 67:164–171, June 2018.
[9]. Shanwen Zhang, Chuanlei Zhang, and Wenzhun Huang. Integrating leaf and flflower by local discriminant CCA for plant species recognition. Computers and Electronics in Agriculture, 155:150 –156, December 2018.
[10]. Fateme Mostajer Kheirkhah and Habibollah Asghari. Plant leaf classification using GIST texture features. IET Computer Vision, 13(4):369–375, June 2019.