Machine Learning Technique for Image Classification System using Assembly

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***Abstract*--- This paper Mainly describes about how machine learning and deep learning techniques can be applied to various purposes in real time. Modern technique for classification and identification of objects place an important role in the field of e-commerce, surveillance and many other. One of the main objectives of the smart classification and identification is to ameliorate the technique in the modern world and to make human life easier in terms of comfortable and accurate in finding the things. The machine learning and deep learning techniques used here helps in exact classification according to the specified classes and identification of objects accurately in real time.**

An open source library called TensorFlow helps to create the model and to plot results in terms of graphs. The packages imported in programming helps in easy access to the repository and eliminating anomalies occurring during the execution. This article presents a comprehensive survey on various attributes and kinds of images that are to be considered for classification. The Tensor board used here helps to analyze the graphical results in terms of accuracy and the loss obtained.

Keywords—Machine Learning, TensorFlow, Tensor Board, Python

I. INTRODUCTION

Recently, Object classification and detection is growing and becoming a trend among technology developers especially with the growth of data in different parts of industry such as e-commerce, automotive, healthcare, and gaming. One of the most noticeable examples of this method is used and implemented in Face book. The detection percent of Face book extents up to 98% of accuracy to classify the few images and distinguish them to albums by the process of identifying the face.

The process of image classification is done using the frequently used method known as machine learning. There are many parts that may be improved in machine learning. Tensor Flow was developed by the researchers at Google as single infrastructure for ML. It is an Open Source and a defined Library for AI which focuses on Object Arrangement, Observation, Understanding, Determining, Forecast and Formation.

Object detection in Tensor Flow can be done by using various models and this can be described as a technique of defining the occurrence of the class to which the object is intended for and assessing the position of the object by resulting the hopping box around it. Single class and multiple class object detection can be done in an image. Deep CNNs method is generally used for object detection.

II. Related Work

- According to [2], here we can see the implementation of machine learning technique into the dataset tracking procedure and to improve the original tracking method potentially. this method uses the Naive Bayes algorithmic technique to improve the prediction techniques. This also makes use of fitcdiscr function in MATLAB to train Gaussian discriminant classifier. The steps in this method includes, Feature extraction, Live-cell tracking, Dimensionality reduction of feature space [11].
- From this journal we can see the discussion regarding research using Decision Tree which is one of the techniques in image classification. The DT has multiple datasets that are located under each of Hierarchical classifier. It must be done in order to calculate membership for each of the classes. The classifier allowed some rejection of the class on the intermediary stages. This method also required of three (3) parts which the first one is to find terminal nodes and second in the placement of class within it. The third one is partitioning of the nodes. This method has the high rate of efficiency and the method is very easy for implementation.
- In the journal [4], this paper discusses on Support Vector Machine (SVM) active learning that was very actively growing interests during that time. It also proposed some new idea by combining spatial information from a sequential process in the trial process with spectral. It requires three strategy where the first one is Euclidean distance. It helps in calculating some of the training samples from the main part the model. The second strategy is based on the Parzen window technique and finally, it includes spatial entropy. The result showed that two of the images have high resolution in terms of effectiveness of regularly.

III. PROPOSED WORK.

- **Module 1:** packages to be imported : Importing the package of OS helps in reading the files and directory from the repository, NumPy package makes it easier to obtain numpy arrays from python data and also performs matrix calculation. Another library matplotlib. pyplot helps in plotting the graph and exhibition of images in the training and validation data. The TensorFlow Classes that are imported helps in construction the model.

- **Module 2**: loading the Data: the Data required can be downloaded from any data set. Here we use the Datasets downloaded the sieved version of Datasets related to Cats and dogs from the Kaggle. The downloaded data can be then stored in the temp directory, the figure 1 mentioned bellow represents the sample cats and dogs datasets.

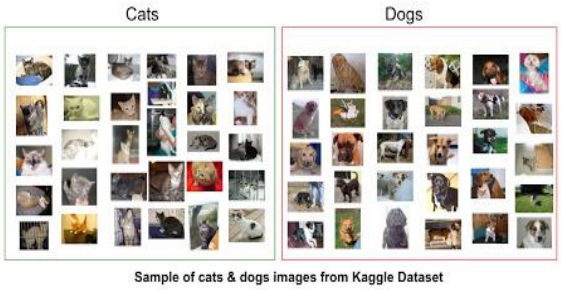
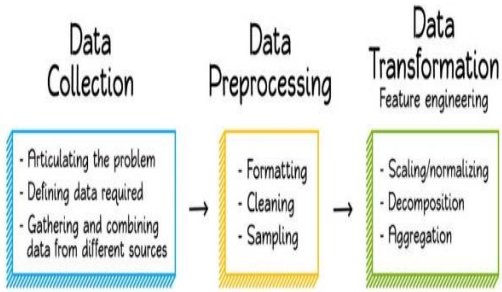


Figure 1 : cats and dogs datasets

- **Module 3:** Data Preparation: Establish a path and evaluate ML modules on a metric like performance, it's imperative to establish a guileless benchmark before we start making machine intelligence shapes. Here the images are converted to easier forms of tensor. The figure 2 represents the procedure for data preparation phase.



- **Module 4**: create the model: In this model there are blocks of convolution which also contains the max pool layer individually. There also exists a relu metric function on top of which 512 units are placed.

- **Module 5**: Interpreting module results to extent possible: This undertakes to clear up shape visualize particles by education a direct decay around the conceive particle, which is an easily interpretable shape.

Figure 2: comparing of training and validation metrices

IV. METHEDOLOGY

Step 1:

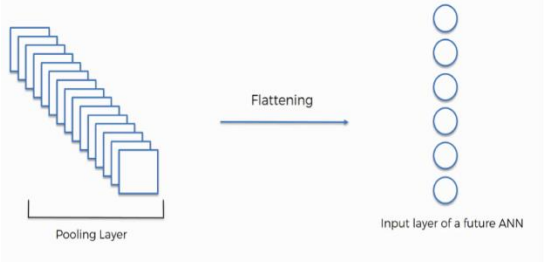
A. **Convolution Operation:** Convolution operation is one of the building blocks in the plan. This step mainly focuses on the subjects like feature detectors, neural network filters, future maps etc.…

B. **The Rectified Linear Unit (ReLU)** : This is similar to convolution operation

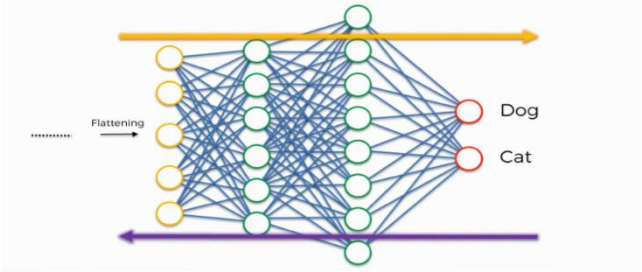
Step2: Max Pooling: Detects the images represented in different format and angles, sample images are mentioned in Figure 3.

Figure 3: images in different angles

Step 3: Flattening: this converts the resultant map into column like structure.



Step 4: Full Connection: This consists of multiple layers to process the data.

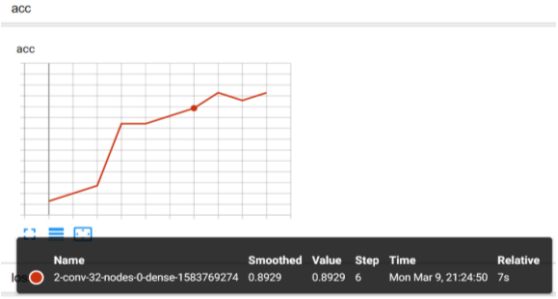


V. CONCLUSION AND RESULTS

An accurate and efficient system for classification of images based on the represented classes are developed. This project uses techniques which are modern in machine learning and deep learning fields. His used a custom Datasets from the Kaggle website. The data here is very accurate and consistent. The main applications of the developed system are in the field of e-commerce, surveillance, anomaly detection, people counting, and autonomous driving vehicles.

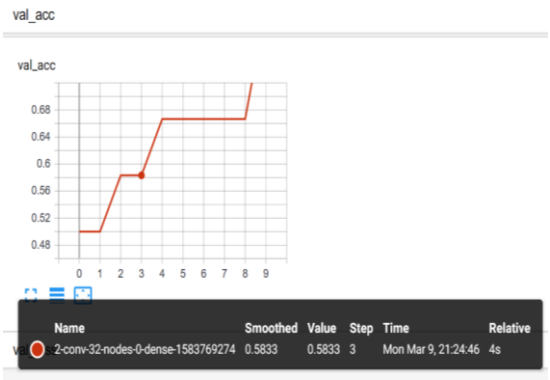
This can also be used in real life and every day application for object detection and tracking the objects with high accuracy. Addition of a temporally consistent network would enable smooth detection and more optimal than traditional method.

❖ TRAINING ACCURACY

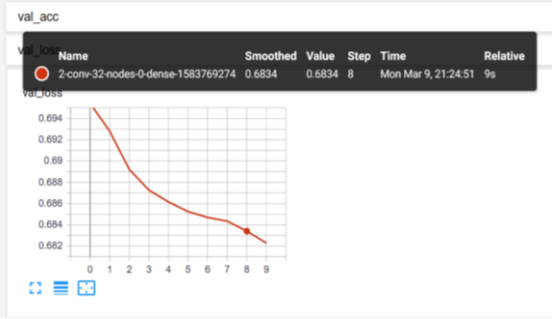


❖ TRAINING LOSS

❖ VALIDATION ACCURACY



❖ VALIDATION LOSS



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