Cotton Leaf Disease Predictions Using Image on Plants

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Abstract— Cotton leaf diseases on cotton plant must be identified early and accurately as it can prove detrimental to the yield. The proposed work presents a pattern recognition system for identification and classification of three cotton leaf diseases i.e. Bacterial Blight, Myrothecium and Alter aria. The images required for this work are captured from the fields at Central Institute of Cotton Research Nagpur, Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola and the cotton fields in Buldana and vardha district. Active contour model is used for image segmentation and Hus moments are extracted as features for the training of adaptive neuro-fuzzy inference system. The classification accuracy is found to be 85 per cent. Cotton is very important crop in our country and if some disease will affected on that crop the total economy of the farmer as well as country will get collapse. Normally in my country if disease will get detected by the farmer he will contact to the Experienced person and get solution for the same but if the detection and identification of disease not correct will badly affecting on the plant. In second case farmer will contact to the owner of pesticide shop the person will suggest some wrong treatment with respect to his experience. In third case is that farmers are just going with nature they thing is that the disease will get cleared automatically in some period of span.

Keywords: Cotton leaf diseases, Active contour model, spatial moment, Central moments, Snake segmentation, clustering, classification, back propagation

I. INTRODUCTION

Cotton is one of the most important fiber crops in entire world to provide basic raw material for cotton textile industry. Cotton crop faces many problems due to diseases which affects it a lot and it is not possible to identify it by naked eyes of human. The largely affected part for the disease is leaf of the plant .About 80 to 90 percent of disease on the plant is on its leaves. Fig.1 shows some examples of diseased and non-diseased cotton leafs. So our study of interest is leaf of the crop rather than whole cotton crop.

II. COTTON LEAF DISEASES

The spot on the leaf are considered as main entity re-presenting the presence of disease and believed as marker of crop diseases. The underneath of each leaf of cotton plant contains a small cup like structure called holding nectar .These deposits and moist stem make the plant attractive to a variety of pests and insects .The various cotton leaf diseases and their symptoms are discussed as follows.

1) Red Spot Disease: It is a major potentially destructive bacterial disease caused by a bacterium, Xanthomonas, campestrispy, malvacearum. It starts as angular spot because of the restriction of the spot by the fine veins of the leaf and having red to brown border around it .Firstly this angular spots appear as water-soaked region and in later stages turn dark brown to black as shown detailed in figure 2 .The disease spot may be spread along the major veins of the leaf and in the advanced stages leaf petioles and steams may get infected resulting in early fall off the leaves and it will badly affecting on the growth of the plant.
2) White Spot Disease: It appears in the form of circular spot of size 1 to 15mm and having color which can vary from circular brown wholes , grey-brown to tan color refer as show in Figure 2. Irregular dead areas may develop as a result of union of older spots on edges .Mature spots have dead centers which crack and fall out normally. The disease is more prominent on lower leaves of the plants as compare to the upper part leaves of leaf.
3) Crumple Leaf Disease: Small soft bodied insects on underside of leaves and/or stems of plant of cotton usually green or yellow in color are found, but may be pink, red or black and little bit brownish depending on species .Host are available on plant; if aphid infestation is heavy it may cause leaves to yellow and/or distorted form center, necrotic spots on leaves and/or stunted shoots of cotton leaf called honeydew which encourages the growth of sooty mold on the plants and causes loss of production of cotton form plant.

III. MOTIVATION:

There are many motivations for this master project:

- The main motivation of this topic is to identify the type of disease and quantify the damage of crop thereby providing the treatment for the respective disease to the farmer.
- This identification and detection of disease is possible by using image processing techniques on the different parts of cotton crop.
- This paper will give information about the possible disease on cotton plants as well as possible treatment should provide to the farmer and what exact treatment for the disease.

IV. OBJECTIVE OF PROJECT:

There are many objectives of this project:

- Our main objective of proposed work is to detect disease in cotton leaves.
- To be familiar with the diseases found in the cotton.
- To be able to know the sign and symptoms of diseases.
- To get maximum ideas regarding the control measures and management of disease found in cotton.
- To be familiar about the pesticides like fungicides, insecticides and their use in the crop at different times applying different methods.

V. APPLICATIONS & SCOPE:

A. Applications:

- In farms for agriculture purposes.
- At greenhouses, to prevent the out spread of disease among sensitive plants.
- At botanical gardens to maintain the plants health.

B. Scope:

Scope of this project is it is helpful for farmer by identifying disease on cotton leaf and provides solution for increase in growth of productions.

C. Use Case Diagram:-

Use case diagram represent the overall scenario of the system. A scenario is nothing but a sequence of steps describing an iteration between a user and a system.

Use cases represent the behavior of the system. Typically various functions are represented as use cases.

D. Association:

It identifies an interaction between actor and use cases. Each association represent a dialog.

E. Include Relationship:

Identifies a reusable test use case that is unconditionally required for execution of another use case. The decision about when & why to use the included use case is taken by the calling use case.

F. Extend Relationship:

Identifies a reusable test use case that conditionally interrupts the execution of another use case by using its functionality. The decision of when the extending use case should be used is taken by the extending use case itself.

G. Generalization:-

Identifies an inheritance relationship between actors or between use cases.

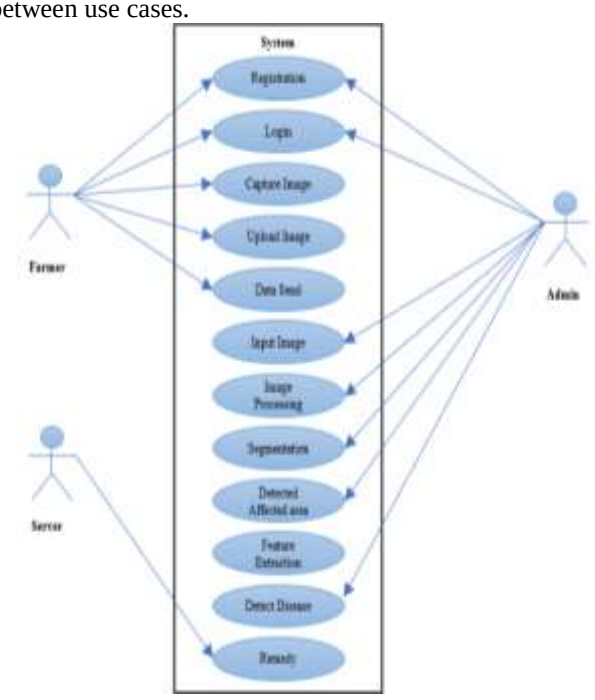

Fig. 1: Use Case Diagram

H. Activity Diagram:-

The activity diagram is a graphical representation of representing the flow of interaction within specific scenarios. It is similar to a flowchart in which various activities that can be performed in the system are represented. This diagram must be read from top to bottom.

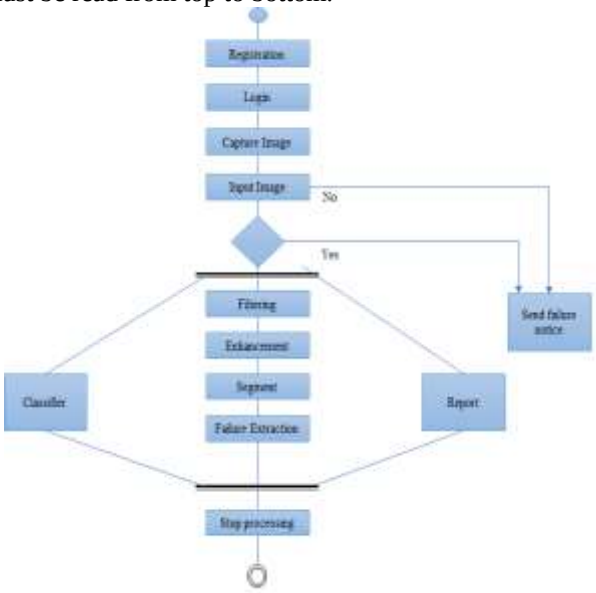

Fig. 2: Activity Diagram

VI. CONCLUSION:

There is a clear need to deliver better information management solutions for users and for the business as a whole. The existing mess of overlapping (or even competing) information systems with most organizations must be addressed and resolved .Enterprise portals may be able to assist with resolving these issues. If they are to succeed, however, organizations must be fully aware of both their strengths and weaknesses (just like any technology).Most importantly, these projects must be driven by clear staff and organizational needs, as well as a clear vision of the user experience that must be delivered. Where portal projects are driven solely by IT considerations, they will fail. They do not offer a 'silver bullet', nor will they eliminate the need to better manage the underlying information. By taking a business-focused and user-centric) approach to portal projects, organizations can take valuable steps towards the goal of providing a single information environment for staff.

VII. FUTURE SCOPE:

In many ways, portals as a technology are struggling to survive. Quite a few vendors now give away their portal products, when a sufficiently large enterprise purchase is made of their main-line products. This highlights that many vendors are finding it difficult to sell their portal products as stand-alone solutions that compete on their own merits, and are forced instead to bundle their technology offerings. With the initial hype of any new technology fading, the limitations and issues with portals are becoming more widely recognized, as is the realization that the marketplace has (so far) been driven by vendors rather than user demand. It is far from clear that portals will be prominent even in the next year

or two, and even now many organizations have lost interest in purchasing (or implementing) portals. That being said, the underlying concept of portals remains sound, and highly desirable. Even if the technology of portals doesn't survive in its current form, it is likely that the general principles will be incorporated behind-the-scenes into a range of platforms. Portals are certainly not sustainable as an IT-driven strategy, and vendors must reshape their offerings to better meet user and business needs if they are to survive.

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