SNAKE SPECIES DETECTION

PROJECT SYNOPSIS

Machine Intelligence

BACHELOR OF TECHNOLOGY- V Sem CSE

Department of Computer Science & Engineering

SUBMITTED BY

Batch No: 12

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Abstract and Scope

This project is to predict snake species and inform about the precautions, the first-aid to be administered in case of a snake bite, the effects and the treatment to prevent subsequent deaths. We aim to identify snakes in real time and relieve the fear of snakes while educating the public, all while saving the lives of these beautiful creatures.

In this project, we will be building a model which takes in captured images from the users and identifies the type of snake. It would give in all the necessary details along with the species identification.

Techniques such as

1. Image Processing
2. Convolution Neural Networks
3. Deep Learning

are used. Features are extracted from the images captured and utilized for classification.

We would be using

1. k-nearest neighbors (*k*NN)
2. Support vector machine (SVM)
3. Logistic regression (LR)

In combination with a dimension reduction approach such as

1. Principle Component Analysis (PCA)
2. Linear Discriminant Analysis (LDA)

as the feature extractor. Features are extracted based on the observation of characteristics like head shape, body pattern, body color, and eyes shape.

The field of this project is under species recognition in Advances in Intelligent Systems and Computing

Feasibility Study

Death and amputation caused by snake bites is a major cause of concern in health care institutions. There are approximately 1.8 to 2.7 million cases of envenoming each year of which 435,000 to 580,000 snake bites need treatment, for they can cause permanent disability and disfigurement.

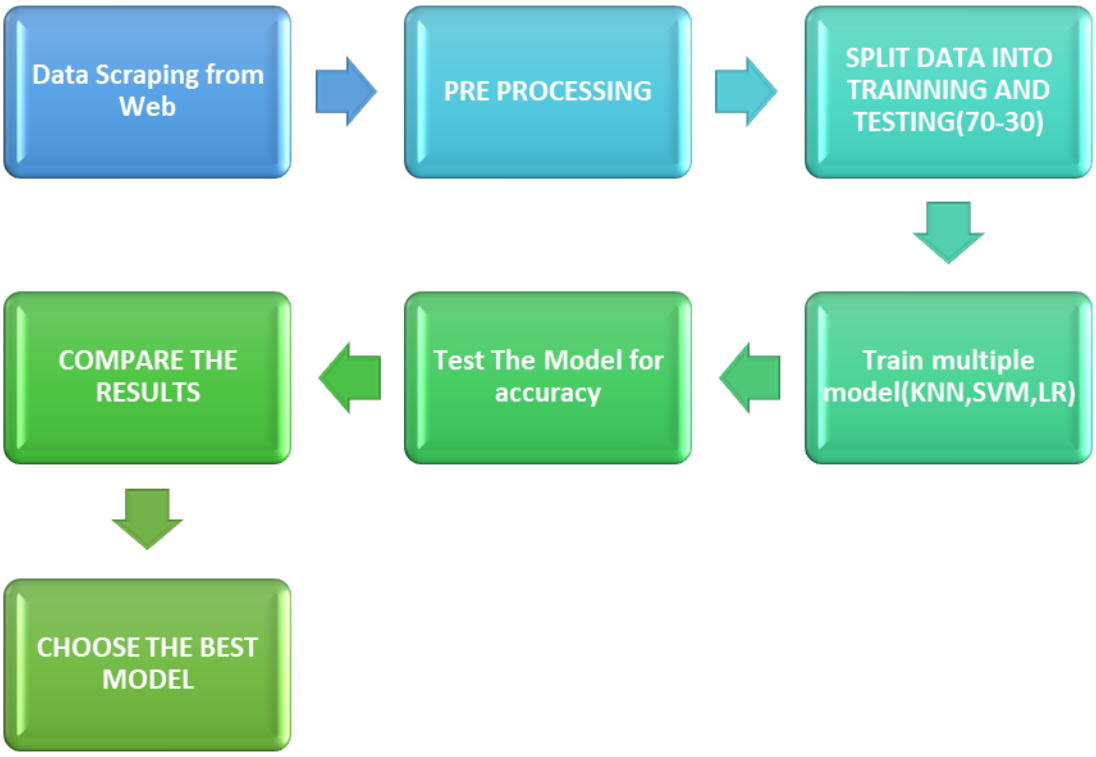
Snakes play a significant role in the field of medicine. However the percentage of such snakes is as low as 20%. This poses a threat to humans whenever bitten by one as identifying the biting snake is challenging. Due to the following reasons:

- The high diversity of snake species in snakebite endemic countries (e.g. 310 snake species in India)
- The limited herpetological knowledge of communities and healthcare providers confronted with snakebite
- Incomplete knowledge of their epidemiological importance

Snake Species Identification is a challenge as erroneous snake identification from the perceptible traits is a prime reason of death because of snake bites.

The need for the project is to mitigate the alarming deaths in villages which is caused due to ignorance of the snake bites, and callous behavior towards venoms.

Design Approach/ Methodology/ Planning of work



1. We will be extracting the data from the web and labeling them according to the snake species. We will be mainly dealing with Indian snakes for this project.

2. We will be removing images which do not represent the snake perfectly and those images which are of low resolution as a part of pre-processing.

3. We will be splitting the data according to the standard ratio of 70 percent training data and 30 percent testing data. The testing data will make sure that all species of snakes are involved and no biasness is there.

4. We will train the model using 3 different Machine Learning models. After referring to multiple research paper we have decide to go ahead with the following model:
    a. KNN
    b. SVM
    c. LR

5. We will test all 3 models using the same testing dataset to find which model has the highest accuracy. The model which has the highest accuracy will be chosen for the final results.

References

IEEE Xplore Paper:

Conference: 2020 IEEE Bombay Section Signature Conference (IBSSC)
INSPEC Accession Number: 20400688
DOI: 10.1109/IBSSC51096.2020.9332218

Snake Species Identification is a challenge as erroneous snake identification from the perceptible traits is a prime reason of death because of snake bites. The main objective of the proposed system is to be able to identify snake species from their visual traits in order to provide suitable treatment, thus preventing subsequent deaths. The proposed system involves techniques based on Image Processing, Convolution Neural Networks and Deep Learning to achieve the mentioned purpose. CNN has been highly used in automatic image classification system. In most cases, extracting features and utilizing them for classification. Deep learning successfully achieves recognition of objects in images as it is implemented using artificial neural networks. Image classification tasks have seen a rise with the introduction of deep learning techniques. So far, no automated method for classification has been suggested to categorize snakes. The system that would be developed will be useful to recognize snake species correctly and thus take necessary action.

ResearchGate Paper:

Conference: International Conference on Computational Intelligence in Information System

DOI:10.1007/978-3-319-48517-1_5

This paper investigates the accuracy of five state-of-the-art machine learning techniques — decision tree J48, nearest neighbors, k-nearest neighbors (k-NN), backpropagation neural network, and naive Bayes — for image-based snake species identification problems. Conventionally, snake species identification is conducted manually based on the observation of the characteristics such as head shape, body pattern, body color, and eyes shape. Images of 22 species of snakes that can be found in Malaysia were collected into a database, namely the Snakes of Perlis Corpus. Then, an intelligent approach is proposed to automatically identify a snake species based on an image which is useful for content retrieval purposes where a snake species can be predicted whenever a snake image is given as input. Our experiment shows that backpropagation neural networks and nearest neighbors are highly accurate with greater than 87 % accuracy on the CEDD descriptor in this problem.