Deeper learning-assisted species identification of bird images

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ABSTRACT— These days, it's hard to classify and forecast which bird species will be around since some of these species are so scarce. From a human vantage point, birds in different situations naturally look at varying sizes, shapes, colors, and angles. Beyond that, visual cues are more useful than auditory cues for identifying bird species. Additionally, it is easier for humans to identify the birds in the pictures. Consequently, the Caltech UCSD Birds 200 [CUB-200-2011] dataset is used for both training and testing purposes by this approach. To create an autograph using tensor flow, a picture is grayscaled and then fed into a deep convolutional neural network (DCNN) algorithm, which generates many comparison nodes. A score sheet is generated by comparing these various nodes with the testing dataset. After looking at the score sheet, it may use the highest score to predict which bird species are needed. The method obtains an accuracy of bird recognition between 80% and 90%, according to experimental study on the Caltech-UCSD Birds 200 dataset (CUB-200-2011).

INTRODUCTION

The current state of bird behavior and population trends is a major concern. Because of their quick responses to environmental changes, birds aid humans in identifying a wide variety of Earthly living forms. However, collecting information on bird species is a labor-intensive and expensive process that demands a lot of human effort. Under these circumstances, scientists, legislative agencies, and others need a reliable framework that can prepare bird data on a massive scale. In this sense, evidence of bird species differentiation plays a crucial role in determining which categories a given bird image belongs to. The process of bird species identification involves classifying images of birds according to their predicted characteristics. It is feasible to identify different kinds of birds using just

visual, auditory, or video evidence. By capturing the unique sound signature of various birds, an audio processing approach enables recognition. The mixed-up nature of the conditional sounds—including bugs, real-world items, and so on—makes the management of this data more and more complicated. In most cases, visuals are more effective discovery tools than audio or video records. It follows that an image-based method is preferable than one that relies on audio or video for bird classification. Both people and computer algorithms that automate bird species identification face formidable challenges when faced with this job. Things are making their way into databases like Caltech-UCSD's with a plethora of categories as image-based categorization methods make the work of categorizing easier. There has been a lot of progress in this area as of late. A popular dataset for bird shots, Caltech UCSD Birds 200 (CUB-200-2011) contains photographs from 200 different categories. The majority of the birds in the collection are native to the North American continent. There are 11,788 photos and annotations in Caltech-UCSD Birds 200, including 15 Part Locations, 312 Binary Attributes, and 1 Bounding Box. This study focuses on the recognition of a large number of classes within the category of birds rather than identifying a large number of other categories. Because there is so much resemblance across classes, bird classification is much more difficult than category classification. Also, there is a great deal of variance within classes since birds are not rigid things and may deform in many ways.

Related works:

Bird and whale species identification using sound images

The authors of this study offer a novel and effective technique for automating the identification of birds and whales by utilizing some of the most powerful texture descriptors currently available in the computer vision field. Starting with the audio file, pictures made from various spectrograms as well as from harmonic and percussion images are used to build the visual features of sounds. These studies employed datasets of bird voices for species classification and a dataset of right whale sounds for whale detection.

Audio hashing for bird species classification

For the purpose of classifying different bird species, convex representation-based audio hashing method is used. Convex-sparse models of a bird vocal communication are

created using the recommended method, which combines matrix factorization with archetypal analysis. The convex models are scrambled using Bloom filters and noncryptographic hash algorithms to produce fully connected compact binary codes. The class-specific k-medoids clustering technique is used to group the retrieved conv-codes from of the training samples, with the Jaccard coefficient serving as the similarity measure. The hash functions and slots in a hash table are utilized as pointers towards the species identification information, while the cluster centers serve as the table's keys.

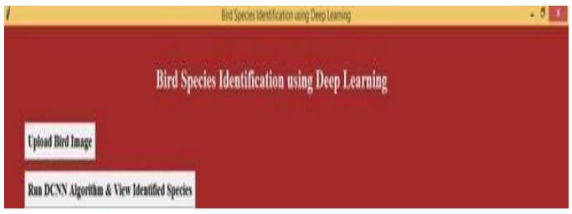
Bird Species Identification using Deep Learning

The Caltech-UCSD Birds 200 [CUB-200-2011] dataset is utilized by this approach for the testing and training. A photo is converted into a greyscale image using the tensor flow approach and convolutional neural network (CNN) algorithm to produce an autograph. A score sheet is created as a consequence of comparing the testing dataset to these different nodes. The needed bird species may be predicted using the highest score once the score sheet has been analyzed.

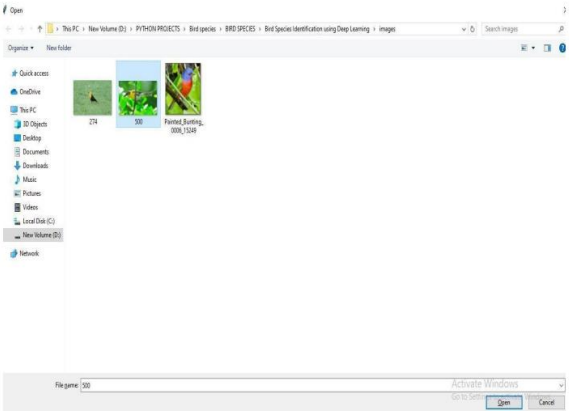
METHODOLOGY

1. **Upload Bird Image:** Using this module, uploading bird image
2. **Run DCNN Algorithm & View Identified Species:** Using this module, knowing the species name of uploaded bird

RESULT AND DISCUSSION

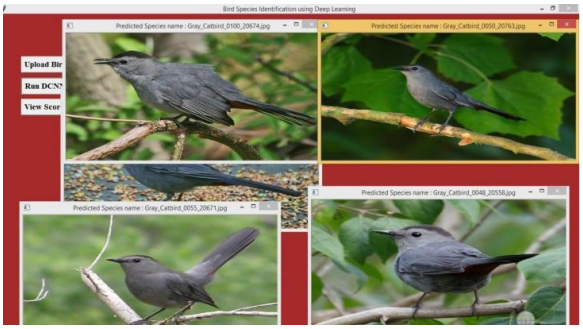


In above screen click on ‘Upload Bird Image’ button to upload bird image



In above screen i am uploading one image of bird called ‘500.jpg’. After upload will get below screen

In above screen, Now click on 'Run DCNN Algorithm & View Identified Species' button to know the species name of uploaded bird



In above screen we got 5 related birds images of uploaded image and we can see the species name of bird on title bar of image. So by uploading any image we can know the name of bird.

CONCLUSION

The primary motivation for creating the identification website is to raise public knowledge of bird-watching, birds, and the need of correctly identifying them, with a focus on species found in India. In addition to making bird-watching simpler, it simplifies the process of bird identification. In this particular experiment, Convolutional Neural Networks (CNN) are used. For picture identification, it employs feature extraction. For feature extraction and picture classification, the approach is adequate. The user inputs a photograph of a bird, and the project's primary goal is to determine the species. We opted for CNN because to its high numerical precise accuracy and suitability for executing sophisticated algorithms. Additionally, it is scientific and multipurpose. We were 85%-90% accurate. When the project's goals are fulfilled, we think it takes on a much larger scale. Using this idea in camera traps, researchers and monitors of wildlife may keep track on the whereabouts and activities of any animal in a given area.

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