**DATAPRO COMPUTERS PVT. LIMITED**
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Date:- 01-04-2025

# Project Acceptance letter from the Organization

To,

The Principal,

Rajah Rsrk Rangarao College,

Bobbili,535558

## TO WHOMSOEVER IT MAY CONCERN

This is to certify that **VAMIREDDY UMA (323241860063)**, final year MCA student of Rajah Rsrk Rangarao College, Bobbili, will be pursuing his project in **Datapro Computers Pvt Ltd** on **Automated Pest Detection Using Image Classification** Under the guidance of **Vijay Kumar Lokanadam**, during the tentative period from **March 2025 to June 2025**, in partial fulfillment of the requirements for the award of the degree of **Master of Computer Applications**.


Copy to,

Head of the Department Computer Science

Rajah Rsrk Rangarao college.

**Automated Pest Detection Using Image Classification**

Abstract

Pest detection in agriculture is a critical task that ensures crop health and optimal yield. Traditional manual inspection methods are time-consuming and inefficient, leading to the development of deep learning-based automated pest detection systems. This research focuses on enhancing pest detection by transitioning from an ensemble-based deep learning model to an advanced object detection framework. The study evaluates the performance of the existing DeepPestNet model and proposes an improved detection system using YOLOv9, aiming for real-time, high-accuracy detection with minimal computational cost.

## Existing System

DeepPestNet is an ensemble model combining multiple Convolutional Neural Network (CNN) architectures, including ResNet50, EfficientNetB0, ShuffleNet, GoogleNet, DenseNet201, and MobileNetv2. These networks, optimized using various versions of the Adam optimizer, collectively enhance pest detection accuracy. While DeepPestNet achieves high precision, it suffers from computational overhead and slow inference speeds, making it less suitable for real-time applications.

## Proposed System

The proposed model leverages YOLOv9, the latest evolution of the YOLO (You Only Look Once) family, known for its superior speed and accuracy in object detection. YOLOv9 introduces enhanced feature extraction, adaptive anchor-free mechanisms, and improved model efficiency, enabling faster pest detection with minimal resource consumption. By implementing YOLOv9, this research aims to achieve real-time, high-accuracy pest identification, improving agricultural monitoring and pest control strategies. feature selection, the system aims to reduce false positives and detect fraud more effectively than the existing MLP-based approach.

# An Efficient Approach for Crops Pests Recognition and Classification Based on Novel DeepPestNet Deep Learning Model

**Publisher: IEEE** Cite This PDF

Naeem Ullah ; Javed Ali Khan ; Lubna Abdulaziz Alharbi ; Asaf Raza ; Wahab Khan ; Ijaz Ahmad **All Authors**





**Abstract:**

Crop pests are to blame for significant economic, social, and environmental losses worldwide. Various pests have different control strategies, and precisely identifying pests has become crucial to pest control and is a significant difficulty in agriculture. Many agricultural professionals are interested in deep learning (DL) models since they have shown significant promise in image recognition. Pest identification approaches in literature have relatively low accuracy in pest recognition and classification due to the complexity of their algorithms and limited data availability. Misclassification of insect pests sometimes leads to using the wrong pesticides, causing harm to agricultural yields and the surrounding environment. It necessitates developing an automated system capable of more accurate pest identification and classification. This paper presents a novel end-to-end DeepPestNet framework for pest recognition and classification. The proposed model has 11 learnable layers, including eight convolutional and three fully connected (FC) layers. We used image rotations techniques to increase the size of the dataset and image augmentations techniques to test the generalizability of the proposed DeepPestNet approach. We used the popular Deng's crops data set to assess the proposed DeepPestNet framework. We used the proposed method to recognize and classify crop pests into 10-class pests, i.e., Locusta migratoria, Euproctis pseudoconspersa strand, chrysochus Chinensis, empoasca flavescens, Spodoptera exigua, larva of laspeyresia pomonella, parasa lepida, acrida cinerea, larva of S. exigua, and L.pomonella types of insects pests. The proposed method achieved optimal accuracy of 100%. We compared the proposed DeepPestNet approach with traditional pre-trained deep learning (DL) models. To verify the general adaptability of this model, we tested the proposed model on the standard Kaggle dataset "Pest Dataset" to recognize nine types of pests: aphids, armyworm, beetle, bollw...

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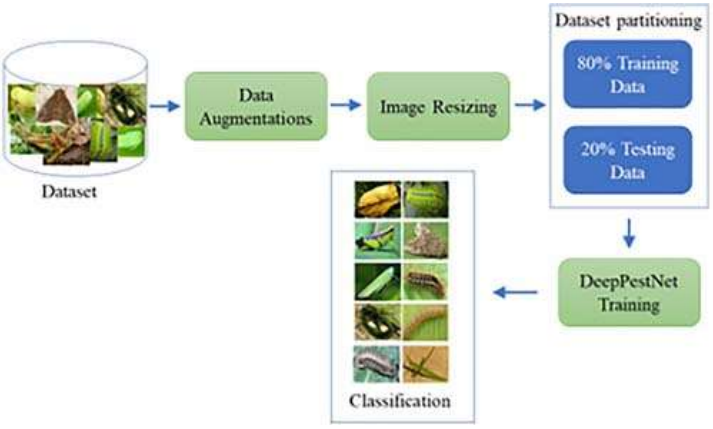


Proposed DeepPestNet framework for smart farming to automatically identify various pest types.

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