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BIRD SPECIES IDENTIFICATION

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ABSTRACT

In our day-to-day human lives, there are bird species of their own kind that are being set up infrequently, and if set up a bracket of bird species is set up, the course can be gruelling at times. Commonly, specific types of birds are found in colourful ones that exhibit various types of classifications such as colour, structure (the shape ratios of the bird), and various ratios of angles from an individual's point of view. Although, the pictures, which provide strong and different dissimilarities to recognise the birds breed further than the audio bracket, is even more convenient, the natural capability to fete the birds through the taken pictures is more convenient. For that purpose, this gadget device uses the most advanced dataset, which is known as Caltech-UCSD Birds 200 (CUB-2000-2011) dataset, for both training and testing. By using the most important algorithm for modelling graph-structured data, known as the DCNN algorithm, an picture is converted into slatescale format to induce signatures with the help of tensor inflow, in addition to which the various nodes of comparison are formed using image processing. By initiating the database of standard image features for bird species and using the algorithm of correspondence comparisons, this project gets proven to attain favourable conclusions in practice.

Keywords: Caltech-UCSD, Deep Convolution Neural Network, Slate Scale Format, Image Processing.

1.INTRODUCTION

- We were always fascinated by the detection of objects using machine learning, which led to this project. Identification of bird species is a difficult task that frequently results in ambiguous markers. Undeniably, most experienced bird identifiers can differ on the species at random intervals if they are given a photo copy of a bird.
- Despite the fact that various types of birds breed and play a part in the same preparatory set of parts, various breeds of bird can fluctuate adequately in structure and aspects. Intra-class conflict is at its height because of discrepancies in lighting and background and an exceedingly large difference in an act.
- Identification of species requires the support of written bird books. So, it also requires experience in the field to distinguish the species correctly. Some breeds of birds look veritably familiar in their appearances; therefore, correlating the accurate species by humans may be error-prone.

- Numerous books have been advertised to help the people be part of the identification of the exact correct species, and devoted online gatherings are held where filmland can be discussed and banded.
- Regrettably, several challenges have made this work accomplishment tremendously delicate to attack. The most well-known are:
- Inter-species variance.
- a large number of different species.
- clarity of the picture.

2. LITERATURE REVIEW

Marcelo T. Lopes, Lucas L. Gioppo et al [2011][1] vigorously tried to identify the bird species automatically using the audio recording of different birds. The author collected the audio clips and recordings of 75 species but there occurred numerous problems while attaining the recordings of 12 species. All this happened by a series of trails and composed into a database. The author dealt identification problem by signal processing and MARSYAS feature set of machine learning. MARSYAS is a method in machine learning for temporal segmentation and extraction of audio from several file.

Peter Jancovic and Munevver Kokuer et al [2016][2] introduced a hybrid model using Deep Neural Network (DNN) and Hidden Markov Model (HMM) which is combinedly called Deep Neural Network Hidden Markov Model (DNN-HMM) which firstly helps in finding the specific species of bird using recording in database. DNN-HMM has a representation learning power and Sequential modelling ability. The author achieved an identification delicacy and recognition delicacy of 98.7% and 97.3% respectively. It is advanced model of bird species using the machine learning applied to audio recordings.

Mario Lasseck et al (2019)[3] developed a computer-based technique for identifying large amount of species at the same time using the audio recording of the different species. It achieved an average identification delicacy of and recognition delicacy of 51.1% and 53.9% respectively. The author used the Convolution Neural Network, Xeno-Canto set and additional ways for audio-clip based species identification.

Andreia Marini, Jacques Facon et al [2013][4] found a way to recognize the bird species by applying the color segmentation algorithm. The color segmentation algorithm is an attempt in removing the background elements in the image and dividing the image into small segments to reduce its complexity. The author created a way to find the bird species based on uprooting the color features from images using above algorithm. The author used CUB-200 dataset which yielded more accurate results. The author used aggregation to separate the intervals of histograms to a fixed number of bins.

Li Jian, Zhang Lei et al, YAN Baoping [2014][5] delivered a method using the algorithm called likeness comparison. Likeness comparison algorithm helps in finding the similarities between the images which are given as input and the images stored in the database and gives the output. The author build a bird species identification automation based on image features of bird images and performing likeness comparison.

John Martinsson et al [2017][6] introduced a concept of attribute extraction and signal classification of images using CNN algorithm and deep residual neural network. Residual neural network is an ANN which uses stack residual blocks to form a network. It is failed due to non-availability of excess amount of training data to train the model. They did an experiment on existing data but it didn't work because of including the background species.

Juha Niemi, Juha T Tantt et al [2018][7] used data augmentation method for converting and rotating the images in asked color manner. The process of increasing the data points from the existing data is called data augmentation. On this data, the author proposed CNN (Convolutional neural Network) trained using deep learning algorithms for classification of image. Convolutional neural Network is a ANN (Artificial Neural Network) helps in recognition

and classification of image. The output/identification is done on parameters handed by the radar and forecasting of image classifier.

Tayal, Madhuri, Atharva Mangrulkar, Purvashree Waldey, and Chitra Dangra[2018][8] used transfer learning and MATLAB(matrix laboratory) technologies and developed a software for identifying the species identification procedure. MATLAB is a platform to analyze and design that transforms system and products. The bird species identification software takes the image as input and display the anomaly of the bird as output.

Loris Nanni, Rafael L.Aguiar, Yandre M.G.Costa, Sheryl Brahnam, Carlos N. Silla, Ricky L.Brattin[2017][9] presented a novel which is not only for bird species identification but also used for Whale species identification. Firstly, constructed the visual features of sounds from audio recording and images from spectrograms, harmonic and percussion images. Images are separated into sub-Windowing and texture scripts are extracted. The author used these images and recognised the birds and whales.

Prof. Pralhad Gavali, Ms. Prachi Abhijeet Mhetre, Ms. Neha Chandrakhant Patil, Ms. Nikita Suresh Bamane, Ms. Harshal Dipak Buva[2019][10] performed the operations to recognize the bird species using Convolution neural network and unsupervised learning. CNN converts the image into a grey scale format and multi node comparisons are created based on tensor flow. Unsupervised learning is to train the machine based on the datasets available. Caltech-USCD birds 200 dataset is used for both training and testing. Training the model is done using Google-Collab. The accuracy is between 80% to 90%.

Year	Technology/Algorithms	Methodology
2011	Signal Processing, MARSYAS	Identifying the bird species based on audio recordings
2016	Deep Neural Network Hidden Markov Model(DNN-HMM)	Finding the bird species by applying the DNN-HMM algorithm on audio recording.
2019	Convolution Neural Network, Xeno-Canto	Computer based techniques for identifying large amount of species
2013	Color segmentation algorithm	Using CUB-200 dataset, recognizing the bird species by color features applying color segmentation algorithm.
2014	Likeness comparisons algorithm	Bird species Identification based on analysis of image features of bird.
2017	Convolution Neural Network, Residual Neural Network	Recognizing the bird using attribute extraction and signal classification. But FAILED due to less amount of training data.
2018	Convolution Neural Network, Deep Learning algorithms and Data augmentation	Converting and transforming the image into a asked color and finding the bird species based on parameters extracted from those images.
2018	Transfer Learning and MATLAB	Performs software operations to find the species based on certain anomaly.
2017	Audio image representation, sub-windowing, texture descriptors, Acoustic features	Converting images and audio into images and comparing them with the needed species and identifying the species.
2019	Convolution Neural Network, Unsupervised Learning, Google-Collab	Identify the birds by applying unsupervised algorithms using the 'Caltech-USCD Birds 200' datasets/database.

3. CONCLUSION

The Principle idea at the back of evolving the recognition software is to make mindfulness concerning watching of bird, bird and their recongnition, particularly birds in country like India. It also serves to the need of rationalizing recongnition procedures and therefore making them bird-identifying in easier way. The main important technology which are applied in the experimental setup is to hand-over learning in Python on a pretrained algorithm(VGG16). It uses point birth for image identification. The system which used is sufficient logically to compliment attributes and segregaton of the particulat images takes place in vital scale.

The primary reason to intiате the design is to recongnize the bird breed from an image of bird given as input by the stoner one. The technology used is transfer literacy and Python. We used Python in the view fact that it's satisfactory for enforcing high end algorithms and gives exact best results perfection delicacy. In added to it is unrestricted method and scientific. One must trust this design enlarges the best deal of compass as the purpose of them meets. In natural habitat of floara And fauna exploration and supervising, this idea of an abstract which can be register to triggers by an cam to preseve the minute details of natural habitat in determined territories and actions of all fauna and their breed.

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