ABSTRACT

Identification of bird species is a challenging task often resulting in ambiguous labels. Even professional bird watchers sometimes disagree on the species given an image of a bird. It is difficult problem that pushes the limits of the visual abilities for both humans and computers. Although different bird species share the same basic set of parts, different bird species can vary dramatically in shape and appearance. Intraclass variance is high due to variation in lighting and background and extreme variation in pose (e.g., flying birds, swimming birds, and perched birds that are partially occluded by branches).Our project aims to employ the power of machine learning to help amateur bird watchers identify Bird species from the images they capture.

LIST OF FIGURES

1. INTRODUCTION

Bird behavior and population trends have become an important issue now-a-day. Birds help us to detect other organisms in the environment. An important problem in ecology, which is the study of interactions between organisms and environment, is to monitor bird populations. The use of acoustics to monitor and classify birds in their natural environments has received a lot of interest lately. Classification of bird species based on image data so, for example useful when monitoring breeding behavior, biodiversity and population dynamics.

Now a day's bird watching is a recreational activity that can provide relaxation in daily life and it's a responsibility to know about our nature because birds are part of our society. Someone who does this is called a birdwatcher or birder. The scientific study of birds is called ornithology. People who study birds as a profession are called ornithologists.

We have nearly 18,000 bird species on our beautiful earth by the new research led by American Museum of Natural History. Birds that look similar to one another or thought to interbreed, but actually different species.

However, because of observer constraints such as location, distance and equipment, identifying birds with naked eye is based on basic characteristics features and appropriate based on distinct features is often seen as tedious classification. Bird classification can be done manually by domain experts but growing amounts of data leads to time consuming process. Later in this detection of object parts is the challenging task because of Complex variations and fringes of objects.

Our main Aim is about bird identification technology to maintain a data base of birds species like a gallery for the generations because our ancestors history data is given in the form of book and papers but for our future generations we have to give the data by using technology So, that we built this technology for everyone to check the birds thesis easily by the image identification.

To classify the aesthetics of birds in their natural habitats, this study developed a method using a convolutional neural network (CNN) to extract information from bird images captured previously or in real time by identifying local features. First, raw input data myriad semantic parts of birds were gathered and localized.

Second, the feature vector of each part of the body is recognized, gathered and filter based on shape, size, color. Third a CNN model was trained with bird pictures for feature extraction with consideration of some features and mentioned characteristics and subsequently the classified, trained data were stored to server to identify target object.

1.1 Existing system

It uses the cnn(vgg16) algorithm to identify the bird species from image.
In this the data is used directly without any preprocessing and vgg16 model has less layers so it can give accuracy upto 80% only.

Drawbacks:

- No data preprocessing is used.
- It can identify only 200 bird species
- Less accuracy (78%-80%)

1.2 Proposed system

Our system employes CNN(Efficientnet b3) algorithm to identify the bird species from image and before feeding the data set into the program we use a preprocessing techinque called Imagedata generator for increasing the accuracy of the program.

Advantages:

- It can identify upto 325 bird species.
- Accuracy is above 90%.

2. REQUIRMENT ANALYSIS

2.1 Hardware and Software Requirements

2.1.1 Software Requirements

Programming languages:

- Python
- Deep learning

Deep Learning packages

- Tensor Flow
- Keras

2.1.2 Hardware Requirements

- RAM: 4GB
- Hard Disk: 1TB HD

2.2 Software Requirements specifications

2.2.1 Vision

PROJECT VISION DOCUMENT	
Name of the Project	Bird species identification from image.
Vision	The vision of the project is to develop a model for identifying bird species using Machine learning.
Users/Actors of the System	Admin User

System Features & Functional Capabilities	The system is trained on a dataset which consists of bird images and their corresponding labels. The system will be able to take an image as input and identify the bird species.
Technologies/Tools to be Used	Machine Learning, Python.
Third Party libraries /APIs/Services to be used	Tensor-flow Keras
Final Deliverable must Include Documents	• Dataset • Complete Source Code • Abstract • Vision Document • Complete Documentation

2.2.2 SCOPE:

Overview

The proposed model is used to classify the image identify bird from the image that we uploaded. It will take less time to complete the process. This system gives peculiar results with good accuracy.

Exclusions:

• Displays the name of the specific bird

Assumptions:

• It can only find the bird which is in database.

2.2.3 System Functions:

Example:

Input:

- Image

Model: Model trained on a large number of datasets

Feature Extraction: detecting the features and extracting them

Object detection: Matching the features and confirming the object.

2.2.4 Detailed software requirements:

Use case model:

Example:

1. Admin
2. User

Actor Name	Admin
Actor Id	ACT-01
Description	Admin
Main Activities	Getting specie of a bird from Image
Work Environment Location	API with the computer system
Number of Users	Only One

Actor Name	User
Actor Id	ACT-02
Description	When a bird image is clicked from a camera user will give that image as a input to the system.
Main Activities	Inserting the image of a bird
Work Environment Location	API with the computer system

Number of Users	Any number

3. SYSTEM DESIGN

3.1 Data Dictionary

After understanding the requirements of the candidates, the entire data storage requirements are divided into tables. The below tables are normalized to avoid any anomalies during the course of data entry.

A data dictionary is a file or a set of files that contains a database's metadata. The data dictionary contains records about other objects in the database, such as data ownership, data relationships to other objects, and other data. The data dictionary is a crucial component of any relational database.

What is Data Dictionary?

A data dictionary contains metadata that is data about the database. The data dictionary is very important as it contains information such as what is in the database, who is allowed to access it, where is the database physically stored etc. The users of the database normally don't interact with the data dictionary, it is only handled by the database administrators.

The data dictionary, in general, contains information about the following:

- ➢ Names of all the database tables and their schemas.
- ➢ Details about all the tables in the database, such as their owners, their security constraints, when they were created etc.
- ➢ Physical information about the tables such as where they are stored and how.
- ➢ Table constraints such as primary key attributes, foreign key information etc.
- ➢ Information about the database views that is visible.

 Importance of data dictionary:

Analysts use data dictionaries for the following reasons:

- ➢ To manage the details in large systems.
- ➢ To communicate a common meaning for all elements
- ➢ To document the features of the system
- ➢ To locate errors and omissions in the system.

3.2 Logical database design

A data dictionary is a file or a set of files that contains a database's metadata. The data dictionary contains records about other objects in the database, such as data ownership, data relationships to other objects, and other data. The data dictionary is a crucial component of any relational database. Ironically, because of its importance, it is invisible to most database users. Typically, only database administrators interact with the data dictionary.

Database Design:

Database design is the process of designation database files, which are the key source of information of the system. The files should properly design, planned for collection, accumulation, editing the required information. The objectives of the database design are to provide effective auxiliary storage and to contribute to the overall efficiency of the computer program component of the system

What is a dataset?

In Machine learning, we use the data set as the data that is given to the algorithm to create a model. A data set is a collection of related, discrete items of related data that may be accessed individually or in combination or managed as a whole entity. A data set is organized into some type of data structure.

In a database, for example, a data set might contain a collection of business data (names, salaries, contact information, sales figures, and so forth). The database itself can be considered a data set, as can bodies of data within it related to a particular type of information, such as sales data for a particular corporate department.

A data set (or dataset) is a collection of data. Most commonly a data set corresponds to the contents of a single database table, or a single statistical data matrix, where every column of the table represents a particular variable, and each row corresponds to a given member of the data set in question. The data set lists values for each of the variables, such as height and weight of an object, for each member of the data set. Each value is known as a datum.

The data set may comprise data for one or more members, corresponding to the number of rows. The term data set may also be used more loosely, to refer to the data in a collection of closely related tables, corresponding to a particular experiment or event.