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PLANT DETECTION USING DEEP LEARNING

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ABSTRACT

This project aims at developing an application that can capture and identify name of plant. There are uncountable species of plants in nature and it is very difficult to identify them without help of botanists. For normal people, however requires species identification skills, which requires intensive training and experience. Also it is very difficult for them to search internet for plant type just by specifying plant properties. The idea of automated species identification helps to solve this issue. Using this application, any user can identify the plant type by capturing the image of leaves. Deep learning is used to classify plant according to species. Then the detail of the leaves is searched in the database to find the plants with same details. Thus just by capturing the image, the user will get accurate details about the plant.

I.INTRODUCTION

It has been estimated that more than 50 million species of plants, animals and micro-organisms are existing in the world. Out of these, about 1.4 million species have been identified so far. Each species is adapted to live in specific environment, from mountain peaks to the depth of seas, from polar ice caps to tropical rain forests and deserts. They include flowering plants (trees, shrubs, grasses and herbaceous plants), as well as the gymnosperms (which include conifers), ferns and related species, and also the bryophytes (mosses and liverworts).Plant biodiversity is invaluable because it balances ecosystems, protects watersheds, mitigates erosion, moderates climate, and provides shelter for animals. In the earth variety of plants species are existing. Some of the plants are easily identified but most of them are not identifiable, because they are rarely found in the earth other than that there are countless species of plants in nature. It is a difficult process that identifying that much trees just by observing. Also it is very difficult for them to search internet for plant type just by specifying plant features. Botanists and those who study plants however, they can identify the plant type using the features. Deep learning (also known as deep structured learning or hierarchical learning) is part of a broader family of machine learning methods based on artificial neural networks. Learning can be supervised, semi-supervised or unsupervised. Deep learning architectures such as deep neural networks, deep belief networks, recurrent neural networks and convolutional neural networks have been applied to fields including computer vision, speech recognition, natural language processing, audio recognition, social network filtering, machine translation, bioinformatics, drug design, medical image analysis, material inspection and board game programs, where they have produced results comparable to and in some cases superior to human expert. Deep learning is a class of machine learning algorithms that uses multiple layers to progressively extract higher level features from the raw input. For example, in image processing, lower layers may identify edges, while higher layers may identify the concepts relevant to a human such as digits, things or letters or faces. The word "deep" in "deep learning" refers to the number of layers through which the data is transformed.

II. LITERATURE SURVEY

Title: Plant Species Classification Using Deep Convolutional Neural Network
Author: Mads Dyrmann, Henrik Karstoft , Henrik Skov Midtiby

Information on which weed species are present within agricultural fields is important for

site specific weed management. This study presents a method that is capable of recognising plant species in colour images by using a convolutional neural network. The network is built from scratch trained and tested on a total of 10,413 images containing 22 weed and crop species at early growth stages. These images originate from six different data sets, which have variations with respect to lighting, resolution, and soil type. This includes images taken under controlled conditions with regard to camera stabilization and illumination, and images shot with hand-held mobile phones in fields with changing lighting conditions and different soil types. For these 22 species, the network is able to achieve a classification accuracy of 86.2 %

Advantages:

- High accuracy in image recognition problems Help to increase the crop yield.

Disadvantages:

- High computational cost
- Huge amount of input data is required for training

Title: Real-world plant species identification based on deep convolutional neural networks and visual attention

Author: Qingguo Xiao, Guangyao Li, Li Xie, Qiaochuan Chen

The objective of this study is to investigate the issue of real-world identification to fulfill better species protection. This study focus on plant species identification. In tradition plant species identification the samples are scanned specimen and the background is simple. However, real-world species recognition is more challenging. To deal with the challenging task, first crop the image in terms of visual attention before general recognition. This approach is known as attention cropping (AC). Deep convolutional neural networks are trained to predict species from a large amount of data. Extensive experiments on traditional dataset and specific dataset for real-world recognition are conducted to evaluate the performance of our approach. Experiments first demonstrate that our approach achieves state-of-the-art results on different types of datasets. Besides, this study also evaluates the performance of data augmentation method AC. Results show that AC provides superior performance. Compared with the precision of methods without AC, the results with AC achieve substantial improvement.

III. Software Requirements

Operating System :Linux, Windows or Android

Language: Python, JavaScript,HTML,CSS

Tool: Tensorflow, SqLite , Sublime ,Google Colab , Bootstrap ,Flask, Jupyter Notebook

Memory	:	16 GB.
Hard Disk	:	40 GB.

IV.SYSTEM DESIGN & IMPLEMENTATION

The explanation behind the plan is to orchestrate the course of action of the issue dictated by the necessities report. This stage is the underlying stage in moving from issue to the game plan space. All things considered, start with what is obliged; diagram takes us to work towards how to satisfy those necessities. The design of the system is perhaps the most essential segment affecting the way of the item and note worthily affects the later stages, particularly testing and upkeep. System diagram delineates all the huge data structure, report game plan, yield and genuine modules in the system and their Specification is picked.The DFD is clear graphical formalism that can be used to address a structure the extent that the data to the system, diverse get ready did on this data and the yield data made by the structure. A DFD demonstrate utilizes an incredibly foreordained number of primitive pictures to address the limits performed by a system and the data stream among the limits. The human identity is to such an extent that it can without quite a bit of an extend see any dynamic model of a structure in light of the way that in a different leveled display, starting with a to a great degree clear and extraordinary model of system, unmistakable purposes of enthusiasm of a structure are bit by bit introduced through the various requests. An information stream outline (DFD) is a graphical portrayal of the "stream" of data through an information structure. DFDs can in like manner be used for the view of data taking care of.

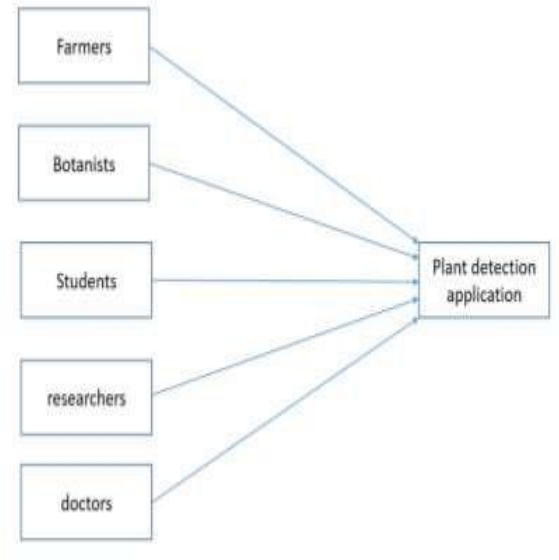

Fig 1: dataflow diagram

During the implementation process, engineers apply the design properties and or requirements allocated to a system element to design and produce a detailed description. They then fabricate, code, each individual module using specified language, processes, physical or logical arrangements, standards, technologies, and/or information flows outlined in detailed descriptions. A system element will be verified against the detailed description of properties and validated against its requirements.

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CONCLUSION

This paper studied a deep learning approach to learn discriminative features from leaf images with classifiers for plant identification. From the experimental results, we justified that learning the features through CNN can provide better feature representation for leaf images compared to hand-crafted features. Moreover, we demonstrated that plant structure is an important feature to identify different plant species with performance of 99.5%, outperforming conventional solutions. This is verified by analysing the internal operation and behaviour of the network through CNN technique.

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