



Colorado Science and Engineering Fair

2024 Individual Project Abstract Form

Please print 2 copies of the completed form. Sign both copies, keep 1 for your notebook and submit 1 copy to your Regional Fair Director with your other paperwork.

Title of Project: HarvestSpectra - An Enhanced Crop Spectral Analysis Using a Novel Vertical Take-Off Fixed-Wing Structure for Precision Agriculture

Finalist's Name: Ruolin (Leo) Hai

School and City: Champion Academy

Sponsor's Name: Peter Hutauruk

Category: Engineering (ENGR)

Division: Senior (9th - 12th grades)

Abstract (250 words or less):

This study introduces two VTOL fixed-wing agricultural drones, namely the Y3 and 4+1 models, designed to facilitate efficient agricultural spectrum data collection and LSTM analysis for vegetation growth information. Through rigorous development and testing, these drones have demonstrated enhanced capabilities in agricultural monitoring, enabling precise data collection and insightful analysis. The integration of LSTM analysis techniques has proven effective in extracting meaningful insights from collected data, empowering farmers and agricultural professionals to make informed decisions regarding crop management and resource allocation. Furthermore, the versatility of VTOL drones allows for their deployment in various agricultural settings, promising tailored solutions for different crops and environments. While initial investment costs may be incurred, the long-term benefits in terms of increased productivity and resource optimization justify the adoption of these advanced technologies. Looking ahead, upcoming research endeavors aim to further refine drone technology, data analytics methodologies, and machine learning algorithms, with the overarching goal of advancing agricultural monitoring systems towards sustainability and resilience.

I hereby certify that the above statements are correct and the information provided in the Abstract is the result of one year's research. I also attest that the above properly reflects my own work.

Finalist's Signature:

Date:

In addition, all students must complete the ISEF Student Checklist (1A), Research Plan, Approval Form (1B), and Checklist for Adult Sponsor (1), and any other ISEF forms required for this type of project. See the International Rules and Guidelines for form requirements. Return COPIES of all of these forms to your Regional Fair Director with you Finalist Verification/Permission Form. A signed copy of this form must be included in your notebook.