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AUTOMATING THE IDENTIFICATION OF FOREST ANIMALS AND ALERTING IN CASE OF ANIMAL ENCROACHMENT

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Abstract - *The evolution of machine learning and computer vision in technology has driven plenty of improvements and innovation into several domains. We see it being applied for credit decisions, insurance quotes, malware detection, fraud detection, email composition, and the other area having enough information to permit the machine to find out patterns. Over the years the quantity of sensors, cameras, and cognitive pieces of kit placed within the wilderness has been growing exponentially. However, the resources (human) to leverage these data into something meaningful aren't improving at the identical rate. Motion sensor "camera traps" enable collecting wildlife pictures inexpensively, unobtrusively, and regularly. However, extracting information from these pictures remains a fashionable, time-consuming, manual task. We demonstrate that such information may be automatically extracted by deep learning, a leading edge kind of computing. We train deep convolutional neural networks to spot, count, and describe the behaviors of just about 4 species in about few hundreds of images from the google images and possibly extend it to other dataset as well. More importantly, if our system classifies only images it's confident about, our system can automate animal identification saving multiple weeks of human labeling effort on this massive dataset. Those efficiency gains would immediately highlight the importance of using deep neural networks to automate data extraction from camera-trap images. One more important aspect of this project would be alerting the forest department with an alarm in case of animal intrusion into the villages.*

***Key Words*: Convolutional Neural Networks, Deep Learning, Tensor flow, Open CV, Wild Animals** …

1. INTRODUCTION

Animal recognition is an area of research that involves the employment of a computer vision algorithm for extracting features from a picture or video, then uses deep learning algorithms for predicting the labels of a given image. The study of animal recognition presents several societal benefits: 1) It allows the monitoring and conservation of wildlife animals especially in an environment where some animals are on the verge of extinction. 2) It also provides the general public a crucial tool to examine and monitor animal population changes over a period of your time. 3) It allows biologists and ecologists to higher understand the impact of the animal population to their environment. Various algorithms and methods are advanced by humanoid being so as to own a superior knowledge on animal behavior. Further, these applications also can be used as an alerting system to humanoid being from disturbance of hazardous wild animal for early protection actions. The first phase, which is the animal identification, will be helpful to identify the recognized animal. In our project, it would be the four wild animals: Lion, Tiger, Elephant and boar. The identification of animals can be done either with the image of an animal or live video footage where in which the animal is found. The second phase, which would be alerting either the forest department or the people who could possibly be affected when the animal intrusion happens in the urban area. The signal of alerting the people happens to be a sound, which is produced when the wild animal is on the road ways, or near to any possible human population.

2.RELATED WORK

In earlier research, People have worked on Identification of animal has aided humanoid being to look at and to require care their animals easily. Their work shows that support vector machines (SVM's) can simplify well on problematic image classification problems where the important features are high dimensional histograms. Their work also marks an experimental method, and its clarifies having progressively better results gotten over alterations to the SVM architecture and that they have explained that it's likely to extend the classification obtained on image histograms to higher levels with error rates as low as 11% for the classification of nearly 14 Corel groups and 16% for a more general set of substances. Higher level spatial features, histogram features are used. Histograms are wont to bifurcate other kinds of data than images.

Another research have proposed object classification system and claimed it's capable of accurately detecting, localizing, and recovering the configuration of textured animals in real images. They have built a distortion model of shape from a collective videos of animals and an appearance model of texture from a labeled group of animal images, and syndicate these 2 models spontaneously. They developed a simple texture descriptor. They tested their models on a few datasets; images taken by professional photographers from the Corel collection, and images from the net taken from by Google. Instead of employing a histogram of textures, they represented texture with a patch of pixels. They demonstrated that their work is good enough for detecting animals. Broadly speaking, they also discussed on unsupervised algorithm for learning models using both video and images. These learned models appear promising

for classification tasks beyond discovery, like localization, recovery, and counting.

Research proposed based on supervised and unsupervised founded classification system to categorize the animals. Initially, the images are segmented using maximal region amalgamation segmentation algorithm. The Gabor features are removed from segmented images. Further, the removed features are reduced based on supervised and unsupervised methods. In supervised method, they have used Linear Discriminate Analysis (LDA) dimension discount technique to decrease the features. The decreased features are inserted into symbolic classifier for the purpose of classification. In unsupervised method, they have used Principle component analysis, dimension reduction method to decrease the features. The decreased features are fed into K-means algorithm for the purpose of grouping. Experimentation has been showed on a dataset of more than 2000 animal images containing of 20 dissimilar categories of animals with variable fractions of training samples. From the projected model, it is detected that supervised classification system achieves better associated to unsupervised method.

3. PROPOSED SYSTEM

3.1. Data Collection, Categorizing and Pre - Processing:

Animal classification is categorized into two phases. The first phase is training phase followed by second phase i.e., testing phase. In the training phase images will be acquired either by capturing from still camera or by recorded video available in the internet databases. These raw images won't be suitable for extracting the information as it consists of noises color distortion etc. In order to overcome from this pre - processing of the images is very much necessary. In the pre - processing domain, images will be subjected to remove unwanted data like noise and image size formations. After cleaning, the images are subjected to detect the animals in the images using suitable algorithms. Same techniques will be applied in the testing phase also.

The data is being collected mostly from google and this is done manually. The total number of images collected for this project would be around 1500 images. These images are collected for five different categories namely: Lion, Tiger, Elephant, Boar and Human.

The pre – processing of all the images collected are done, which refers to the labeling. A labeling software is used to label the images to the specified category, which makes the training data set ready for the project.

3.2. CNN

Convolutional neural network is a subset of artificial neural network that uses multiple perceptron to analyze image inputs and have weights to several parts of images and ready to segregate one another. One advantage of using Convolutional Neural Network is to leverages the use of local spatial coherence within the input images, which permits them to own fewer weights as some parameters are shared. This process is clearly efficient in terms of memory and complexity. The building blocks of convolutional neural network are the convolutional layer, max pooling layer and fully connected layer.

4. CONCLUSION:

The project mainly focuses on identifying the images of the four wild animals and alerting the person responsible if any animal encroachment happens in the urban area, which is done by collecting live feed through a camera kept near the forest roadways.

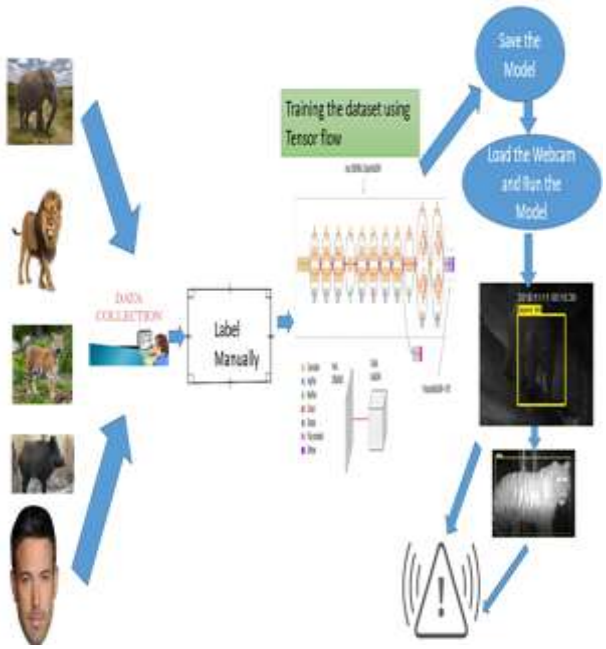

Fig - 1 : Architecture Diagram

5.EXPERIMENTAL RESULTS

In this project, the performance evaluation is done based on minimum loss. When the image pretends to have minimal among the five categories, the category where the loss is minimum is chosen and returned as the output. All the process takes place within the model itself. When the image is feed, only the result of the animal image will be returned. The performance evaluation of all the four animals have be obtained with around 0.001 loss that is almost all the shows around 99.9 percent correct result. Below down are some of the animal image screenshots given to have a look at how the real world output looks like. Training loss and some other performance evaluation graphs are given below.

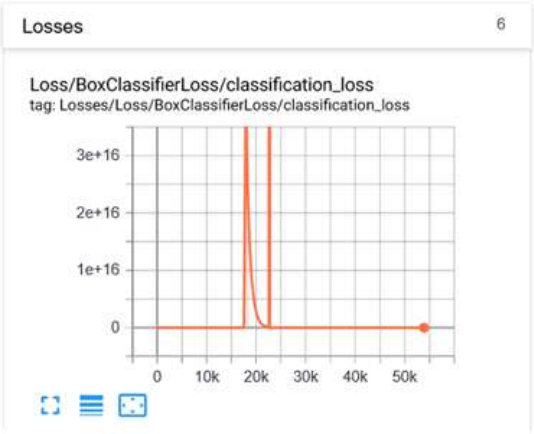

Fig - 2 : Training loss

6. SAMPLE OUTPUT

6.1. Screenshots:

Fig – 3 : Output Screenshot – Boar

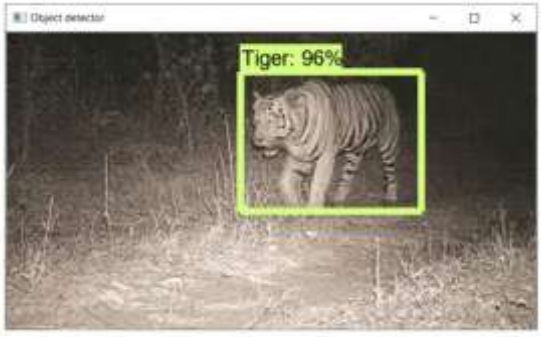

Fig – 4 : Output Screenshot – Boar

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