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AN OPEN CV BASED AUTOMATIC LEAF DISEASE IDENTIFICATION USING IMAGE PROCESSING

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Abstract -Agricultural productivity is something on which economy highly depends. This is the one of the reasons that disease detection in plants plays an important role in agriculture field, as having disease in plants are quite natural. If proper care is not taken in this area then it causes serious effects on plants and due to which respective product quality, quantity or productivity is affected. Detection of plant disease through some automatic technique is beneficial as it reduces a large work of monitoring in big farms of crops, and at very early stage itself it detects the diseases i.e. when they appear on plant leaves. This paper presents an algorithm for image processing technique which is used for automatic detection and classification of plant leaf diseases.

Keywords: **Internet of Things (IoT), ImageProcessing,Image recognition,Image enhancement, Infection identification.**

INTRODUCTION

Identification of the diseases is very important in any field to preventing the losses. Health monitoring and disease detection on plant is very critical for sustainable agriculture. The studies of the leaf diseases mean the studies of visually observable patterns seen on the leaf. Leaf disease detection requires huge amount of work, knowledge in the plant diseases, and also require the more processing time. This paper presents the Internet of Things (IOT) based agricultural production system by using environmental sensors and prediction system. This would be useful to predict disease on crops proactively and thereby enabling users to avoid the same. We are using convolution neural network which is time and space

consuming but the results are optimized and suitable for customers applications on Smartphone. Daily images of plants are captured at regular intervals of time and then used to train machine with convolutional neural network.

EXISTING SYSTEM

The Existing system can only identify the type of diseases which affects the leaf.MATLAB based image processing concepts will be used.

WORKING OF EXISTING SYSTEM

The following process are done using MATLAB.Working flow of this approach includes following steps:

1. Take RGB image
2. Image Color transformation of RGB to Gray scale
3. Image segmentation
4. Feature extractions
5. Statistical analyses
6. According to analysis matching of feature extraction are done.

PROPOSED SYSTEM

In our project thetechnique Open CV is used for the image processing technique And Robotic prototype which is used for the automatic movement of Internet of things concept was used to send the immediate alert to the particular person .

Each and every time the camera capture the images of leaf and compare it with the data set already given.

Our working step in four modules

- Camera
- Image analyse
- Image recognition
- Image enhancement

BLOCK DIAGRAM

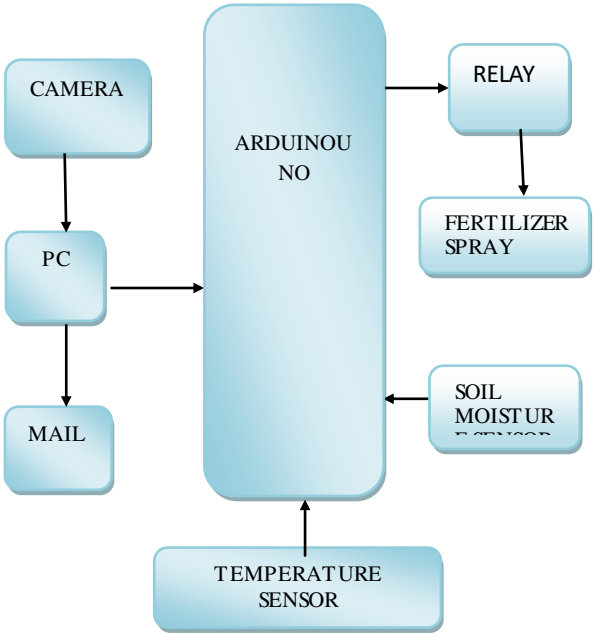

Fig 1.Block diagram

INTERNET OF THINGS (IOT)

The term Internet of Things (often abbreviated IOT) was coined by industry researchers but has emerged into mainstream public view only more recently.

IOT is a network of physical devices, including things like smart phones, vehicles, home appliances, and more, that connects to and exchange data with computers.

Some claim the Internet of things will completely transform how computer networks are used for the next 10 or 100 years, while others believe IOT is simply hype that won't much impact the daily lives of most people.

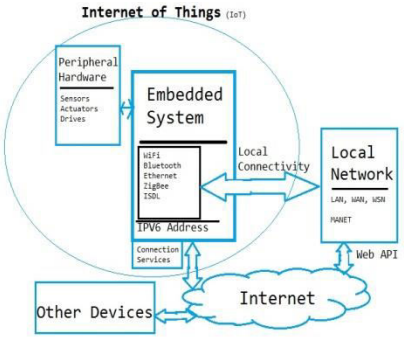

Fig 2.Process of IOT

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The internet of things helps people live and work smarter, as well as gain complete control over their lives. In addition to offering smart devices to automate homes, IoT is essential to business.

IOT provides businesses with a real-time look into how their systems really work, delivering insights into everything from the performance of machines to supply chain and logistics operations.

IOT enables companies to automate processes and reduce labor costs. It also cuts down on waste and improves service delivery, making it less expensive to manufacture and deliver goods, as well as offering transparency into customer transactions.

As such, IOT is one of the most important technologies of everyday life, and it will continue to pick up steam as more businesses realize the potential of connected devices to keep them competitive

IMAGE PROCESSING

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 Imagistics or parameters related to the image. Most image-processing techniques involve treating the image as a two-dimensional signal and applying standard signal-processing techniques to it. Images are also processed as three-dimensional signals where 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 full-body 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.

Digital image processing is the use of computer algorithms to perform image processing on digital images. As a subcategory or field of digital signal processing, digital image processing has many advantages over analog image processing.

Fig 3.Infected image of leaf

IMAGE USED IN IMAGE PROCESSING

Image recognition enhances the processing of scanned images by allowing you to automatically recognize and extract text content from different data fields. For example, when you scan a form and use document imaging software to process it, CR allows you to transfer information directly from the document to an electronic database.

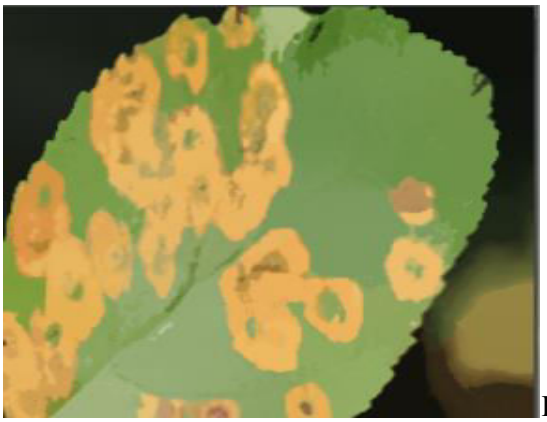

Fig 4.Blured image after image processing

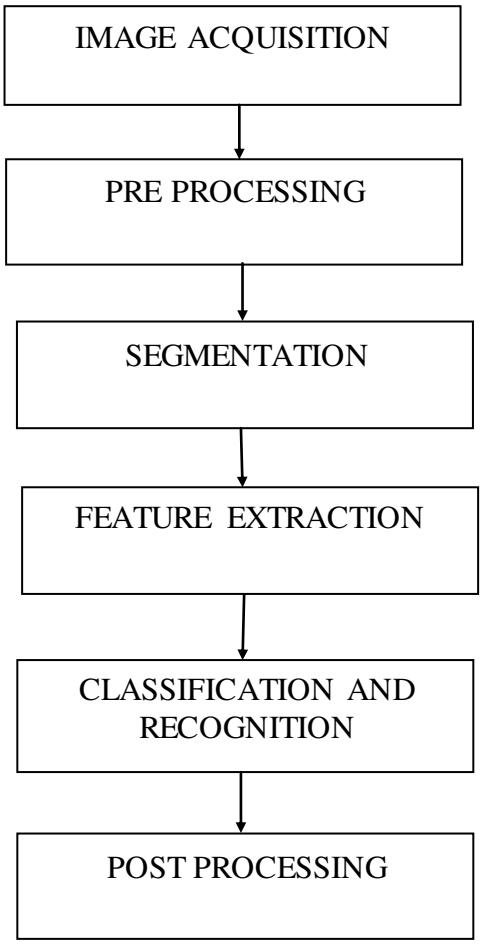

Fig 5.Schematic diagram of image recognition system

IMAGE RECOGNITION

Since commercial IR engines achieve high recognition performance when processing black and white images at high resolution, almost all the

methods in the literature that addressed the issue of image recognition in complex images and videos employed an IR system to finally recognize images. However, these IR software can't be applied directly on regions previously extracted by a image localization procedure. Experience shows that IR performance in this context is quite unstable, as already mentioned in Section, and significantly depends on the segmentation quality, in the sense that errors made in the segmentation are directly forwarded to the IR.

To extend the recognition capability of the IR for image and video text, the main research efforts focus on text segmentation and enhancement.

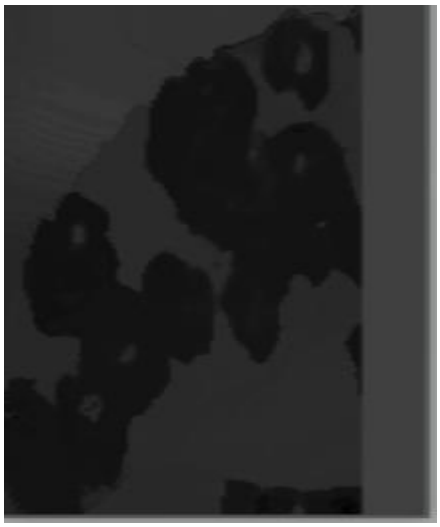

Fig 6.Recognition of leaf disease

ENHANCEMENT OF IMAGE

If the image grayscale value is known, text enhancement methods can help the binarization process. In , a method for enhancing text in images exploits the imageistic that text images consist of many stripe structures. Four directional filters (horizontal, vertical, diagonals) are used for blurring non-stripe structures in an input image while keeping the stripe structures in each direction. However, without proper estimation of the image scale, the designed filters can not enhance image strokes with different thickness .

In enhanement can also reduce the influence of background regions. The enhancement is performed on text images, which are blocks of image containing the same text string detected and tracked in consecutive video frames. In , the maximum or minimum value at each pixel position is computed for enhancing images that are known to have either the darkest or lightest grayscale values in video. In an average image is computed from the detected and tracked text images for reducing the noise variance. These methods assume that image and background have different movements and the grayscale value of images is constant in consecutive .

Fig 7.Enhancement image of infected leaf

This is the final enhancement image of infected leaf. With the help of the enhacement image we compare this with normal leaf and found whether the leaf is infected or not.

FUTURE WORK

- In future work,we planned to fix automatic fertilizer spray for infected leaves.
- Once the image capture through the camera is recognized as the leaf is infected,automatically the relay will on usingArduino UNO and the fertilizer starts spraying.

CONCLUSION

Plant disease detection attracts significant attention in the field of agriculture where image based disease detection plays an important role. To improve the yield of plants, it is necessary to detect the onset of diseases in plants and advice he farmers to act based on the suggestions. It is very difficult to monitor the plant diseases manually. It requires

tremendous amount of work, expertize in the plant diseases, and also require the excessive processing time. Hence, image processing is used for the detection of plant diseases. Smart farming and precision agriculture involve the integration of advanced technologies into existing farming practices in order to increase production efficiency and the quality of agricultural products. As an added benefit, they also improve the quality of life for farm workers by reducing heavy labor and tedious tasks.

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