Animal Detection on AWS

Abstract:

Efficient and reliable monitoring of wild animals in their natural habitat is essential. This project develops an algorithm to detect the animals in wild life. Since there are large number of different animals manually identifying them can be a difficult task. This algorithm classifies animals based on their images so we can monitor them more efficiently. Animal detection and classification can help to prevent animal-vehicle accidents, trace animals and prevent theft. This can be achieved by applying effective deep learning algorithms.

Existing System:

The main problem is to determine how the two broad techniques can be used to extract features from images and then predict the corresponding image labels. This problem even becomes more pronounced when objects or animals exhibit similarities in appearance or background information. The use of classical computer vision methods to approach these problems could involve tedious feature engineering, and cannot easily be adapted or transferred to new application domains because they are domain specific.

To address these challenges, the emergence of deep learning provides several learning possibilities for instance: use of transfer learning through which pretrained weights from one domain can be transferred or adapted to another application domain. The success of most of the deep learning methods relies on training deep neural networks on large image datasets.

Proposed System:

we extended the research of deep learning on small datasets with a limited number of images. Additionally, we explore the concept of reduced deep neural network architectures compared to standard architectures, and classical computer vision methods. To further enhance recognition system accuracies on either aerial or still views, we propose a rotation-matrix data-augmentation (DA) method and a hybrid variant that combines rotation-matrix and colour constancy as another approach to data-augmentation.

The latter aids the recognition system to be robust to illumination variance. Furthermore, the study also attempts to explore the benefits of different colour spaces for deep learning. Finally, we want to investigate neural network-based detection techniques for recognizing and detecting instances of a specific animal. The earlier mentioned broad recognition systems are examined on images from several datasets: still images (Wild-Anim dataset, Bird-600 dataset, Croatia-

fish dataset), aerial images (UAV dataset containing cow and non-cow images), segmented images (Animal-shape and MPEG-7 datasets), and images from a rescue centre (Badger dataset). For this aim, the use of classical methods and customized neural network architectures are used for feature extraction. Consequently, the supervised learning algorithm is used for detecting or classifying an image depending on the dataset under study.

Software Tools:

1. AWS EC2
2. AWS Sage Maker
3. AWS Notebooks
4. AWS S3
5. AWS SNS
6. AWS CloudWatch
7. AWS IAM
8. AWS Rekognition
9. Python3
10. VS Code
11. Jupyter Notebook
12. Colab
13. TensorFlow
14. Keras

Hardware Tools:

1. Laptop
2. Operating System: Windows 11
3. RAM: 16GB
4. ROM: 8GB
5. Fast Internet Connectivity

Applications:

1. You can use this architecture for deploying any deep learning model on AWS
2. You can create custom API for creating Web App for this kind of deep learning model to embed in Mobile Apps.