RESEARCH ARTICLE OPEN ACCESS

HERBS AND USAGES PREDICTION USING DEEP LEARNING TECHNIQUES

M.Saravanan*, M.Dhanaraj**, S.Santhosh***, K.Velumani****
*(Assistant Professor/CSE, Sri Ramakrishna College of Engineering, and Perambalur)
Email: : saravanansrce@gmail.com
** (Student/CSE, Sri Ramakrishna College of Engineering, and Perambalur)
Email: : rajd46727@gmail.com
*** (Student/CSE, Sri Ramakrishna College of Engineering, and Perambalur)
Email: :santhiya1412003@gmail.com
**** (Student/CSE, Sri Ramakrishna College of Engineering, and Perambalur)
Email: : kvelumani2000@gmail.com

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Abstract:

Automatic plant image identification is the most promising solution towards bridging the botanical taxonomic gap, which receives considerable attention in both botany and computer community. As the machine learning technology advances, sophisticated models have been proposed for automatic plant identification. Medicinal plants are gaining attention in the pharmaceutical industry due to having less harmful effects reactions and cheaper than modern medicine. Based on these facts, many researchers have shown considerable interest in the research of automatic medicinal plants recognition. There are various opportunities for advancement in producing a robust classifier that has the ability to classify medicinal plants accurately in real-time. In this paper, various effective and reliable machine learning algorithms for plant classifications using leaf images that have been used in recent years are reviewed. The review includes the image processing methods used to detect leaf and extract important leaf features for some machine learning classifiers. These deep learning classifiers are categorized according to their performance when classifying leaf images based on typical plant features, namely shape, vein, texture and a combination of multiple features. And then retrieve the results about usage of herbs with improved accuracy rate. Experimental results show that the proposed system provides improved accuracy rate.

Keywords — **Botanical Taxonomic Gap, Machine Learning, Pharmaceutical, Image Processing, Herbs.**

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I. INTRODUCTION

In imaging science, image processing is processing of images using mathematical operations by using any form of signal processing for which the input is an image, a series of images, or a video, such as a photograph or video frame; the output of image processing may be either an image or a set of characteristics or parameters related to the image. Most imageprocessing techniques involve treating the image as a two-dimensional signal and applying standard signal-processing techniques to it. Images are also processed as threedimensional signals with the third-dimension being time or the z-axis. Image processing usually refers to digital image processing, but optical and analog image processing also are possible. This article is about general techniques that apply to all of them. The acquisition of images (producing the input image in the first place) is referred to as imaging. Closely related to image processing are computer graphics and computer vision. In computer graphics, images are manually made from physical models of objects, environments, and lighting, instead of being acquired (via imaging devices such as cameras) from natural scenes, as in most animated movies. Computer vision, on the other hand, is often considered high-level image processing out of which a machine/computer/software intends to decipher the physical contents of an image or a sequence of images (e.g., videos or 3D fullbody magnetic resonance scans). In modern sciences and technologies, images also gain much broader scopes due to the ever growing importance of scientific visualization (of often large-scale complex scientific/experimental data). Examples include microarray data in genetic research, or real-time multi-asset portfolio trading in finance. Image analysis is the extraction of meaningful information from images; mainly from digital images by means of digital image processing techniques. Image analysis tasks can be as simple as reading bar coded tags or as sophisticated as identifying a person from their face. Computers are indispensable for the analysis of large amounts of data, for tasks that require complex computation, or for the extraction of quantitative information. On the other hand, the human visual cortex is an excellent image analysis apparatus, especially for extracting higher-level information, and for many applications — including medicine, security, and remote sensing — human analysts still cannot be replaced by computers. For this reason, many important image analysis tools such as edge detectors and neural networks 2 are inspired by human visual perception models. Image editing encompasses the processes of altering images, whether they are digital photographs, traditional photochemical photographs, or illustrations. Traditional analog image editing is known as photo retouching, using tools such as an airbrush to modify photographs, or editing illustrations with any traditional art medium. Graphic software programs, which can be broadly grouped into vector graphics editors, raster graphics editors, and 3D modelers, are the primary tools with which a user may manipulate, enhance, and transform images. Many image editing programs are also used to render or create computer art from scratch. Raster images are stored in a computer in the form of a grid of picture elements, or pixels. These pixels contain the image's color and brightness information. Image editors can change the pixels to enhance the image in many ways. The pixels can be changed as a group, or individually, by the sophisticated algorithms within the image editors. Many graphics applications are capable of merging one or more individual images into a single file. The orientation and placement of each image can be controlled. When selecting a raster image that is not rectangular, it requires separating the edges from the background, also known as silhouetting. This is the digital analog of cutting out the image from a physical picture. Clipping paths may be used to add silhouetted images to vector graphics or page layout files that retain vector data. Alpha compositing, allows for soft translucent edges when selecting images. There are a number of ways to silhouette an image with soft edges, including selecting the image or its background by sampling similar colors, selecting the edges by raster tracing, or converting a clipping path to a raster selection. Once the image is selected, it may be copied and pasted into another section of the same file, or into a separate file. The selection may also be saved in what is known as an alpha channel. A popular way to create a composite image is to use transparent layers. The background image is used as the bottom layer, and the image with parts to be added are placed in a layer above that. Using an image layer mask, all but the parts to be merged are hidden from the layer, giving the impression that these parts have been added to the background layer. Performing a merge in this manner preserves all of the pixel data on both layers to more easily enable future changes in the new merged image.

II. EXISTING SYSTEM

In the ancient past, the Ayurvedic physicians themselves picked the medicinal plants and prepared the medicines for their patients. Most of the plants are identified using their leafs the common steps to classify the leaf of a plants are Capturing image, noise removal and resizing ,Extracting features, use proposed methodology and finally identify or recognized the plant. Existing system implement the system and classifying medicinal plants, they present a Multichannel Modified Local Gradient Pattern

(MCMLGP), a new texture-based feature descriptor that uses different channels of color images for extracting more significant features to improve the performance of classification. Author has trained their proposed approach using SVM classifier with various kernels such as linear, polynomial and HI. In addition, used different feature descriptors for comparative experimental analysis with MCMLGP by conducting the rigorous experiment on our own medicinal plants dataset. And also implement the system which would provide a solution for identifying the plant and providing its medicinal values, thereby helping in the cure of many ailments in a natural way. This existing system discusses about the dataset collection, feature extraction using texture and HOG and thereby classifying based on Support Vector Machine algorithm.

DISADVANTAAGE:

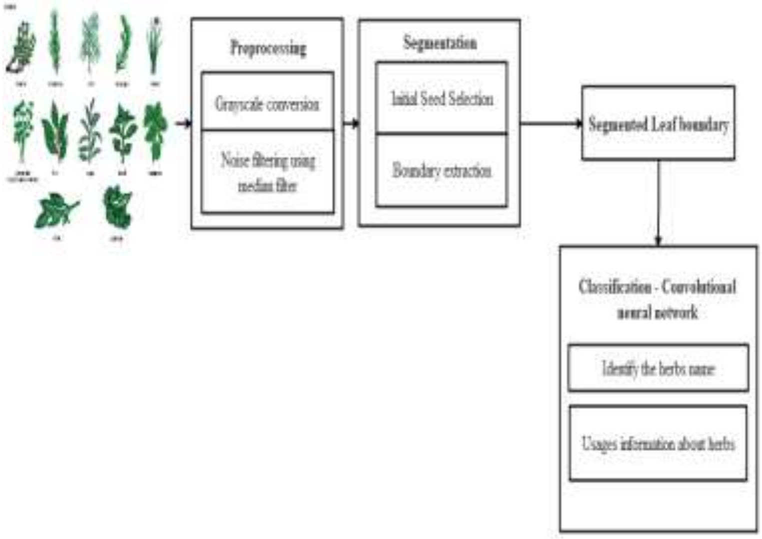
- Irrelevant features are extracted
- Computational complexity can be high
- Dimensionality problems may be occurred
- Manual intervention can be needed

III. PROPOSED SYSTEM:

Leaf detection and classification is fundamental to agriculture, forestry, rural medicine and other commercial applications. Precision agriculture demands plant leaf disease diagnosis for automatic weed identification. The proposed system implement an automated plant identification system that helps users without specialized knowledge and in-depth training in botany and plant systematics to find out the information of some herbal plants by taking pictures of the plants to feed into an automated plant recognition system. Computer vision aided plant identification systems have been developed to meet the demand of botanists to recognize and identify unknown herbal plants more rapidly. The core tasks of the systems are image recognition and retrieval, which have attracted much attention from researchers in the field of computer vision. Leaf species identification leads to multitude of societal applications. There is enormous research in the lines of plant identification using pattern recognition. With the help of robust algorithms for leaf identification, rural medicine has the potential to reappear as like the previous decades. This project discusses CNN based approaches for Indian leaf species identification from white background using .NET framework. In proposed system we can implement guided active contour method to segment the leaf parts. And implement variations of CNN models over the features like traditional shape, texture, color and venation apart from the other miniature features of uniformity of edge patterns, leaf tip, margin and other statistical features are explored for efficient leaf classification.

ADVANTAGES

- Segmentation can be done easily to spilt the tree parts
- Classify the parts of herbs and usages
- Eliminate redundant features of images
- Provide improved accuracy rate



SYSTEM ARCHITECTURE

IV. CONCLUSIONS

Traditional systems of medicine continue to be widely practiced on many accounts. Population rise, inadequate supply of drugs, prohibitive cost of treatments, side effects of several synthetic drugs and development of resistance to currently used drugs for infectious diseases have led to increased emphasis on the use of plant materials as a source of medicines for a wide variety of human ailments. This project proposed CNN based approaches for detecting Indian leaf species. The experiments were conducted with pre-training and edge detection. CNN is experimented with softmax as well as sigmoid layer. The results validate that with proper edge detection and pre-training, binary CNN with sigmoid is able to detect the leaf species. The project developed gives the best and an easy way to classify the correct plants. The medicinal uses of the plants and the high demand for the plant made us to work towards this successful automated plant species classification.

FUTURE ENHANCEMENT

In future, we can extend the framework to implement various deep learning algorithms to improve the accuracy in herbs classification. And also include multiple classifications with various parts of herb plants such as root, flower and other parts

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