



Research Note

APPLICATION FOR DIAGNOSIS OF DISEASES IN CROPS USING IMAGE PROCESSING

Arunkumar Beyyala^{1*} and Sai Priya Beyyala¹

*Corresponding Author: **Arunkumar Beyyala**, ✉ arunbeyyala@gmail.com

Every plant shows a distinct behavior at the time of infection. The plant disease can be analyzed by the detailed study of visually observable patterns of a particular plant. The major diseases are **pathogens** (infectious diseases). A plant scientist is to estimate the damage of plant (leaf, stem) caused due to disease by calculating the percentage of affected area. It results in prejudice and low turnout. In this paper we are going to know the techniques for detection of plant traits or diseases using Image Processing. These techniques are used to decrease the difficulty in detecting the plant diseases. It is any form of signal processing for which the input is an given in the format of image, such as a photograph or video frame and the output of may be either an image or a set of characteristics or parameters related to the image.

Keywords: Plant diseases, Pathogens, Diagnosis, Image processing

INTRODUCTION

India is one of the agricultural productive countries. Here more than 70% are depending on cultivation. The cultivation of crops may be fruits or vegetables etc, should be high range in optimum yield and best quality. For this the improved technology will be supported. The management of recurrent crops requires close monitoring especially for the management of diseases that can affect production significantly and subsequently the post-harvest life.

Diseases in crops are caused by pathogens viz., Fungi, Bacteria and Viruses. After entry of pathogens into Host (crops), characteristics

symptoms are expressed only after a definite incubation periods, though internal physiological changes in Host system occurs immediately after the entry of pathogens. Management practices being adopted only after observing visible symptoms. In perennial crops, the incubation period varies from one month to five years on depending on the type of pathogen. After, complete penetration and spread by the pathogen in host system, management/control of diseases is sometimes not possible/ or takes longer period, and also become expensive.

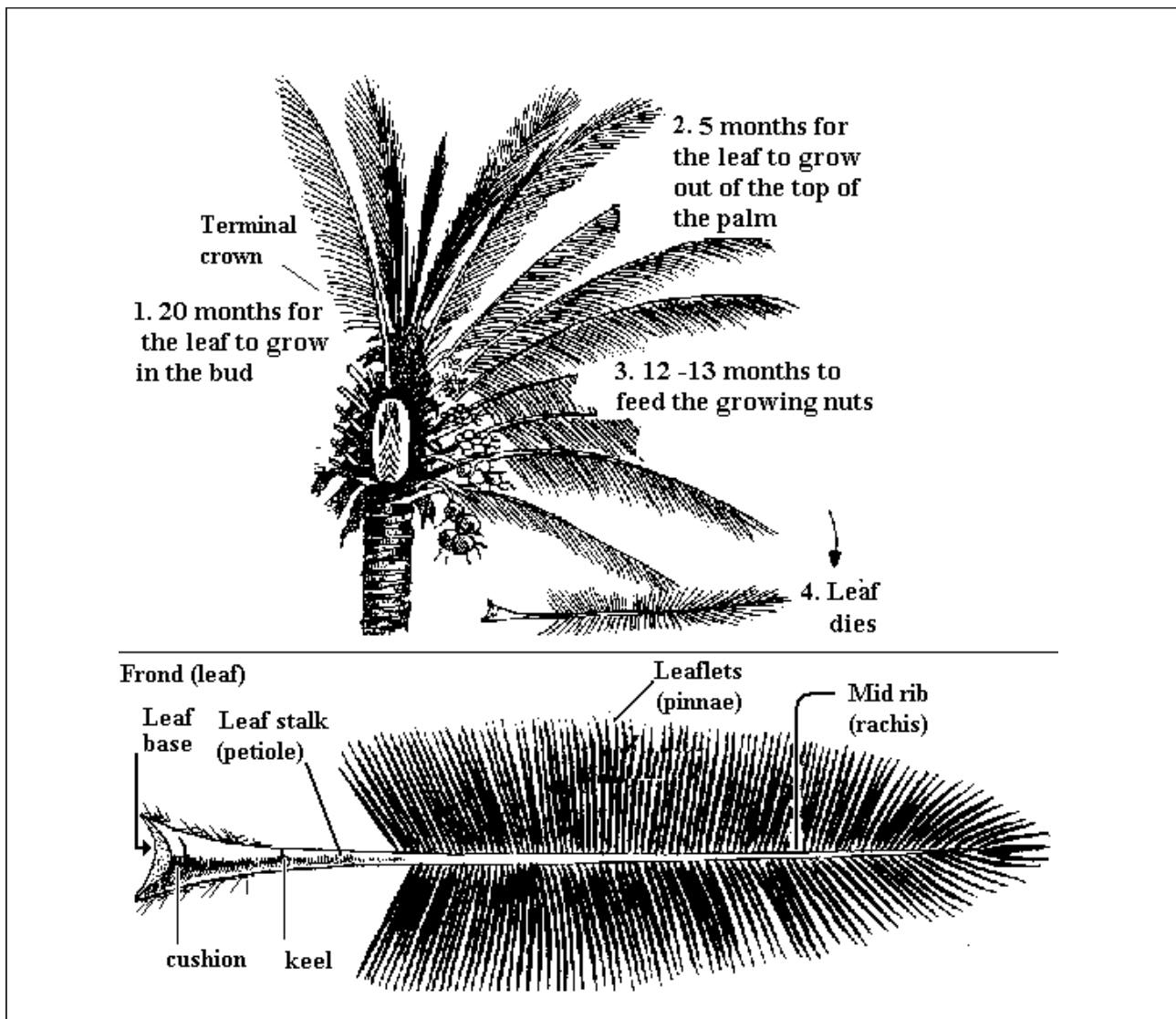
Hence, with this background, it is proposed to develop an effective image processing module

¹ Department of Computer Science Engineering, Vignan's Nirula Institute of Technology and Science for Women, Guntur, Andhra Pradesh.

for early diagnosis of disease, even before symptoms expression, for deadly diseases viz., Bud rot and Basal stem rot disease in Coconut (*Cocas nuciifera* L), Mosaic and Greening in Citrus, with the following.

1. Analyzing the disease caused for a plant.
2. Area of effected region.
3. Determine the color and size of effected portion.
4. Comparison to the normal size and shape of a particular tree, etc.

A symptom is an observable fact that accompanying something and is produced as an evidence of its survival. Disease is caused by pathogen which is any agent to cause disease. In most of the cases traits or diseases are seen on the leaves or stems of the plant. Therefore identification of plants, leaves, stems and then finding out the diseases, percentage of the disease incidence, symptoms of the disease attack, plays a key role in successful cultivation of crops. Annually a huge loss is gained by the cause of disease to a plant. Following two



examples shows that how some diseases have shattered the economies of nations.

1. Tomato Yellow Leaf Curl: Tomato yellow leaf curl virus (whitefly-transmitted geminivirus); Israel; Tomato Common bean *Phaseolus vulgaris* and tomato *Lycopersicon esculentum* 1999 [Spain (bean)] and 1990s [global spread (tomato)] Up to 80% yield loss. Due to Anthropogenic introduction of propagation material.

2. Sugar Cane Orange Rust: *Puccinia kuehnii*; Australia; Sugarcane *Saccharum officinarum* Australia: Australian sugar production fell by 25% and gross value of cane production dropped 20% in 2000-2001. Evolution of new strain that broke Q124 resistance.

MAIN OBJECTIVE'S

1. To develop effective software system to diagnose and differentiate symptoms caused by Pathogens in Basal stem rot and Bud rot diseases in Coconut and Mosaic and Greening in Citrus.
2. To fine tune the developed software for early diagnosis of Basal stem rot and Bud rot diseases in Coconut and Mosaic and Greening in Citrus.
3. To confirm that the developed system using image processing technology is in on-farm testing.

CONCLUSION

Traits management is a challenging task. Specific quantification of these visually observed diseases, pests, traits has not studied yet because of the complexity of visual patterns. Hence there was an enormous demand for specific and sophisticated image patterns understanding.

REFERENCES

1. Ahsan Abdullah and Muhammad Umer (2004), "Application of Remote Sensing in Pest Scouting: Evaluating Options and Exploring Possibilities, Proceedings of the 7th International Conference on Precision Agriculture and Other Precision Resources Management, Hyatt Regency, Minneapolis, MN, USA.
2. Brendon J Woodford, Nikola K Kasabov and C Howard Wearing (1999), "Fruit Image Analysis using Wavelets", Proceedings of the ICONIP/ANZIIS/ANNES.
3. C Mix, F X Pico and N J Ouborg (2003), "A Comparison of Stereomicroscope And Image Analysis For Quantifying Fruit Traits", *Seed Technology*, Vol.25, No. 1.
4. Jayamala K Patil, Raj Kumar Bharti Vidyapeeth C.O.E. Kolhapur, Bhatati Vidyapeeth (Deemed Univ.) Pune Defence Institute of Advanced Tech, Deemed University, Girinagar, Pune.
5. Jean Beagle Ristaino and Tracking (2006), "The Evolutionary History Of The Potato Late Blight Pathogen With Historical Collections", *Outlooks on Pest Management*.
6. Jon Traunfeld (1997), "Late Blight of Potato and Tomato, home & garden information center".
7. Mohammad Ei –Helly, Ahmed Rafea, Salwa Ei – Gamal and Reda Abd Ei Whab (2004), Integrating Diagnostic Expert System With Image Processing Via Loosely Coupled Technique, Central Laboratory for Agricultural Expert System (CLAES).

8. Panagiotis Tzionas, Stelios E Papadakis and Dimitris Manolakis (2005), "Plant leaves classification based on morphological features and fuzzy surface selection technique", 5th International Conference ON Technology and Automation ICTA'05, Thessaloniki, Greece, pp.365-370.
9. Qing Yao, Zexin Guan, Yingfeng Zhou, JianTang, Yang Hu, Baojun Yang (2009), "Application of support vector machine for detecting rice diseases using shape and color texture features", 2009 International Conference on Engineering Computation, IEEE computer society, pp-79-83. Advances In Image Processing For Detection Of Plant Diseases.
10. Rakesh Kaundal, Amar S Kapoor and Gajendra P S Raghava (2006), "Machine learning techniques in disease forecasting: a case study on rice blast prediction", *BMC Bioinformatics*.
11. Renato B Bassanezi, José Belasque Junior and Cícero A Massari Current Situation, Management and Economic Impact of Citrus Canker In São Paulo And Minas Gerais, Brazil.