Abstract

Soybean is among one of the most important commercial crops, which is cultivated worldwide. The research work presented in this thesis work focuses on the problems associated with the cultivation and highlights the effect of various Soya plant foliar diseases on its yield. Research has been presented a fully automatic disease detection, classification and severity level estimation system which is based on color image sensing and processing. Structural texture and normalized DCT-based feature descriptors for refined lesion histograms have been developed and proved the suitability of using the same for classifying the infections under consideration. The ST, ST-DCT and ST-NDCT based feature descriptors have been used for cataloguing and a performance comparison carried out. We analyze the statistical and spectral information of the infected portion to model the descriptors. We also test several color and texture based visual feature descriptors using both retrieval and classification based approaches to solve the stated problem. These techniques can be designed at any stage such as background removal, disease segmentation, feature extraction and image categorization. Soybean plant foliar detection is a complex problem because of the very similar symptoms of the different type of diseases, so obviously required complex image processing techniques to solve it. Background subtraction, infected area detection, disease characterization and disease categorization are the main components used in this research to detection and classification the diseases of soybean plant. It has been derived and development various new parameters and indices like Ratio of Infected Area (RIA), Lesion Color Index(LCI), Damage Severity Index(DSI), Infection Per Region(IPR), Disease Level Parameter (DLP), which are subsequently used for disease level prediction.