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Classification of Animal based on FootPrint Using DeepLearning

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Abstract: An emerging area in machine vision is a real dog biometric system that can identify and describe animal life in images and videos these programs offer methods for classifying animals using computer vision CNN features a well-liked deep learning technique are the foundation of the current system for classifying animal faces. Here, the suggested system analyses photos of animal footprints to categorise them using deep learning. Using a clever method, the footprint photos are pre-processed and turned into grayscale boundaries. Gabor filter are used to extract features of segmented image. The dimensionality reduction is carried out based on unsupervised model, Principal Component Analysis (PCA). The classification model is then fed with reduced feature vectors. The categorization and identification of the animal class is done using probabilistic neural networks, or CNNs.Footprints 0 dataset of five different animal categories of 100 images is to be used for classification. The performance analysis of the system is evaluated using the measure accuracy, precision, recall and fl-measure.

Keywords: Probabilistic Neural Network, precision, recall, F1score

I. INTRODUCTION

Computer vision algorithms extract features from photos and videos, while deep learning techniques leverage those features to predict the types of animals present in given images. There are numerous benefits to advancing animal recognition technologies. They enable monitoring and preservation efforts for endangered species in the wild.

Additionally, they provide a vital tool for the general public and scientists to analyse long-term population trends across different animal groups. Studying animal recognition also deepens our comprehension of how an area's animal populations influence the surrounding environment. Researchers develop sophisticated algorithms to gain deeper insights into animal behaviour patterns as well. Such applications can even alert humans to the presence of dangerous wildlife nearby, allowing protective measures to be taken.

The passage also discusses how animals leave behind footprint impressions known as tracks when traversing across malleable ground materials like mud or snow. These tracks offer clues that hunters leverage to track prey, while naturalists use them to identity local fauna. Varying by the creature's weight and substrate composition, animal tracks can eventually become fossilized over millions of years - preserved as trace fossils in rock formations. Fossilized tracks provide palaeontologists with evidence about ancient animal life.

II. BACKGROUND & REALTED WORK

Li et al. introduced a novel rasterization-based approach for categorizing various tree species from intricate forest point cloud data acquired through terrestrial laser scanning (TLS). Their methodology involves extracting individual trees, removing noise, voxelizing tree characteristics, and employing a deep belief network (DBN) model for tree species classification. The proposed technique demonstrated high accuracy across multiple datasets, leveraging rasterization as an effective means to represent 3D object information. The researchers aim to explore enhanced representations of 3D objects in future work.

Han et al. tackled object detection challenges in optical remote sensing images (RSIs) through an innovative weakly supervised learning (WSL) framework and high-level feature learning. Their work stands out in two key aspects: firstly, it establishes a WSL framework that significantly reduces the manual effort required for annotating training data while achieving excellent performance, contrasting with typical supervised or semi-supervised approaches.Secondly, they developed a deep neural network capable of unsupervised learning of high-level features and provided.

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III. IMPLEMENTATION

A. Data Collection

The Max Planck Institute for Ornithology has an online database with animal tracking data. It is intended to assist animal tracking researchers in managing, sharing, safeguarding, analysing, and archiving their data. Move bank is a global project with over 11,000 users, including representatives from research and conservation organizations around the world.

B. Data Pre-Processing

Pre-processing Animal footprint images are converted into gray-scale [13]. Gray-scale image is a image consists of binary contents in the form of 0 and 1 pixels of the initial rgb image. Gray-scale image consists of image pixel is a single sample representing only small amount of light, it carries only intensity information between (0 to 1). The converted grayscale for further processing, it should be further reduced in information which includes edge detection.

C. Feature Extraction Module

Here we choose Gabor filters for the purpose of feature extraction. Gabor filters effectively preserves the texture characteristics of an image pattern in frequency domain. By applying the selective scale and orientation gabor filter on an image where, the texture analysis is accomplished. Initially the image are segmented before extracting desired feature

D. . Classification Module

Classification After processing and feature extraction we have to determine the animal class by comparing the input image with trained data, trained data consists of 80 percent samples, probabilistic neural network is used for footprint classification.

IV. PROPOSED SYSTEM

The proposed model is presented to alleviate all of the short comings of the existing system.With the use of a deep learning algorithm to categorise the animals from a picture collection, this system will improve the accuracy of the neural network findings. The overall classification results have improved. Finding the accuracy more trustworthy is to predict and recognise the animal image.

The proposed system consists of the following modules,

- Data selection
- Data pre-processing
- Data splitting
- Classification
- Performance analysis

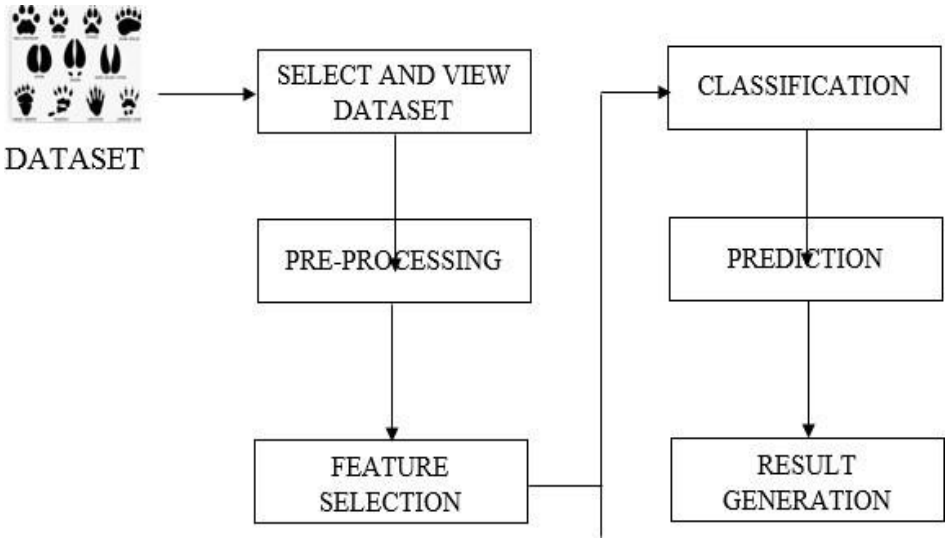

Fig .1 System Architecture

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A. Data Selection*:*

The data selection is the process of selecting the data for Animal Foot Print dataset. In this project, forest animal digital images is used to find the scene. The dataset which contains the information about the elephant, dog etc.

B. Data PreProcessing

Shape is an attribute of an image matrix that returns the shape of an image, consisting of the number of rows, columns, and planes. It is returned by the imread() and imshow() functions. One plane is all that is required for a grayscale image.

C. Data Splitting

Data splitting is the process of dividing accessible data into two groups, usually for cross-validator purposes. For machine learning to take place, data must be there. Test data are also required in addition to training data in order to evaluate and ascertain the algorithm's performance.

Using our approach, 30% of our dataset was used as training data and the remaining portions were used for testing. Data splitting is the process of dividing accessible data into two groups, usually for cross-validator purposes. Part of the data is used to develop a predictive model, while another part of the data is used to evaluate the model's efficacy. Separating the data into training and testing sets is an essential first step in evaluating data mining techniques.

D. Classification

PNN When one input characteristic has larger values than the other, the network is sensitive to these situations. Before to training, input data needs to be standardised. The range of the input features must match the standard deviation. For more details, see the description.

The training dataset grows in size as the forecast becomes slower. For tiny datasets, the algorithm is substantially more effective. The network employs lazy learning, thus it doesn't require iterative training. It just stores the variables and makes predictions based on them.

Step 1: For segmentation, we employ the PNN algorithms.

Step 2: The following variables are utilized in the PNN classification algorithm max depth: The default setting is 5. A tree's maximum depth must be specified. The scale is from 1 to.

Col sample by tree has a value of 0.3. You have to specify the subsample ratio of columns when constructing each tree.It ranges from 0 to 1. Rate of learning: The default setting is 0.1. To avoid overfitting, you must specify the step size shrinkage utilised.

in update.

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E. Performance Analysis:

This suggested approach's effectiveness is assessed using metrics such :

Accuracy: The classifier's capability is expressed in terms of accuracy. It accurately predicts class label, and the predictor's accuracy measures how effectively it can estimate the value of a predicted attribute for new data.

$$AC= (TP+TN)/ (TP+TN+FP+FN)$$

Precision: Precision is calculated by dividing the total number of true positives by the total number of true positives + false positives.
Precision=TP/ (TP+FP)

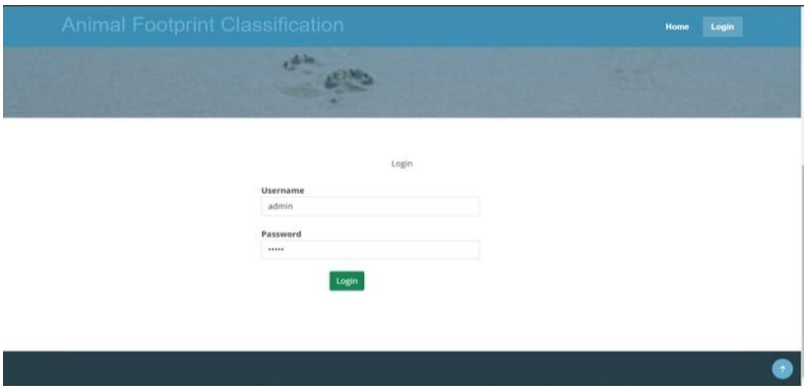
Recall: Recall is defined as the number of true positives divided by the number of true positives plus number of false negatives.

V. RESULTS & ANALYSIS

A. Initial Home Page look like this:

B. Login page look like:

First, User has to create an account and then after login to the site.



C. Output page look like:

- After, upload the Animal footprint image.
- Take the features of image .
- Based on featues of image it display the Animal name.
- And it also display the If any threat happened to people or not.

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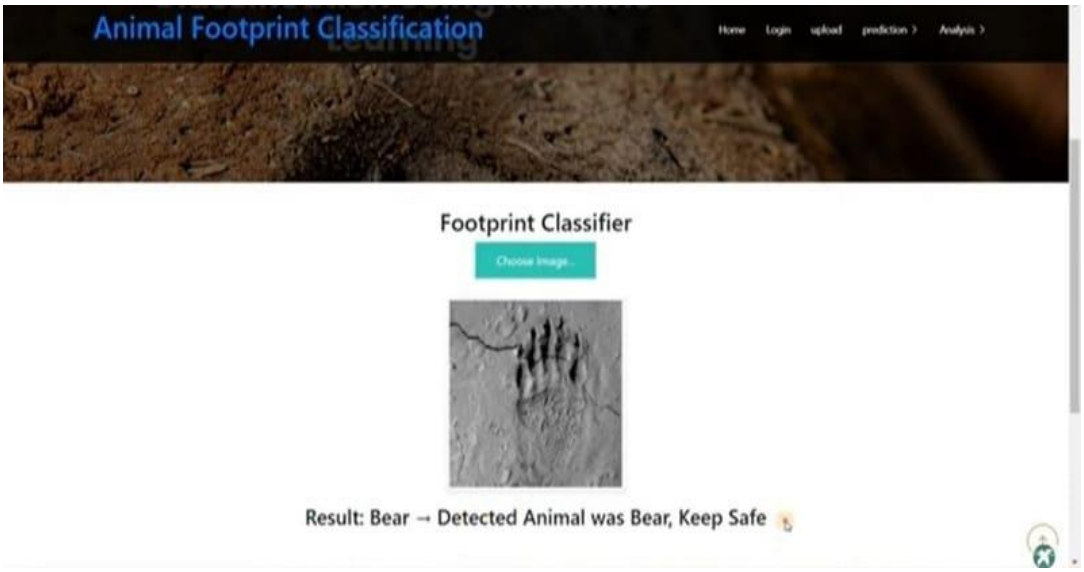

VI. CONCLUSION

The deep learning classifier in this approach is used to identify animal footprint photos in the dataset. The data on forest animals is used in the pre-processing procedure as input data. The photos are shrunk and arrayed in the pre-processing phase. The dataset is divided into a training dataset and a testing dataset in the feature selection technique that follows. All of the photos are then downsized and converted to an array. Lastly, the study of the forest creatures from photos is done using the classification method. The implementation of the PNN deep learning algorithm predicts the outcome based on accuracy, precision, recall, and f1-measure. To apply alternate accuracy approaches in the future, such as the Probabilistic Neural Network Algorithm, to increase animal footprint accuracy.

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