Targeted Spraying for Precision Agriculture

Breif Background

Conventional blanket pesticide spraying wastes chemicals, harms soil and the environment, increases costs, and lacks precision, while current drone sprayers still cannot differentiate healthy crops from pest-affected areas. Therefore, there is a need for an AI-assisted targeted spraying system that uses multispectral imaging, image analytics, and automated drone spraying to enable data-driven, site-specific pesticide application

Application Sectors

- 1. Precision agriculture,
- 2. Sustainable farming,
- 3. Targeted spraying.

TRL 5

Tech/Prod. Summary

An AI-driven drone-based precision spraying system that uses multispectral imaging, machine learning, and KML-based targeted flight paths to autonomously detect pest-infested crop zones and spray only the required areas, minimizing chemical usage, improving yield, and enabling sustainable, data-driven precision agriculture

Tech/ Product Description

This system uses a drone with a multispectral camera to capture Red, Green, Red Edge, and NIR imagery, which is processed into vegetation indices like NDVI and NDRE to detect stress or pest-affected crop regions. Machine learning algorithms map these affected zones and convert them into KML files, which guide an autonomous spraying drone with precision nozzles to apply pesticides only where needed, reducing chemical usage and environmental impact. The solution supports pre- and post-spray analysis, is modular for different crops, and offers an affordable, scalable, data-driven approach for sustainable precision agriculture.

Market Potential

1. Global Precision Agriculture Market Reach to USD 1.2 billion by 2030.
2. Agricultural Drones Market: reach ~USD 10-12 Billion by 2030

Impact - SDG:

SDG 2 – Zero Hunger
SDG 12 – Responsible Consumption and Production
SDG 13 – Climate Action

Value Proposition

1) Increases crop productivity through precision farming.
2) Reduces human exposure to toxic chemicals.
3) Optimizes chemicals use and minimizes waste.
4) Promotes eco-friendly, data-driven agriculture.

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