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BIRD SPECIES DETECTION FROM VOICE FEATURE

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Abstract - *The goal is to find which species of bird is present in an audio recording using supervised learning. Devising effective algorithms for bird species classification could be a preliminary step toward extracting useful ecological data from recordings collected within the field. In this project use SVM (Support vector machine) algorithm to classify bird voices into different species supported 256 features extracted from the chipping sound of birds.*

The challenges during this project included memory management, the quality of bird species for the machine recognize, and also the mismatch in signal/noise between the training and also the testing sets. So to unravel this challenges used SVM algorithm and got good accuracy in it. Here SVM is that the best algorithm to resolve the challenges within the recognition. The algorithm SVM got 98.2% accuracy.

Key Words: supervised learning, support vector machine, signal, ecological data, testing set

1.INTRODUCTION

Monitoring birds by their sound is very important for several environmental and scientific purposes. A range of crowdsourcing and remote monitoring projects now record these sounds and a few analyses the sound automatically. The audio modality is well-suited to bird monitoring because many birds are way more clearly detectable by sound than by vision or other indicators. Overview the techniques used for bird species detection, and specific issues to be addressed. Then describe a knowledge challenge which introducing, with new public datasets, as an initiative to advance the state of the art. First, though, must outline the applications that bird detection in audio is beneficial. The foremost basic is that the simple estimation of presence/absence in a very given sound clip: a detector outputs a zero if none of the target species are detected and a 1 otherwise.

The user should operate the software that's Non-Real time. This paper uses dataset that contains bird songs collected from kaggle. The fundamental methodology is Support vector machine (SVM) is extremely preferred by many because it produces significant accuracy with less computation power. SVM may be used for both regression and classification tasks. But, its widely utilized in classification objectives.

The next four section are explained as follows. The section 2 presents related research studies and briefly describes the bird species recognition problem; Section 3 outlines the database employed in the popularity experiments and describes initial signal pre-processing, syllable segmentation, the feature extraction procedures and indicate the classification algorithm; Section 4 presents the results obtained in experiments; finally, Section 5 presents conclusions and indicates future research directions.

2.RELATED WORKS

There are many related systems are available. These systems use different approaches, such as CF, CBF, and hybrid to recommend the popular items. These approaches are discussed as follows:

Lopes, M. T., Silla Junior, C. N., Koerich, A. L., & Kaestner [2] This paper deals with the automated bird species identification problem, during which its necessary to spot the species of a bird from its audio recorded song. This can be a resourceful thanks to monitor biodiversity in

ecosystems, since it's an indirect non-invasive way of evaluation. Different features sets which summarize in several aspects the audio properties of the audio signal are evaluated during this paper along with machine learning algorithms, like probabilistic, instance-based, decision trees, neural networks and support vector machines. Experiments are conducted in a dataset of recorded songs of three bird species. The experimental results compare the performance of the features sets and different classifiers showing that it's possible to get very promising leads to the automated bird species identification problem. Index Terms—machine learning; pattern recognition; signal processing; bird species identification. [3] during this paper address the task of hierarchical bird species identification from audio recordings. they evaluate three varieties of approaches to cope with hierarchical classification problems: the flat classification approach, the local-model per parent node classifier approach and also the global-model hierarchical classification approach. For the flat and local-model classification approach they employ the classic Naive Bayes algorithm. For the global-model approach they use the world Model Naive Bayes (GMNB) algorithm. As within the classical Naive Bayes, the algorithm computes prior probabilities and likelihoods, but these computations take under consideration the hierarchical classification scenario: it assumes that any example which belongs to a given class also will belong to all or any it's ancestor classes. within the current application, the employed class hierarchy is that the standard scientific taxonomy of birds employed in Biology. So as to cope with the bird songs obtain features by computing several acoustic quantities from intervals of the audio signal. they conduct three experiments so as to match the three different approaches to the hierarchical bird species identification problem. Our experimental results show that the utilization of the GMNB hierarchical classification algorithm outperforms both the flat and local-model approaches (Using the Hierarchical F-measure metric); hence the employment of a global-model approach (such because the GMNB) will be a feasible thanks to improve the classification performance for problems with an oversized number of classes. Index Terms—Bird species identification. Audio classification. Hierarchical classification. Hierarchical Na¨ıve Bayes classifier. [4] Stowell, D., Wood, M., Stylianou, Y., & Glotin Many biological monitoring projects depends upon acoustic detection of birds. Despite increasingly large datasets, this detection is usually manual or semi-automatic, requiring manual tuning/post processing. review the state of the art in automatic bird sound detection, and identify a widespread need for tuning-free and species-agnostic approaches. introduce new datasets and an IEEE research challenge to handle this need, to form possible the event of fully automatic algorithms for bird sound detection.

3. SYSTEM IMPLEMENTATION

System Implementation is that the stage where the theoretical design is converted into a working system, the new system is additionally totally new, replacing an existing manual, or automated system or its visiting be a major modification to an existing system. The system is implemented using VISUAL STUDIO CODE and data set. In this project use svm method for implementation it's a supervised learning algorithm which may use for binary classification or regression. It's a coordinate of individual observations. It's supported decision planes which defines decision boundaries. The system is constructed on environments namely using Non-Real Time Bird voices.

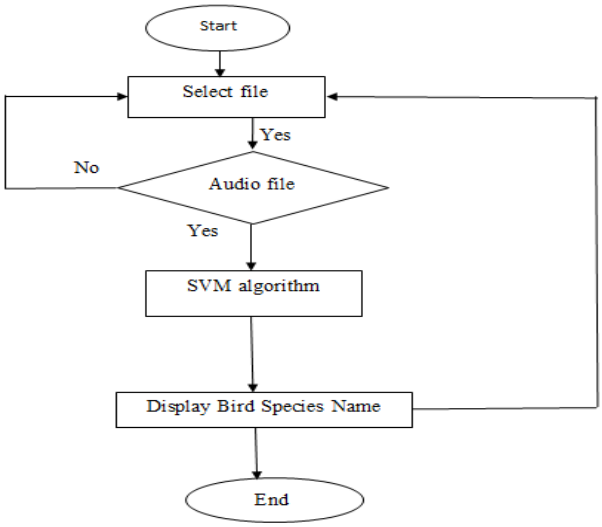

Fig.3 Flow chart for bird species detection from voice features

3.1. PSEUDO CODE FOR BIRD SPECIES DETECTION FROM VOICE FEATURES

Pre-processing and have Processing

Step 1: Read from read_csv

Step 2: Read audio file supported file_id

Step 3: Fetch sg, mask, data, audio_mask, sample_rate

Step 4: Determine window size

Step 5: Extract features from each audio file

For each audio frame get Species, genus, spec_centr_, chromogram_ update weight file

Step 6: write weight file to external csv file

Prediction

Step 1: Read Input Audio File

Step 2 : Fetch sg, mask, data, SampleRate, Audio_Marks

Step 3: Extract Features

Step 4: Import weight file

Step 5: Compare Model weights with Input audio features

Step 6: Display Bird Species Name

Procedure for Bird Voice Recognition in Non-Real-time

Step 1: Start

Step 2: Choose the audio file

Step3: if button is capable SVM then SVM algorithm is employed for recognition.

Step 4: Bird Species displayed

Step 5: End

4. RESULT AND DISCUSSION

Bird species detection from voice features is employed to predict the bird species, first, the features from audio of bird within the training dataset is extracted using SVM Algorithm. The training dataset consist of 265 bird audios. In non-real time the dataset contains of 265 bird's voices. It consists of voice and noises then using SVM algorithm it'll separate both noises and bird voice. Then ill recognize the bird species.

Table 1: Result Analysis

Algorithm Name	No. of Testing audio	Test case pass	Test case fail	Accuracy
SVM	265	260	5	98.24%

5. CONCLUSIONS AND FUTURE WORKS

The Bird species detection is increasingly important role in research oriented. The applying developed addresses the matter of manual detection of non-real time bird voices. The project demonstrates a unique SVM method to acknowledge the bird species in non-real. The experiments demonstrate that the SVM obtained 98% classification accuracy in non-real-time. Using the audio file, then choose the algorithm and so will find the bird species. As a future work intend to test and include new features, which aren't connected to spectral construction of syllables for improving

accuracy. Additional features, extracted from phrases and songs, which show connections between syllables could even be used. And it can even be implemented using real time. Create an android/iOS app rather than website which is able to be more convenient to user. System may be implemented using cloud which might store great deal of knowledge for comparison.

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