Bird Species prediction using Gaussian Naive Bayes Approach

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***Abstract*: Bird species detection plays a major role in the importance of ecology and in to monitor the conservation of bird species. A better and novel approach for bird species classification based on the features extracted from the bird images stored in the database. In the image, the bird might be in different angle, posture and sizes. In existing system, there are many methods that make use of the acoustic measure based on the data type of spectrogram such as Mel-Frequency Cepstral Coefficient. For our project, the proposed idea is to perform edge detection and extract the features required to predict the species of the bird using Gaussian Naive Byes (GNB) Approach. In the proposed system we used both K- Nearest Neighbor (KNN) and GNB to predict the bird species. Using KNN the accuracy was found to be 66%. While with GNB was around 88%. Hence the prediction is carried out using GNB approach.**

***IndexTerms*: Bird Species, Features, Predict, Accuracy.**

I. INTRODUCTION

Bird species considered to be detected in our project is the migratory birds from the Vedanthangal bird sanctuary. Ten species of birds are considered they are Gargneys, Darters or Snake birds, Glossy Ibisis, Grey pelicans, Grey Herons, Terns, Painted Storks, Spoon Bills, Spot billed Duck, Golden Oriole [4]. Machine Learning and its approaches acts as a good method for prediction as predicting the output becomes efficient if it has high accuracy and a comparison can be made with other approaches or algorithms too. Bird Species classification is a very big challenge due to the size, posture, angles of view of the bird images from which the features are to be extracted [1]. If the color is considered to be the feature to be extracted from the bird image then it is even more challenging because of the illumination of colors in the image. Through this the accuracy for the prediction of bird species is very low. Bird Species classification is important because many birds are endangered species or in red list. Birds are very useful for us in many ways and it also maintains the ecosystem balanced by pollinating. Some bird species that migrate can be used for our research in the Climatic changes. Migratory birds are especially becoming extinct as they are killed by airplanes. In order to create awareness bird species classification is important. Bird Species Prediction using Gaussian Naïve approach focuses on migratory birds in the Vedanthangal Bird sanctuary [4]. A Database is created considering the migratory birds from vedanthangal which sums up to ten species. Each species has ten images stored in the database. The images are subjected to image pre- processing using Laplacian and sobel operator. By implementing the proposed system the prediction of output has higher accuracy compared to other methods and is less complicated.

II. FEATURE EXTRACTION

For our proposed system, the main objective is to detect the bird species using the images of the bird as creating datasets. The datasets are subjected to feature extraction procedures [10]. Its edges are detected and then the Gaussian Naïve Approach is used to predict the species of the bird from the stored dataset. From the above mentioned birds there are rare breeding birds or the bird that has their colony disappeared, the endangered species and the red list birds. In order to conserve and save the species from endangered and red list this project is undertaken to create awareness about the bird species.

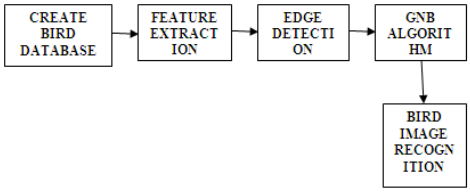

Fig.1 Overview of the Research

Database Creation

The database is created considering the migratory birds from Vedanthangal Bird Sanctuary [3], [4]. It consists of ten species with ten images. The current image of the bird to be predicted is captured and is given to undergo feature extraction to predict the species using GNB.

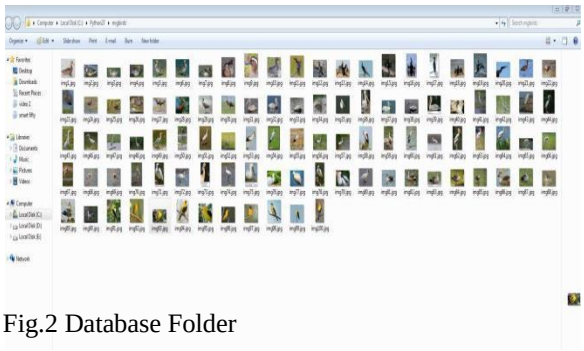

Fig.2 Database Folder

Pre-processing of Image

The images stored in the datasets undergo the preprocessing phase applying Laplacian and the sobel operator for having a view to which the parameters are extracted without noise from the image [8].

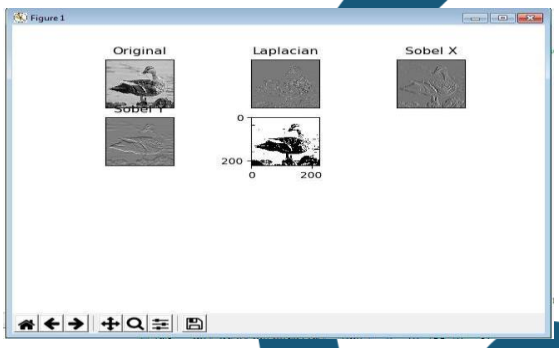

Fig.3 Pre-processed Image

III. METHODOLOGY

Edge detection is a method of detecting an edge of the image. Locating edges in an image is a very important step towards analyzing image features. Edges consist of outline features and contain important information. It drastically reduces the size of the image and deducts information that may be less significant, thus retaining the significant structural properties of an image. Many images contain some amount of redundant information that can be filtered out while detecting edges and while reconstruction it can be replaced [9]. Also, edge detection does not take up too much space in the memory of the computer. Since edges occur at image locations representing the boundaries of the object, edge detection is vastly used in image segmentation where images are divided into areas indicating different objects.

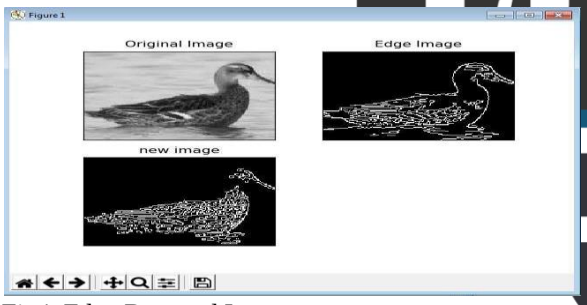

Fig4. Edge Detected Image

Parameter Extraction

The edge detected images are then processed for parameter extraction. The parameter that is considered in our proposed system is the sum of white pixels of the edge detected image. The sum of the white pixels is calculated by passing the edge detected image to the arithmetic python program for finding the Mean, Variance and Standard Deviation for the sum of white pixels.

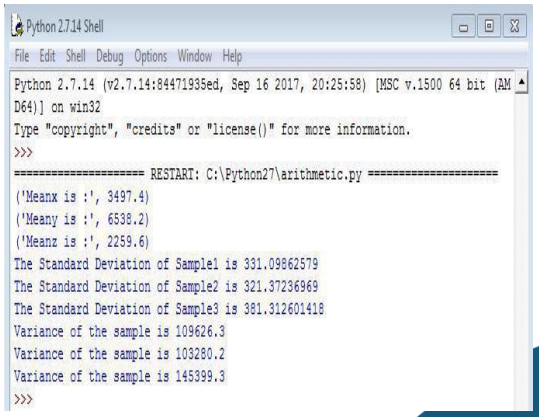

Fig5. Parameter Extracted Output

GNB Algorithm

As the accuracy was very less from the KNN approach we move on to Gaussian Naïve Bayes approach (GNB). Here the python program considers the number of bird species to be X and the sum of white pixels to be Y and is mapped. When the unknown species of bird image is given, it undergoes all the above steps till the parameter extraction then the value of sum of white pixel is given as input to the GNB program. Comparing this with the stored values of the datasets it predicts the species number of the bird and accuracy through this method is found.

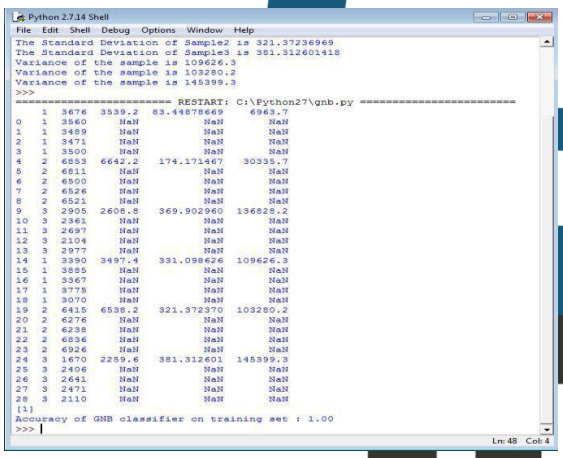

Fig6. GNB Predicted Output

IV. CONCLUSION

Our project 'BIRD SPECIES PREDICTION USING GAUSSIAN NAÏVE BAYES APPROACH' presents a simple solution to detect the species of the bird by using the arithmetic values instead of using the beak or size of the bird which makes the system complicated. Here in our project we determine or predict the species of the bird by calculating the sum of white pixels from the edge detected image. In our project we considered the ten species of migratory birds from the vedanthangal bird sanctuary, with this same technique the project can be extended for other bird species and prediction can be done once we give the unknown species of the bird.

VI. ACKNOWLEDGMENT

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