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Agri-Vision: Autonomous Crop Health & Yield Forecasting

Overview

The agricultural industry is under pressure to increase food production while minimizing resource use. A significant portion of crop yield is lost to diseases and pests, costing the global economy over $220 billion annually. Agri-Vision is a comprehensive AI-powered platform that uses autonomous drones equipped with multispectral cameras to survey fields, detecting the earliest signs of plant stress before they are visible to the human eye.

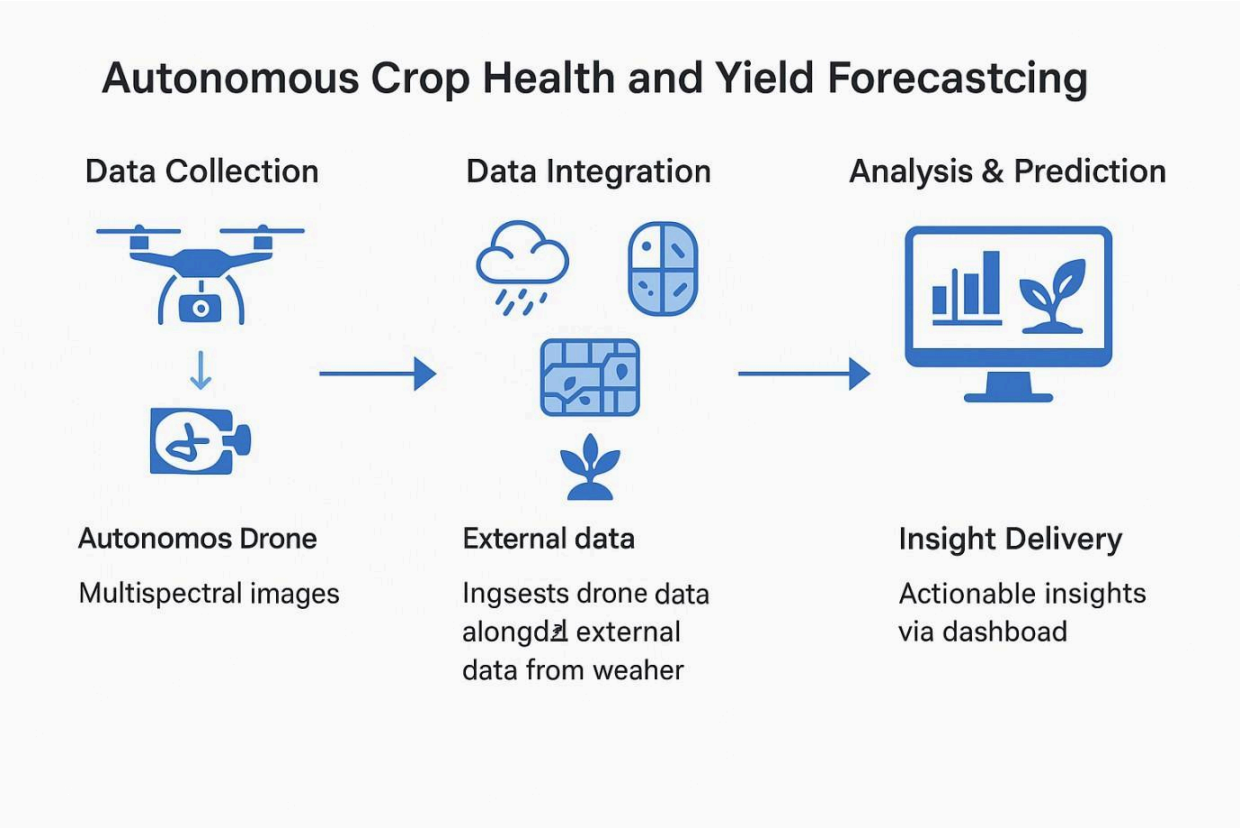
Objective

The objective is to provide farmers with an early warning system for plant diseases and pests to reduce global crop loss. We aim to increase agricultural efficiency by optimizing the use of resources and to improve farm profitability by providing accurate crop yield forecasts.

Methodology

The system is built on a streamlined data pipeline. The Data Collection phase uses autonomous drones to capture multispectral images. The Data Integration phase ingests drone data alongside external data from weather APIs and IoT sensors. The Analysis & Prediction phase processes the fused data to identify problems and forecast yields. Finally, the Insight Delivery phase presents actionable insights on the Agri-Vision dashboard.

Highlevel system Diagram:



Significance

The global precision farming market is a rapidly growing sector with a projected market size of over $21 billion by 2032. Our solution offers a clear, measurable return on investment for farmers. By enabling precise intervention, Agri-Vision can reduce crop loss by up to 80% and unnecessary pesticide use by 40%.

Expected Outcomes

We expect to deliver an autonomous drone system, a specialized multispectral imagery analysis model, and a multi-modal data fusion engine. The platform will directly contribute to maximizing a farm's crop yield and profitability, with an average increase of 15-25% over a three-year period.