Investigating the Use of Machine Learning in Potato Crop Disease Prediction and Preventive Measures in the Context of Smart Farming and Climate Change

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Potato cultivation is a vital component of global agricultural production, and fungal diseases pose significant challenges to farmers. A vast majority of Pakistani potato growers are small-holding farmers with less than 25 hectares of land. These farmers cannot afford the most technologically advanced and expensive tools, hence there is a dire need to develop cost-effective forecasts and early warning services for predicting the time of appearance of disease and hence optimizing the use of remedies. This research project aimed to make a potato crop disease-predicting model using machine learning that gives both small and large holding farmers a cost-effective solution to predict crop diseases before they set in, allowing them to take timely preventative measures and reduce wastage and yield loss. To address this issue, the research project explored the use of artificial intelligence modeling in detecting and predicting three major fungal diseases affecting potatoes: black scurf, late blight, and early blight. For this research, environmental data was collected from on-ground IOT sensor weather stations in two regions of Western Punjab, Depalpur and Kasur, to train decision tree regression models to predict the chances of disease occurrences in the future using parameters such as temperature, humidity, and dew point, while comparing its accuracy to a model trained from data from a forecasting API. To further facilitate the farmer, a mobile application has been developed that takes a location input from the user and calls the API to fetch future forecasts linked to the project algorithm.

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