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Location-Based Identification of Transboundary Plant Pests & Diseases Using UAVs & Deep Learning

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Abstract

Farming, like all industries, is being disrupted by technologies in a push to increase productivity while being sustainable and contributing positively to climate change. Farmers are faced with a perennial problem of pests and diseases which negatively impacts the productivity and profitability of their enterprises. The most common of these being transboundary plant pests and diseases which affect food crops. To address this challenge, we propose Project Anton, a deep learning-based distributed solution that uses image data remotely sensed from satellites or any device with a camera to detect pests and diseases and give recommendations on the treatments and appropriate interventions to apply. We propose the above as we realized that physical field inspections delay productivity as farmers have to wait a long time for inspections and even more time to get inspection results. Lack of aggregated data makes it difficult to track pests and diseases including effects on yield, while lack of accurate land mapping data makes it difficult for agriculture researchers to provide resources/medicines to farmers especially those in remote areas. We use google earth engine to get satellite data used for land cover mapping, field mapping and location based field analysis. Currently the solution uses already existing platforms like Whatsapp and facebook messenger in combination with a deep learning model trained to identify pests and diseases based on image data. Furthermore, this data is visualized and analyzed on a web application to provide community feedback for farmers as well as a disease heatmap of a target area. For future work, we plan to integrate drones for collecting data and collaborating with the relevant stakeholders for testing and validation of the model.

Keywords satellite images, UAVs, remote sensing, deep learning, mapping

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