Digital Technology for ANR – Final Project Proposal

Classification of Harmful Farm Insects in Agriculture

Abstract:

The "Dangerous Farm Insects Dataset" comprises 1591 images of harmful insects impacting the agricultural production. These consist of 15 distinct species of insects. The main purpose of this project is to develop models using different machine learning methods to classify the dangerous insects which helps in the control of these pests and increase the yield.

Objectives:

- ***Exploratory Data Analysis*:** Exploration of the dataset and performing some basic Exploratory Data Analysis to understand the data structure and quality. This includes employing some data augmentation techniques, to diversify the data.
- ***Model Training:*** Experiment with some SOTA models, including but not limited to models such as CNN, MobileNet, ResNet etc.
- ***Model Evaluation:*** Evaluation of the trained models using some of the metrics such as accuracy, precision, recall and F1-Score. Also, using some methods like cross-validation to evaluate the model in a better way, leading to better generalization of the model to unknown data.
- ***Inference:*** Test the final models with unseen data and evaluate the results.

Significance:

- Detection of the hazardous insects in a timely fashion, which helps in reduced damage to the crops and increase in yield and economic sustainability.
- Can be used for the early detection of certain insect-borne diseases, helping in public health and disease prevention.
- Helps in the study of these insects, which helps in ensuring the biodiversity and promoting environmental inclusivity.

Outline:

- Processing the images in the dataset for training, which may include techniques such as resizing, normalization etc.
- Implementation of the above-mentioned deep learning models using frameworks such as Tensorflow / Pytorch
- A pipeline for the model inference, testing the model on the unseen data.
- Preparation of a report summarizing the entire experimental setups, use cases and evaluation.

Conclusion:

This project seeks to utilize deep learning techniques on images to identify harmful insects in agricultural settings. This timely detection aids in effective pest management and promotes environmental conservation efforts.

Dataset reference:

I have attached the datasets link for your reference. Kindly have a check it.
https://drive.google.com/drive/folders/1dxl9Pbd_m7-w8VbuKYGyvI0MYKb6Qkyc