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Digital Disease Mapping of Citrus Canker from Selected Citrus Orchards in Pothowar.

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Agriculture is one of the essential sectors for the survival of humankind. At the same time, digitalization touched across all the fields became easier to handle various difficult tasks. Adapting technology as well as digitalization is very crucial for the field of agriculture to benefit the farmer as well as the consumer. Due to adopting technology and regular monitoring, one can able to identify the diseases at the very initial stages and those can be eradicated to obtain a better yield of the crop. Crop growth and yield are essential aspects that influence the field of agriculture as well as farmer economically, socially, and in every possible way. So, it is necessary to have close monitoring at various stages of crop growth to identify the diseases at right time. But, humans naked may not be sufficient and sometimes it would be misleading scenarios arise. In this aspect, automatic recognition and classification of various diseases of a specific crop are necessary for accurate identification. This thought gave inspiration for the present proposed framework.

Pakistan confers with a broad range of agro-climatic positions, diverse from tropical to temperate, allowing 20 different types of fruits to grow. Citrus is an important fruit within the economically important family Rutaceae and is cultivated in Pakistan on 20.0461 thousand ha with an annual production of 2.29 million tons. The citrus production level in Pakistan is at the 16th level in the production of citrus around the world. Its production is decreasing after 2015 due to some serious Pre and Postharvest diseases.

In 2016 CABI give a red alert to Pakistan on Citrus. One of the serious diseases that cause high losses in Citrus production is Citrus canker caused by gram-negative bacteria *Xanthomonas axonopodis*. Conventionally methods for plant disease diagnosis using hand lenses till to isolation lab techniques are laborious and not predictive for fungicidal application from time to time and make some treatment to control the diseases. By applying Artificial Intelligence and taking 4 to 5 thousand images of Citrus canker spots from different orchards from different plant parts fruit and leaves at a different location from pothowar. Then resize the images and retain images in a convolutional neural network (CNN) by using python as a computer language. A Model Citrus Fruits Detection (Multi Classification).ipynb (CFD) developed, detects the Citrus canker disease on Citrus Plant, and also detects and gives data about it that is it at the initial stage (Low Infection) or final stage (Severe Infection).

Keywords: Citrus; Citrus Canker; *Xanthomonas axonopodis* pv citri; Artificial Intelligence; CNN

Biography

Mr Amar Mehmood is an Adjunct Professor at PMAS-Arid Agriculture University Rawalpindi and 2. Dr. Gulshan Irshad University Rawalpindi and a Visiting Professor at PMAS-Arid Agriculture University Rawalpindi. He has over forty years of experience of research and post graduate teaching in the field of Plant and Agriculture.