Bird Species Identifier

A Minor Project Synopsis Submitted to

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Bachelor of Technology
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Under the Supervision of
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1. Abstract

Today, many species of birds & snakes are rarely found, and it is difficult to classify bird species when found. For example, for different scenarios, birds come with different sizes, forms, colors and from a human viewpoint with different angles. Indeed, the images show different differences that need to be recorded as image recognition of bird & snake species. It is also easier for people to identify birds in the pictures.

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.

For this experiment, a bird or snake image was converted into a grayscale format that generated the autograph. After examining each and every autograph that calculates the score sheet from each node and predicts the respective bird or snake species after the score sheet analysis.

2. Introduction of the Project

Nowadays, Identification of bird species is a difficult activity sometimes leading to uncertainty. Birds allow us to search certain organisms within the environment as they respond quickly to changes in the atmosphere.

But collecting and gathering bird information requires huge efforts by humans as well as being a much more expensive method.

In such situations, a robust system must be in place that will provide large-scale bird information processing and serve as a valuable resource for scholars, government agencies and so on.

Consequently, naming bird species plays a significant role here for determining which species belongs to a specific image of birds.

3. Objective

Nowadays we find a lot of birds in our day-to-day life and find it difficult to segregate its kind, know its type, wonder where it’s from etc.

There are many applications which identify the bird through its voice and image.

But still, ornithologists are finding it difficult to get a quality application that provides necessary details for betterment in knowing better details about a bird they could see.

An automatic classification system for bird species are needed, which will be great convenience for many practical applications. Classifying bird species is an interesting problem for Fine-grained categorization, also known as subcategory recognition, which is a subfield in object recognition.

4. Scope

It is important to common people and even fresher's of the department of ornithology to identify a bird they encounter in their day-to-day life.

Through this system we can discover more new species of birds & snakes and can identify those that are on the verge of extinction and save them. smooth and faster operations at all levels.

Bird species identification is a challenging task to humans as well as to computational algorithms that carries out such a task in an automatic fashion

5. Study of Existing System

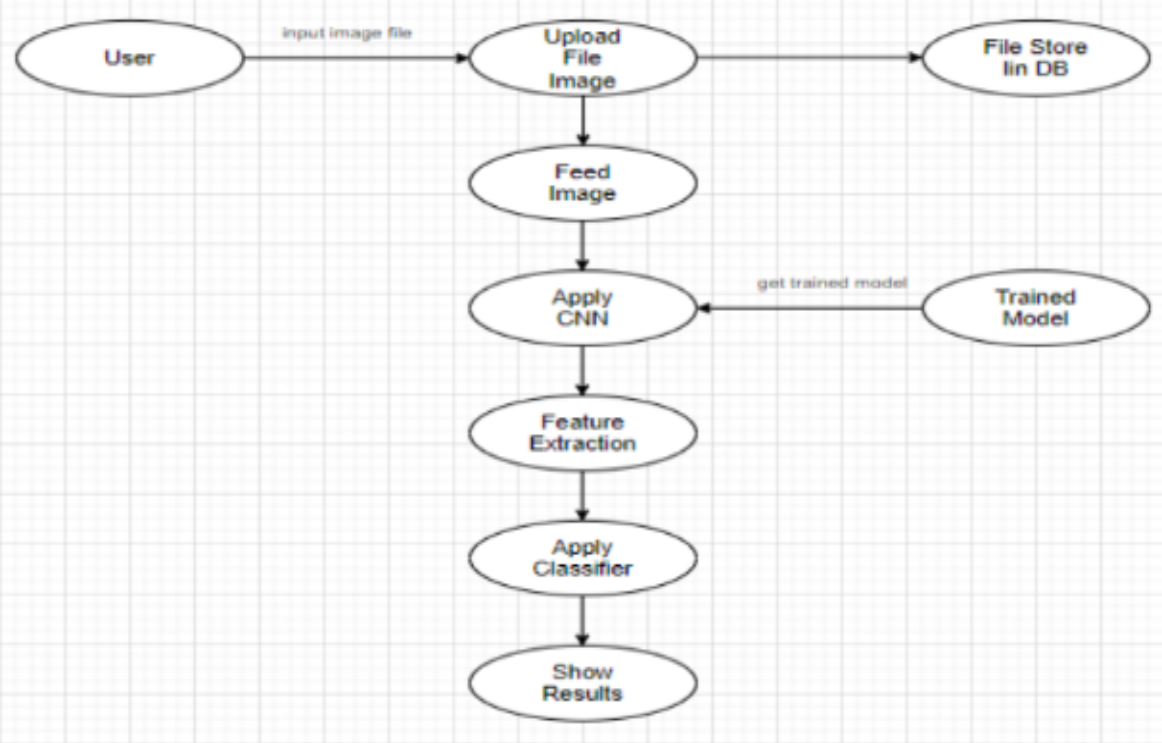
The proposed system of bird species identification uses the Convolutional Neural Network (CNN) concepts to identify the species of the birds being searched for using its images that are uploaded instantly.

The system undergoes multiple filtration and a series of algorithms to find the match of data of the bird under investigation. The further result that will be displayed consists of information like its scientific name, family, gene and further scientific information.

Additionally it displays basic information about the bird like its nativity, food it eats, hotspot places of that particular breed, the climate it lives in, and etc.

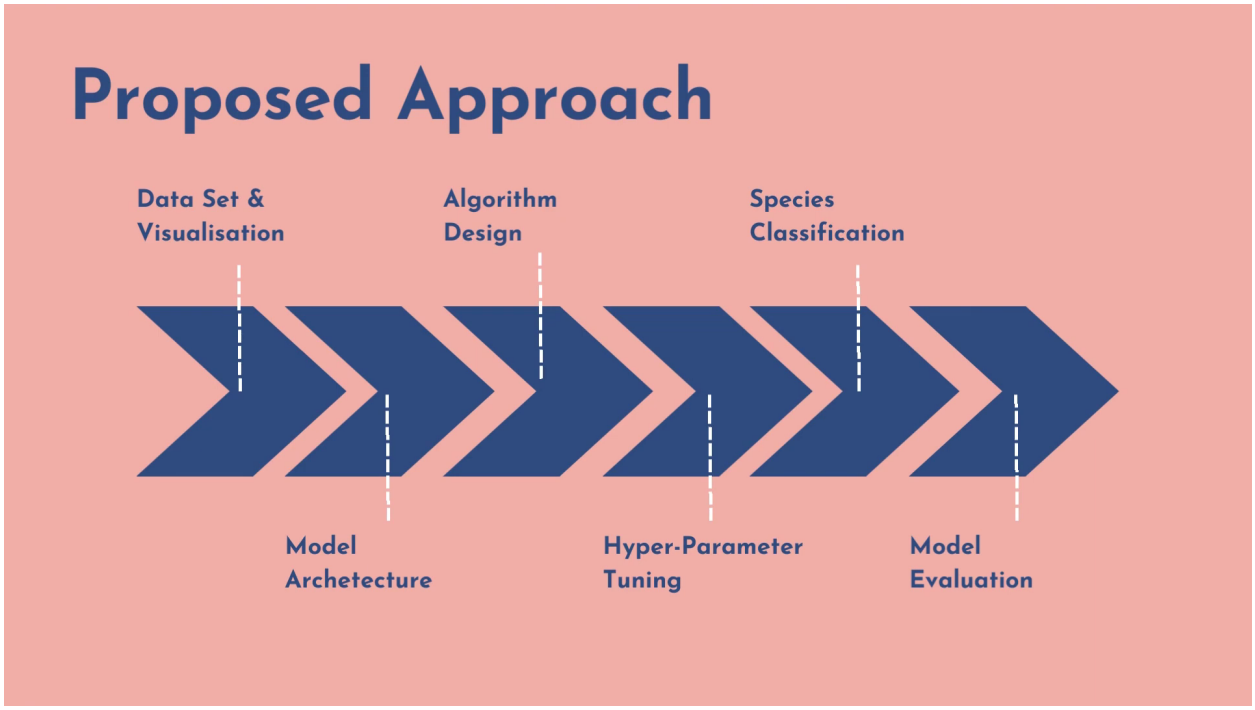
It has received more and more attention in the field of computer vision for its promising applications in biology and environmental studies. Recognising bird species is difficult due to the challenge of discriminative region localisation and fine grained region learning.

6. Project Description



The proposed solution of the model is given below explains the working of the project, the user would be able to capture and upload the image to the system and can store the image in the database if that image is not available in the dataset. Then the image would be fed to the system and CNN would be applied.

After that the features of the image such as face, expression, angle, beak etc. would be extracted and the classifier would classify the image and predict with the help of the trained dataset.
To develop such a system a trained dataset is required to classify an image. The trained dataset consist of 2 parts: trained result and test result. The dataset can be retrained to achieve higher accuracy in identification stage.



7. Expected Outcome

This study developed a software platform that uses deep learning for image processing to identify bird species from digital images uploaded or captured by an end-user on a smartphone in real time. To develop such a system a trained dataset is required to classify an image. Trained dataset consists of two parts: trained result and test result. The dataset has to be retrained to achieve higher accuracy in identification.

The trained dataset is created using 50000 steps, higher the number of steps higher its accuracy. The accuracy of the trained dataset is 93%. The testing dataset has nearly 1000 images with an accuracy of 80%.

Whenever a user will upload an input file, the image is temporarily stored in the database. This input file is then passed to the system and is given to CNN where CNN is coupled with a trained dataset. Various features such as head, body, color, beak, shape, and the entire image of bird or snake is considered for classification to have maximum accuracy. Each feature is given through deep convocational network to extract features out. These features are then collected and forwarded to the classifier. The input will be compared with the trained dataset to generate results.

8. Resources

- DataSet : BIRDS 450 SPECIES- IMAGE CLASSIFICATION (Kaggle)
- Python Jupyter
- HTML
- CSS
- JavaScript
- StreamLit

9. Conclusion

The use of additional meta-data raises the rank of the species in the predictions of the models, but it does not seem to be enough to push it to the highest rank, which means that the model has to predict fewer species, but the actual top-1 accuracy does not seem to be affected.

Through an analysis of the data set we also found that the relative number of training samples for each bird species is quite uneven, which seems to lead to a favoritism, from the model of bird species, and that some bird species are difficult to classify than others.
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10. References

1. Niemi, J., & Tanttu, J. T. (2018). Deep Learning Case Study for Automatic Bird Identification. Applied Sciences, 8(11), 2089.
2. Nyaga, G. M. (2019). A Mobile-based image recognition system for identifying bird species in Kenya (Doctoral dissertation, Strathmore University).
3. Huang, Y. P., & Basanta, H. (2019). Bird image retrieval and recognition using a deep learning platform. IEEE Access, 7, 66980 - 66989.
4. Gavali, P., Mhetre, M. P. A., Patil, M. N. C., Bamane, M.S.N., & Buva, M. H. D. (2019) Bird Species Identification using Deep Learning.
5. Nguyen, H., Maclagan, S. J., Nguyen, T. D., Nguyen, T., Flemons, P., Andrews, K. & Phung, D. (2017, October). Animal recognition and identification with deep convolutional neural networks for automated wildlife monitoring. In 2017 IEEE international conference on data science and advanced Analytics (DSAA) (pp. 40-49). IEEE.