

A Survey on Ayurvedic Medicine Classification using Tensor flow

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Abstract

Ayurveda is an ancient medical science which works hand in hand with the medicinal plants. There is a huge problem that most of the people cannot recognize these medicinal plants and thus are not able to take the benefit of herbal power to cure diseases. Experts are needed to recognize these ayurvedic medicines and sometimes they are also in dilemma about the species of plant. In recent times the use of technology has increased so much that almost everyone uses a smartphone. There are various advancements in technology and one of the biggest is Deep Learning and Machine Learning which helps Machines to do the tasks which humans do but with much ease. There are several Machine Learning applications available which recognizes humans, objects, trees, animals etc. But the need for a recognizer is increasing in the field of Ayurveda as the experts are very less and the use is increasing day by day. Thus we have thought to propose a system which recognize ayurvedic plants just by a single image of its leaf. This will have a huge impact on laymen in day to day use, in the field of education and also among researchers. Also it will unite everyone to take this field of Ayurveda further ahead.

Keywords - Ayurveda, Medicinal Plants, Convolutional neural networks, Mobile Application, Recognizer.

1. INTRODUCTION

In India there are wide range of people using Ayurvedic Medicines. Majority Prefer these herbal medicines mainly because there are less or no side effects of these medicines [4]. Ayurveda cannot sustain without Medicinal plants. Many medicinal plants have been decreased in last few years and we need an easy and quick way to recognize these medicinal plants. But the biggest problem is the difficulty in finding ingredients (medicinal plants). Also identification of a simple medicinal plant requires an expert to be present around. Plants can be classified with the help of shapes, colors, texture and structure of their leaf, bark flowers seeding and morph [1]. But it is very difficult to recognize plants with their two dimension image. Thus leaf has been one of the most important feature while studying Plants property. Leaf classification is believed to be the most important step in studying plant diversification [3]. An efficient plant recognition

system will help medical field as well as Botanic researches and Ayurvedic studies. This paper proposes an efficient method of classification of ayurvedic plants [2]. We believe that our solution will fill the gap between the knowledge possessed by Ayurvedic practitioner and other people. The Input takes an image of leaf of the plant and gives the name of the plant in output.

2. Image Samples

The images of plants leaves which we used for the system are shown in the fig. We used 5 different plants for which we got images of best quality with the help of camera and of somewhat lower quality with the help of smartphone. The plants used are (a) Asparagus racemosus, (b) Bauhimia purpurea, (c) Citrus medica, (d) Terminalia catappa (Badam) and (e) Yucca gloriosa. In all we used around a two hundred images first time for each plant for training and testing and then we used around five hundred to six hundred images for each plant.

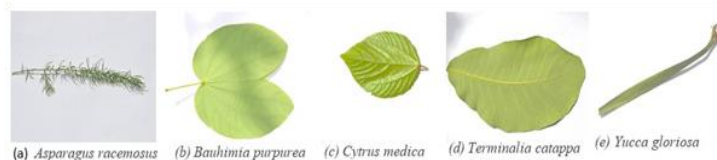


Figure 1 Images of plant Leaves

3. Existing Systems

3.1. ENVIS-FRLHT Medicinal Plants

It is a very simple and free android application which lets you search any plant with all names it has and gives you full detail of that plant .

3.2. PlantSnapp

It is an application that will let you recognize plants and trees but it belongs to a certain regions only and it matches some plants with machine learning algorithm and some with the huge database it has. Also it is a paid application which will try to recognize the captured plant [5].

3.3. LikeThat Garden

It is a very simple and easy to use application. In this you are supposed to click picture of the plant and it will match that image with the

images in the database and gives you the most similar one. So it recognize only those plants which are in the database and also similar kind of images should be present in the database [5].

3.4. FlowerChecker

It is an application which uses real Botany to identify flowers, fungus, lichen etc. It is the most accurate application which is available in both android and apple store.

3.5. Plantifier

It is a free application available in both apple app store and android in which you can click an image of the plants and other users will help you to identify plants if they know which plant it is[2].

3.6. Leafsnap

It is an application which identifies trees spices from their leaves. It is basically identifying trees from UK and is available only on apple store [2].

3.7. Google goggles

Although this application is not directly related to plants but goggles can click images and recognize objects in the image, gives suggestions and information about the same if available [5].

3.8. Medicinal Plant Identification

From the above application none of the app is for medicinal plants recognition but they are mostly concentrated more towards garden plants. This is one app which help you search medicinal plants and gives you information on the same.

4. Proposed Technique

So, Basically what we are doing is we trained Google LeNet network with the dataset we created. After training the Network was ready to recognize the medicinal plants for which it was trained. So we will be giving image to the network as an input and the name of the most similar medicinal plant will come in the output was the thought which we had. First of all Google LeNet is an inception module given by Google which is a 22 layer CNN (Convolutional Neural Network)

4.1. Convolutional Neural Network

CNN is very simple and almost the same as regular Neural Networks which has some specific weights and bias. Everything that we do for learning an ordinary neural network applies to a convolutional neural network. But the change is that the CNN

takes an assumption that the inputs are images and thus this allows us to make changes to its architecture. A CNN transforms its neurons in a three dimension (height, width, depth) form. It has such an architecture that each volume of input transforms to another output volume [21].

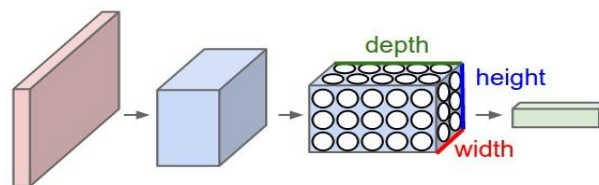


Figure 2 Convolutional Neural Network [6]

There are mainly three types of layers which are used to build a CNN those are (a) Convolutional layer, (b) Pooling layer, (c) Fully Connected layer and one more layer is used called Normalization layer [6]. The Convolutional layer is the core part of CNN which does most part of the computation and heavy work on the inputs which includes taking a volume of input combining them by performing dot products (filters) on them and giving output volume block of image. Pooling layer is commonly inserted after a period regularly. Its task is to gradually reduce the spatial size of the representation which in turn reduces the number of parameters in computation in the network. The Fully Connected layer is the last layer and it has full connections to all the activations from the previous layers [6].

4.2. Google LeNet

It was the first inception model that suggests that it is not necessary to stack up CNN layers sequentially. It shows that creative structuring of layers can bring about better efficiency and performance. There are pieces of network that are working in parallel. Basically there is a choice available at each layer of ConvNet of whether to have a pool operation or a conv operation which makes the task parallel. Some of the major points about Google LeNet are that it has used around 9 inception modules and around 100 Layers [7]. There are no Fully Connected layers used instead average pooling layer is used. The main advantage of this is that it uses 12x lesser parameters than other Networks which is the main reason for its speed and efficiency [7].



Figure 3 Architecture of Google LeNET [7]

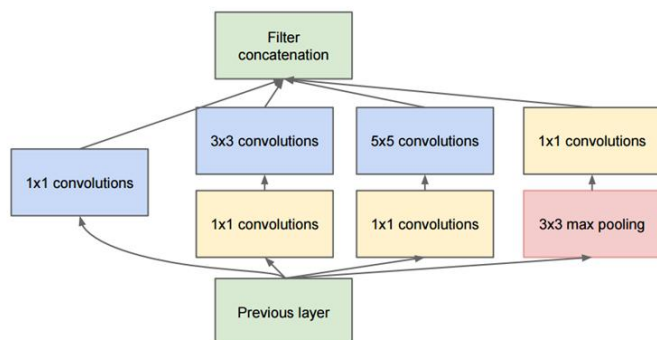


Figure 4 Inception Module [7]

5. Conclusion and Future work

Ayurveda makes us use herbal treatments and also creates many remedies for different medical issues [2]. Ayurvedic plant recognition system is very useful to common people so that they can make remedies for diseases at their home itself and also to professionals and students to work better in research [2]. So, we would like to say that since Ayurveda is very much used not only in India but also in the whole world there has to be some help from the technology which recognizes the plants and solve problem of identifying medicinal plants. Google LeNet architecture is very fast and efficient and it is producing best results for now. In future we are looking for applying the same in mobile application. Our project aims at developing a free application for both Android and IOS store so that people can get the best use of Ayurveda and Ayurvedic medicines.

6. REFERENCES

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