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Animal Species Detection

Rohan Singh, Anurag Shukla, Swati Singh, Tuba Fatma

Department of Computer Science and Engineering

Babu Banarasi Das Institute of Technology and Management, Lucknow, India

ABSTRACT

Exploring wildlife in their natural habitat is important. This proposed activity develops an algorithm for finding animals in wildlife. With so many different animals, identifying yourself can be a daunting task. This algorithm classifies animals based on their images so that we can monitor them effectively. Detection and classification of animals can help prevent animal car accidents, track animals and prevent theft. This can be achieved by using active deep learning algorithms. Effective and reliable monitoring of wildlife in their natural environment is essential. This project develops an algorithm for finding out the animal species around us.

Research based on finding animals is useful in many real-life programs.

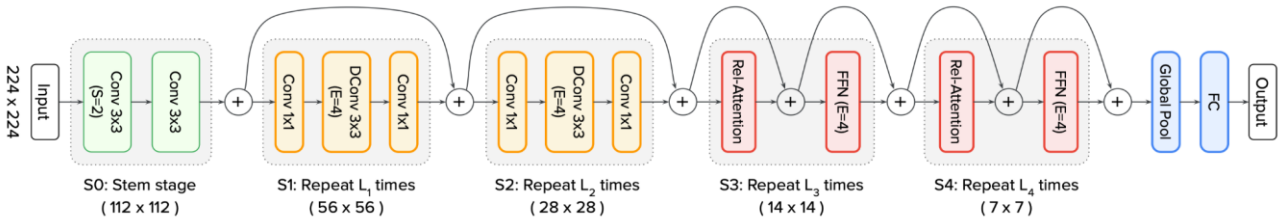
INTRODUCTION

At present, the discovery and recognition of animals remains a difficult challenge and there is no unique approach that offers a solid and effective solution to all situations. Animal species are a rich source of information that provides scientific evidence to answer scientific questions related to nature. Machine learning is a sub-system of artificial intelligence that enables systems to automatically learn and develop from an unplanned experience. The main purpose is to allow computers to train themselves without interruption or assistance and to correct their own mistakes with this learning. In our model, we use in-depth learning, modern machine learning technology that has led to the dramatic development of artificial intelligence (AI) in recent years. Deep neural networks are a collection of algorithms that set new records with accuracy for a few key issues; Convolutional neural network (CNN) is a type of deep emotional networks, often used to investigate visual images.

PROPOSED WORK

1. Animal Species Detection
2. Web Interface

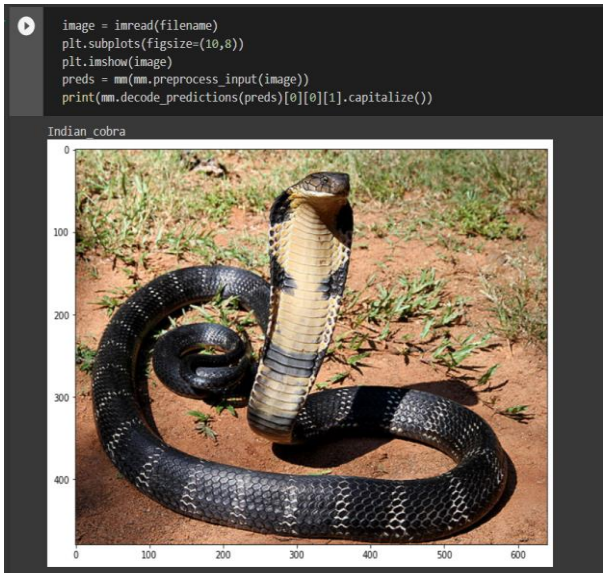
Animal Species Detection-

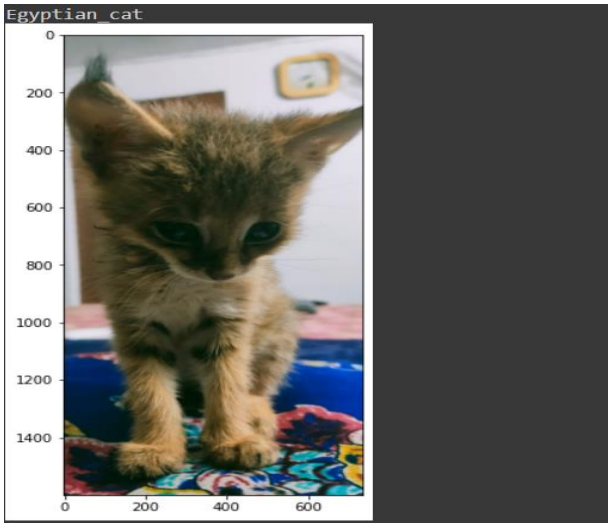


The first step will be training a model to be able to detect and classify an animal from the image provided by the user through the web interface. The model which will be used is CoAtNet. Trained with a huge JFT-3B dataset, it takes advantage of both Convolutional Neural Networks (CNN) and Transformers.
We also train the model on our custom dataset. Once the model is trained we will save and import it into our web interface backend.

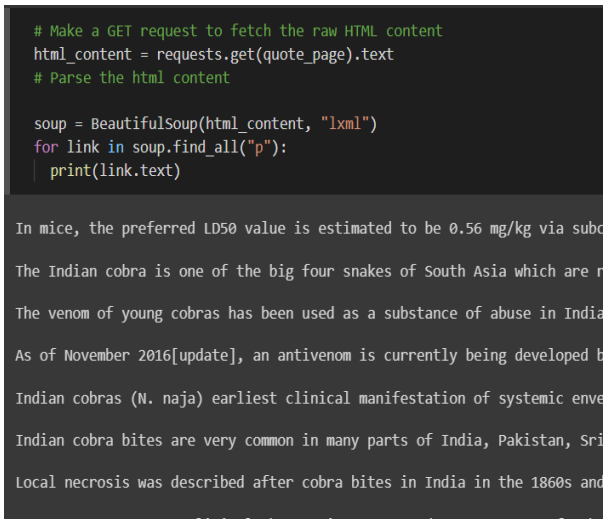
Web Interface-

The web interface is made using Django, which is a very powerful python based web framework used for rapid development and clean, pragmatic design. Here in the interface the user will click/upload a picture of the animal they want to know details about. Once the picture is captured it will be sent to the backend for further processing.
In the backend we will use our trained model to identify the species of the fauna.





Once we have identified the species of the fauna, we do web scraping to find out details about it. For this purpose we use BeautifulSoap, which is a famous python library used for web scraping.



The details of the species will be displayed to the user along with the picture they upload in the results section of the prediction in the web interface.

TECHNOLOGIES USED

Tensorflow-

Tensorflow is a cloud based machine learning platform provided by google. It is an open source and end to end platform to run machine learning, deep learning and AI models. It

provides all the necessary tools for a researcher to just get started with their workload.

Keras-

Keras is an open source library of Neural Network, written via Python which can work on Theano, TensorFlow, or CNTK.

Numpy, Pandas, Matplotlib-

In the well-known Python packages used in data science and machine learning, we find Numpy, Pandas and Matplotlib.These libraries are widely used in the pre-data processing and have made the task much easier in the project.

Web Scraping-

We have used web scraping to extract information about the animal from the web and provide it to the user.

Web Scrapers can extract all the data from specific sites or specific data that a user wants.

Django-

Django is a python based web framework which promotes rapid development. It is used for both the front and back end development of websites. The user interface for the project is made with the help of Django web framework due to its easy to use and code nature.

LITERATURE REVIEW

N. Banupriya1, S. Saranya2, Rashmi Swaminanthan3, Sanchitaa Harikumar4, Sukitha PalaniIsamy distinguishing and Describing life privately Capture by In-Depth Learning - during this study, the placement and functions of life square measure known before victimisation in-depth study. This paper examines the flexibility to mechanically and accurately collect camera image capture knowledge.

Kumar, S., & Singh, S. K. proposed a low-cost system for monitoring pets (dogs) using their main biometric identification of animals. The observation method was used to match single shots with grade-based learning methods to grade and match the extracted features of facial images to identify pets (dogs).

Marco Willi, Ross T. Pitman, Anabelle W. Cardoso, Christina Locke, Alexandra Swanson, Amy Boyer, Marten Veldthuis, Lucy Fortson's Animal Detection

Preliminary research on automatic animal identification focuses on comparing patterns of certain animal species in images and requires a large amount of forensic analysis.

Wildlife observation using in-depth learning methods -Ruilong Chen . They have tested the use of machine learning methods to automatically monitor wildlife.Convolutional neural networks have recently been introduced to separate wildlife images, which are limited to reported performance.

CONCLUSION

The project therefore uses the Convolutional Neural Network (CNN) formula to seek out life. The formula classifies animals properly by an honest amount of accuracy and so the image of the found animal is displayed for higher results for various functions like getting life into human surroundings and preventing life slaughter and even human conflict. Though some species of animals share a similar pattern, this model may notice some delicate variations between them. We have encountered many problems throughout the acquisition and classification of animal photos like large variations in kind and appearance of colour, light conditions, etc. In recent years, with the

increasing importance of animal identification, following animal recognition algorithms have received further attention.

FUTURE WORK

This activity can be further expanded by sending a message in the form of an alert when an animal is found in a nearby forest office. In addition it can be used to reduce wildlife conflicts and animal hazards. Most animal sightings are found to have both advantages and disadvantages. Yet in a country like India, given the growing number of stray animals, there is no real implementation of such programs. Future research needs to be expanded to build a device that can detect animals during the day, night, and fog. In foggy weather, no programs were available that promised to identify the animals. In fact, most AVCs (Animal-Vehicle Collision) occur when dogs or cattle collide with a car in an urban area, so we need to focus on identifying animals such as dogs and cattle instead of deer or giraffes.

Sending alerts and messages to the users on detection of wild animals and dangerous species in rural areas can also be a scope in future.

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