PROJECT TITLE -

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ABSTRACT:

The Plant and Animal Diseases Portal provides a comprehensive platform for monitoring, diagnosing, and managing various diseases affecting plants and animals. This portal integrates machine learning and data analytics to identify disease patterns, track outbreaks, and offer diagnostic support to agricultural and veterinary professionals. Users can access a database of symptoms, images, and recommended treatments, aiding in early detection and containment. This system aims to support farmers, researchers, and policymakers in protecting biodiversity, and enhancing the health of agricultural resources through real-time information and disease management tools.

KEYWORDS:

symptoms matching, image classification, object detection, model integration.

INTRODUCTION:

The increasing prevalence of plant and animal diseases poses a significant threat to global food security, biodiversity, and economic stability. Timely detection and accurate diagnosis are crucial for risks to human health. By creating a centralized portal for disease detection and management, we aim to address several key issues: Problem Statement Farmers and veterinarians face challenges in identifying plant and animal diseases in their early stages, leading to delayed intervention and the spread of infections. The scarcity of affordable and user-friendly diagnostic tools contributes to poor disease management. Developing a portal that includes AI-driven diagnostic tools, image-based detection, and symptoms analysis for early disease identification could enable users to address issues promptly and minimize damage. Managing these diseases effectively, minimizing losses, and ensuring the health and sustainability of agricultural and natural ecosystems. The Plant and Animal Diseases Portal aims to serve as a centralized platform for the monitoring, diagnosis, and management of diseases affecting various plant and animal species. Moreover, this portal fosters collaboration among farmers, veterinarians, researchers, and policymakers, providing them with a shared platform to share insights, report outbreaks, and access up-to-date information on disease management practices. Ultimately, this initiative aims to reduce the spread of diseases, protect agricultural resources, and support sustainable farming practices. This

report outlines the portal's design, core functionalities, and the potential benefits it offers to stakeholders in agricultural and environmental sectors. The motivation behind developing an Animal and Plant Disease Portal stems from the significant impact that diseases in plants and animals have on agriculture, economy, and public health. Diseases in plants can lead to severe crop losses, affecting food security and farmers' livelihoods similarly, diseases in animals, especially livestock, can impact food production, animal welfare, and even pose risks to human health. By creating a centralized portal for disease detection and management, we aim to address several key issues.

COMPONENTS:

Machine Learning-Based Approaches:

ML models analyse handcrafted features from plant leaf images. Popular algorithms include Support Vector Machines (SVM), Convolutional neural network (CNN), deep learning.

Deep Learning Approaches:

Convolutional Neural Networks (CNNs) can automatically extract hierarchical features from images. Models like ResNet, VGG16, InceptionV3, and MobileNet are widely used for plant and animal disease classification.

Mobile Applications for Disease Detection:

Several mobile apps use image processing and AI to detect plant diseases. Mobile-based animal disease detection is emerging with AI-powered veterinary tools.

CONSTRUCTION:

The platform will be developed using modern web technologies to ensure performance and scalability. The backend will support a secure, centralized database with APIs for data exchange between departments. Key construction aspects include:

WORKING:

(A) For Animal

Step 1: Select Animal

The user selects an animal type (e.g., Cow, Dog, Cat, Goat, etc.). The system filters the relevant disease database for the chosen animal. Why? Different animals have different diseases, so selecting an animal helps the system focus on relevant diseases.

Step 2: Enter Symptoms

The user manually enters the observed symptoms (e.g., fever, loss of appetite, coughing, weakness). The system converts symptoms into numerical features for processing by the SVM model. Example Feature Encoding: Fever: 1 Weakness: 1 Loss of Appetite: 0 Coughing: 1

Step 3: Predict Button (Triggering the SVM Model)

The user clicks the Predict button. The system sends the symptom feature vector to the SVM model for disease classification. Why? This triggers the machine learning model to analyse the input and predict the disease.

Step 4: Apply SVM Model (Feature Extraction Classification)

A. How SVM Works in This Step?

Training Phase (Before Deployment): The SVM model is trained on a dataset of animal symptoms and diseases. Each disease is treated as a class (e.g.,"Foot and Mouth Disease," "Rabies," "Influenza"). The model learns the patterns that distinguish one disease from another. The algorithm finds an optimal hyperplane that separates different diseases in high-dimensional space.

Prediction Phase (After User Input):

- The system maps the symptom vector to the trained SVM model.
- The decision boundary (hyperplane) determines which disease category the input belongs to.
- If the data is not linearly separable, an SVM Kernel Trick (e.g., RBF Kernel) is used to transform it into a higher dimension for better separation.

Example Hyperplane Classification in SVM: Suppose the symptoms match *Foot and Mouth Disease*, and the SVM classifier assigns.

step5: Disease Prediction Output

The system displays the predicted disease and a confidence score (how certain the model is about the classification). The user can take further action based on the result (e.g., consult a veterinarian).

Example Output:

Animal: sheep

Predicted Disease: Foot Root

Description: Bacterial infection of the foot, swelling precaution:

Maintain clean and dry living, treat hooves

Medication: Antibiotics (e.g. Penicillin), foot care and proper sanitation

(**B) For Plant**

Step 1: Card Box (Image Display):

This is the UI component where the user can view the selected image. It serves as a preview before running the model.

• It ensures the user selects the correct image before processing.

Step 2: Take a Photo

- The user can capture an image of the affected plant.
- This image is directly sent for processing.

Step 3: Pick from Device

- The user can select an existing image from their gallery or storage.
- This allows using previously captured images. Why?
- Flexibility in image selection ensures better usability.

Step 4: Apply CNN Model How CNN Works in This Step?

- The image is pre-processed (resized, normalized).
- It is fed into a pre-trained CNN model (e.g., ResNet, VGG16, or MobileNet).
- The CNN extracts important features (textures, shapes, colours) through multiple layers:
  - Convolutional Layers → Extract features using filters.
  - Pooling Layers → Reduce dimensions while retaining key information. – Fully Connected Layers → Classify extracted features into diseases.

Example Feature Extraction:

- A CNN learns to recognize disease-specific patterns, e.g., brown spots on leaves for fungal infections.

*Step 5: Predict

- The model classifies the image into a specific disease category.
- It assigns a confidence score to the prediction. Example Output from CNN:
- Healthy (95% confidence)
- Leaf Blight (87% confidence)
- Powdery Mildew (90% confidence)

Step 6: Disease Prediction Output

- The system displays the predicted disease name, diseases, Description, Precaution and Medication
- The user can take action, such as consulting an expert.

CONCLUSION:

The development of a mobile portal for plant and animal disease detection using Flutter, Dart, and Python presents a significant advancement in agricultural and veterinary diagnostics. By integrating machine learning models with a cross platform framework, we have created an application that is accessible, efficient, and user-friendly. This solution addresses the critical need for early disease detection, helping farmers, veterinarians, and hobbyists protect plant and animal health and reduce economic losses.