

Smart Pest Management: An Augmented Reality-Based Approach for An Organic Cultivation

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Abstract— The agricultural world faces more difficulties due to crop pests that damage or infliction cultivated plants. The main challenges to those interested in cultivation are pest attack and disease. Pests spread the disease, and the yield is decreased. However, it is possible to control pest attacks and infections in the early attack stage to reduce pesticide use and keep the farm safe. Mobile applications can provide accurate identification rather than manual detection. Mobile applications and technologies are created when considering the solution. The importance of the proposed solution is to increase the rate of the plant product and achieve high revenue without any cost. One of the main components used in this system is the image processing technique. The pest images will be taken, and they will be subjected to various preprocessing for noise reduction and enhancement of the pictures. Using image processing, the user can determine the pest's life cycle stage. The user can identify the stage of the damaged plant by applying the classification algorithm. The content analysis is based on the machine learning process, especially using a Convolutional Neural Network. Hence, the proposed system will help to get knowledge of organic pest prevention methods. In the system, we determined the type of pest with 90% accuracy by submitting a damaged leaf and a pest image. The pest's lifecycle stage and stage of the affected plant also can be identified in our system with high accuracy. Moreover, it shows the organic prevention methods.

Keywords— *Image processing, Convolutional Neural Network, Augmented Reality, Pesticides, Machine Learning*