Identification of Medicinal Plant using Image Processing

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Abstract: *Plants play crucial role in our life as they provide food, oxygen, housing, medicine and many more. Mainly plants have been used for medicinal use since decades. Currently, identification of medicinal plant is done manually where it requires huge investment and experts to confirm its accuracy effectively. To overcome this issue, creating a website application to identify medicinal plants by applying certain machine learning algorithms. After that training machines using data by extracting features and classification which are important to identify medicinal plants which affects accuracy of the system. This research scrutinize methods of image processing for classification and identification of plants.*

Keywords: Medicinal Plant

I. INTRODUCTION

Thousands of plant species are there in World which has medicinal values even some are poisonous to humans. Plants are not only for medicinal use and are also cornerstone of food chain. Tuties plants properly it is important to identify unknown plants. Until now most successful method for identifying plants is manual-based approach based on its characteristics. However it is often time consuming and it requires expert botanists.

Many researchers have conducted automated classification study based on feature extraction of medicinal plants. These steps include preprocessing of database, feature extraction, model building and testing, final evaluation results. Common people who doesn't have knowledge of medicinal plants can even recognise medicinal plants.

This paper presence a comprehensive survey on identifying medicinal plants. The shape feature of leaf is commonly used to identify medicinal plants. The leaf is majorly used in classification of plants by applying machine learning algorithms.

1.1 Abbreviations and Acronyms

ML : Machinel Learning

CNN : Convolutional Neural Networks DL:Deep Learning

A. Algorithms

Algorithm for Identification of Medicinal Plant: Step 1: Input Leaf Image

Step 2: Leaf Image Preprocessing and Feature Extraction Step 3 : Model Development

Step 4 : Model Evaluation Step 5 : Model Deployment

1.2 Algorithm

What is CNN Convolutional Neural Networks?

Convolutional neural networks are a group of neural networks which is proven very productive in sectors such as classification and image identification.CNN is made up of one or more convolutional layers and then proceeded by one or more fully connected layers in standard multilayer neural network.

1.3 Architecture of CNN

First we do convolution and then sub sampling again convolution subsmping fully connected layer and after that we get output so we can understand easily what it is.

First layer : Convolution layer
This layer is fundamental process where we have to choose filter as we have done in the past they have chosen filter 2×2, 3×3 filters are chosen and it will convolve over the input image. Scanning the pixel is what is called convolving we will roll over the input image and will create and extract the feature map each feature belongs to some class/category and the filter essentially does the hovering work. and thats called convolve. Now include the activation functions.

Second Layer : Pooling Layer (Down Sampling / Sub Sampling)
Suppose there are 20 pixels now we need to reduce /shrink it further so I go with max pooling where we can make it 10 x 10 what did we do ?now We essentially reduced no. of pixels and we down sampled that is what is done after the convolution and that is called pooling layer.We can repeat the pooling layer based on how many layers that we want in our model that we are developing and there is no restriction to it.

Third Layer : Flattering Layer
We are going to flatter means that the Output from previous layers are flatterned to single vector which are going to be input for next layer.

Fourth Layer : First Fully Connected Layer
It's very essential layer which takes input from features analysis and appeal weight to anticipate correct labels.

Fifth Layer : Fully Connected Layer
Here in this layer we completely get the output i.e. is it medicinal leaf or Non medicinal leaf, is it orange or apple etc that's being done in this layer.

1.4 Software/Hardware Requirements
A. Visual Studio Code
It's a streamlined code editor with support for development operations like debugging, task running, and version control. It aims to provide just the tools a developer needs for a quick codebuild-debug cycle and leaves more complex workflows to fuller featured IDEs, such as Visual Studio IDE.

B. Python
Python is an interpreted, high-level, general purpose programming Language by Guido Van Rossum and first released in 1991, Python's design philosophy emphasizes code Readability with its notable use of significant Whitespace. Its language constructs and object-oriented approach aim to help programmers write clear, logical code for small and large-scale projects. Python is dynamically typed and garbage collected. It supports multiple programming paradigms, including procedural, object oriented, and functional programming.

C. PHP
PHP (Hypertext Preprocessor) is known as a general-purpose scripting language that can be used to develop dynamic and interactive websites. It was among the first server-side languages that could be embedded into HTML, making it easier to add functionality to web pages without needing to call external files for data.

D. Javascript
Javascript is used by programmers across the world to create dynamic and interactive web content like applications and browsers. JavaScript is so popular that it's the most used programming language in the world, used as a client-side programming language by 97.0% of all websites.

E. HTML5
HTML5 allows users to have a consistent web experience across multiple devices. This has become increasingly vital since Google confirmed that global search traffic is now predominantly performed on mobile.

F. CSS3

Cascading Style Sheets Level 3(CSS3) is the iteration of the CSS standard used in the styling and formatting of web pages. CSS3 incorporates the CSS2 standard with some changes and improvements. A key change is the division of standard into separate modules, which makes it easier to learn and understand.

1.5 Hardware Requirements

A. Processor

- Intel core i5 or above. 64-bit, quad-core,
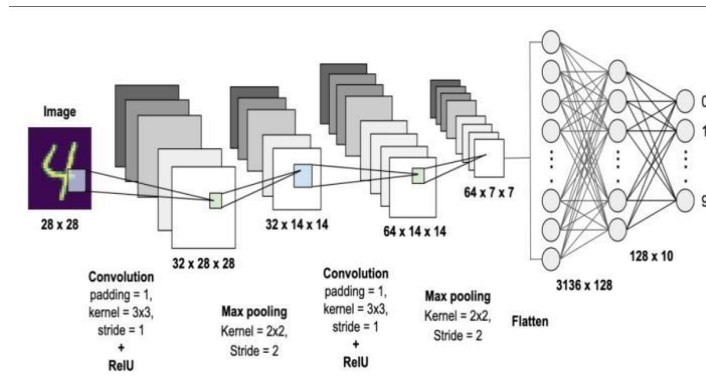- 2.5 GHz minimum per core

B. RAM

- 4 GB or more

C. Hard Disk

- 10 GB of available space or more.
- Display: Dual XGA (1024 x 768) or higher resolution monitors
- Operating system: Windows (7 or Above)

1.6 Figures and Tables

1.7 Formulae

Gray Image=0.5870 G + 0.2989 R + 0.1140 B

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