A CROP PEST CLASSIFICATION USING DEEP LEARNING TECHNIQUES

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ABSTRACT:

This project provides a pest identification system to classify crops beneficial and harmful pests. For that purpose, the project first provides a detailed description of the available pests-identification techniques along with their pros and cons.

Based on the investigation, a classification technique is proposed in this project. The proposed pest's identification and classification model has been developed using the Convolution Neural Network (CNN).

The model has been trained with a dataset of images of different pests. The system has been tested with a huge amount of data and validated across other traditional classification models. The classification accuracy of the proposed system is measured by 90% that is far more superior to other conventional methods.

Keywords: Pests identification, deep learning, CNN, benificial pests, harmful pests

INTRODUCTION:

Agriculture, which is considered the backbone of the economy, contributes to the country's economic growth and determines the standard of life. Crop production always depends upon some production elements like pests, fertilizer, or water.

This project talks about the impact of pests on agricultural achievements. For that purpose, it introduces the deep learning technique for identifying as well as classifying the pests into two major categories: the harmful pests and the beneficial. Most of the farmers are not enough educated and lack the knowledge to differentiate the beneficial pests from the harmful ones and so, they kill both pests.

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So, the differentiation of beneficial pests from harmful ones is a crucial challenge. Scientists have been trying to solve this problem and proposing many techniques for the last few decades.

LITERATURE SURVEY:

[1] S.S.Sannakkiand V.S.Rajpurohit, proposeda "Grouping of Pomegranate Diseases Based on Back Propagation Neural Network" which fundamentally chips away at the technique for Segment the surrendered region and shading and surface are utilized as the highlights. Here they utilized neural organization classifier for the grouping. The fundamental benefit is it Converts to L*a*b to separate chromaticity layers of the picture and Categorisation is discovered to be 97.30% precise. The primary drawback is that it is utilized distinctly for the restricted harvests.

[2] P.R.Rotheand R.V. Kshir sagar presented a "Cotton Leaf Disease Identification utilizing Pattern Recognition Techniques" which Uses snake division, here Hu's minutes are utilized as particular trait. Dynamic shape model used to restrict the essentialness inside the contamination spot, BPNN classifier handles the various class issues. The normal grouping is discovered to be 85.52%.

[3] Aakanksha Rastogi, Ritika Arora and Shanu Sharma," Leaf Disease Detection and Grading utilizing Computer Vision Technology &Fuzzy Logic". K-implies grouping used to fragment the surrendered region; GLCM is utilized for the extraction of surface highlights, Fuzzy rationale is utilized for sickness reviewing. They utilized counterfeit neural network(ANN)as a classifier which primarily assists with checking the seriousness of the unhealthy leaf.

PROPOSED SYSTEM:

The proposed model was developed using Tensor Flow, a robust library in python. The proposed model includes three layers, like other CNN architectures, the input, hidden, and output layers. Our model proposed consists of 4 Convolution and the same number of the activation function. The model contains four max polling layers, a flattened layer later, and a fully connected layer to link the output layer.

SYSTEM ARCHITECTURE:

Datasets were contained in the database in two separate categories: (Beneficial, harmful), and images from 10 different pests were included in each category. The scale of datasets was not the same and, therefore, not appropriate for model feeding. We had to process the dataset beforehand. Second, all the images were resized to 50 x 50 scales and placed in one NumPy series. The dataset was then split into two parts: one for the model training and the other for validation. For the validation process, 25% of

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the total images were used. After that apply the proposed CNN model to extract the features and compare the features with the trained data. Later classify the data either beneficial or harmful

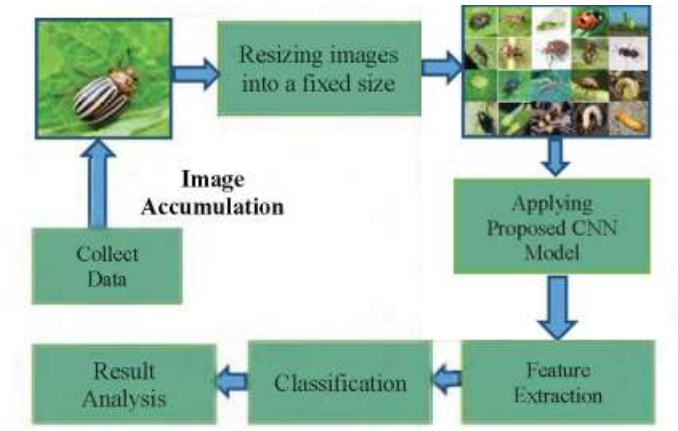

Fig1. Proposed Model Working Process

DATA SET:

This project was done to identify two types of pests (harmful and beneficial) in various crops. In this analysis, there are 10 separate harmful species and 10 beneficial species. The most harmful and beneficial pests are respectively cutworms, aphids, black beans and beets of the lady, big-eyed bugs, and damsel bugs. The sample images of both harmful and beneficial pests are shown respectively in Fig. 1 and Fig. 2. However, the images were collected from different crop fields and the internet which were not sufficient for the in-depth neural network training. To avoid the over fitting problem, image augmentation techniques such as Rotation, Scaling, and Transformation was applied in the dataset [8] for increasing the number of images

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Fig 2: Data set

PROPOSED ALGORITHM:

CNN is a part of deep learning that has recently become a widespread technique of image classification. CNN consists of three layers: the input layer, hidden layer, and output layer. The hidden layer in CNN varies in number from model to model and consists of different layers: Convolutional layers, pooling layers, fully connected layers, and normalization layers. The numbers of the layer can be determined based on the complexity of the problem.

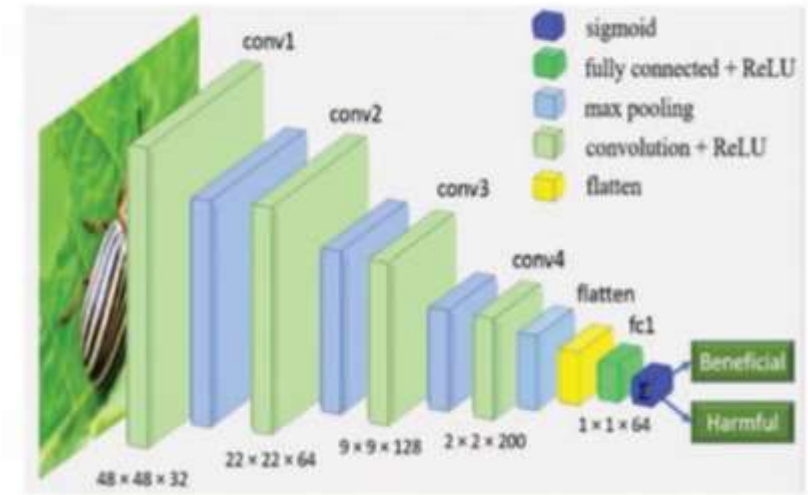

Fig 3: Schematic representation of proposed model

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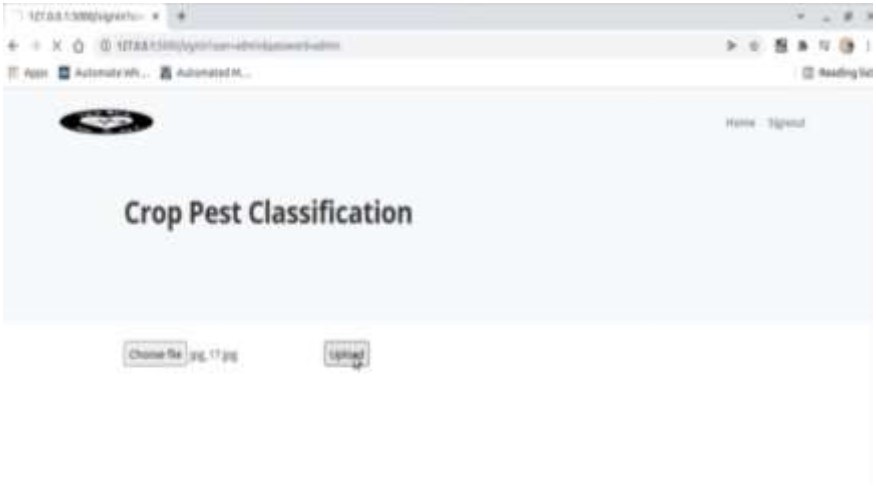
RESULTS:

```
    elif mail1 == str(data[0]) and password1 == str(data[1]):
        return render_template('home.html')
    else:
        return render_template('index.html')

@app.route('/index')
def index():
    return render_template('index.html')

@app.route('/predict2',methods=['GET','POST'])
def predict2():
    print("Entered")

    print("Entered here")
    file = request.files['file'] # fet input
    filename = file.filename
    print("@@ Input posted = ", filename)

    file_path = os.path.join(UPLOAD_FOLDER, filename)
    file.save(file_path)

    print("@@ Predicting class......")
    pred, output_page = model_predict2(file_path,CTS)

    return render_template(output_page, pred_output = pred, img_src=UPLOAD_FOLDER + file.filename)


if __name__ == '__main__':
    app.run(debug=False)
```



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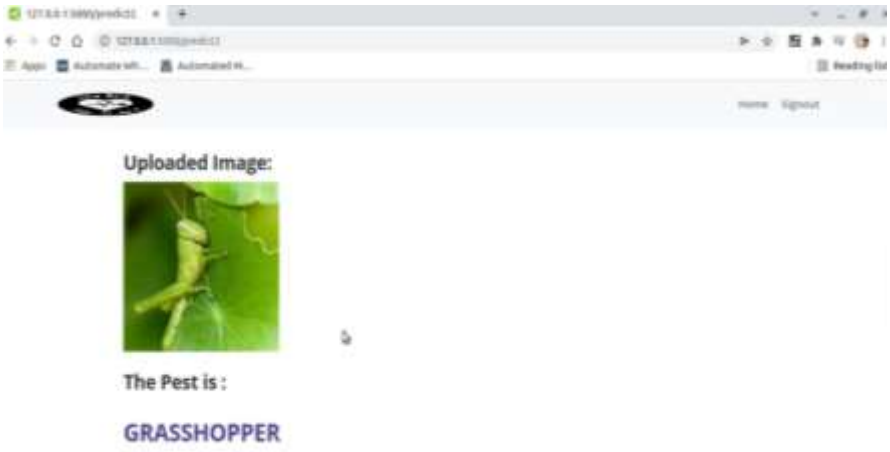

CONCLUSION:

A pests-classification model based on CNN was suggested in this article. The proposed model provides substantial facilities to the farmers to recognize beneficial and harmful pests easily. To establish the model pests with two different classes were considered where each class considers 10 different species. A huge number of pests' images were taken to train and test the system. The system considers various types of CNN based classification techniques for finding out the best classifier`

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