Image Classification for Arts Valley

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A B S T R A C T

Image classification using TensorFlow for ArstValley, is a machine learning model which will classify posts(images) to different categories of labeled images. ArtsValley is a mobile application which provides digital platform for artists. The software mainly provides an art sharing feature where users / artists can share the pictures of their arts. As mentioned above, ArtsValley is specifically developed for artist to share their art work images on the platform, but there may be case of irrelevant posts(images) that might be posted on ArtsValley. Those images might be social, scenery, selfies, gathering, etc. So, to maintain the consistency of platform and to avoid such images on ArtsValley we have an idea to developed a machine learning model for it.

Keywords: Software Development, Machine Learning, Image Classification, Artist, Artwork, TensorFlow.

1. Introduction

We all can agree that India is very rich country when it comes to arts and artists. If we go way back in the history of India, we can see the art works drawn onto the wall. From generations, people came up with such mesmerizing creativity which stole many people's attention. There are many people around the globe who are interested in art works and has hobby of collecting it. Outside India, Art exhibitions are organized and many people buy the art works, this helps the artist very much. But in India, there are limited number of art exhibitions organized for artists. Along with that, not everyone is able participate in those exhibitions. So, we are also considering to give them a platform with the artists. So, they also can share their work.

Since it is platform specific application, there might be cases of user uploading images/posts on ArtsValley which may not be platform specific. Users may upload images of scenery, social media posts, family posts, selfies, etc. And there might be case of uploading someone else's artwork posts on ArtsValley. Like, user could download or can take screenshot of someone else's artwork and can posts on the ArtsValey. This will create inconsistency of the platform and something that users are not expecting for.

So, we have decided to develop a machine learning model to tackle this problem for ArtsValley. This model will be developed using Google's TensorFlow, which is a free and open-source library. TensorFlow provides various pre build libraries for image classification. TensorFlow 2 is an end- to- end, open-source machine literacy platform. You can suppose of it as an structure subcaste for differentiable programming. Keras is the high- position API of TensorFlow 2 an approachable, largely-productive interface for working machine literacy problems, with a focus on ultramodern deep literacy. It provides essential abstractions and structure blocks for developing and dispatching machine literacy results with high replication haste.

We will train our model for mainly three categories of images – Authentic images, Duplicate images, and Irrelevant images. Authentic images are those images which are the real art work of the artist. Duplicate images are those images which were downloaded from internet or taken screenshot of someone else's artwork and posted on ArtsValley. Irrelevant images are those images which are meant for the platform, these images are social, selfies, sceneries, etc.

2. Literature Survey

2.1 Ye Jingyi, Si Rui, Wei Tianqi, "Classification of images by using TensorFlow", Institute of Electrical and Electronics Engineers, 2021

One model for sorting photos was developed as part of the image categorization research. The model used for the research may be used to classify images rapidly and accurately. An adequate data set was picked at the project's outset. After that, TensorFlow was used to build the model. The model would then be trained to obtain the parameters that fit the data well. Finally, various graphs of validation accuracy were made in order to evaluate the model properly. The Team members have become experts in creating convolutional neural network models in Python as a result of working on this project. Additionally, the team members improve their capacity for data analysis.

2.2 Kiran Seetala, William Birdsong, Yenumula B. Reddy, "Image classification using TensorFlow", Springer, 2019

Deep learning (DL) is a method for classifying the raw data into useful knowledge that is then supplied into the computer. Direct classification tasks from sound, text, and images are carried out by DL.

2.3 Derrick Yeboah, Mahamat Saleh Adoum Sanoussi, George K. Agordzo, "Image classification using TensorFlow GPUS", Institute of Electrical and Electronics Engineers, 2021

Numerous papers ignore the numerous image classifications and challenging methodologies. The most recent methods, problems, and options for billing classification are covered in this article. Synthesizing crucial advanced category techniques and targeting strategies that can be applied to increase ranking accuracy is prioritised. A well-known issue in image processing, computer vision, and machine learning is billing sorting. In this paper, we examine TensorFlow GPU-based deep learning-based picture classification. Because the datasets for the classification module's bridges—CIFAR-10 and MNIST FASHION—were. The outcomes demonstrate the effectiveness and precision of TensorFlow GPU-based deep learning-based image classification. Additionally, certain important problems that have an impact on performance are mentioned. However, simple research is needed to identify and reduce uncertainties in the image processing chain to improve classification accuracy.

3. Methodology

To develop the machine learning model for image classification, first we need to assign labels to an image from a given set of categories (authentic, duplicate, and irrelevant). With this the model will be constructed to analyze the posts uploaded by the user on ArstValley and return a label which fall under set of predefined categories. While developing the model, following steps are required:

1. Data preprocessing: - Here we prepare the raw data, making it suitable for a machine learning model. It is the initial step while creating a machine learning model. In our project, the raw data are the set of images that are required to train our machine learning model. The images are art work, social, duplicate, etc. Following is the table depicting the labels of different of images that will be posted on ArtsValley from users. The labels are Authentic images, Duplicate Images, and Irrelevant Images. There are multiple preprocessing methods available in Keras. We can import Keras using TensorFlow and can access methods for preprocessing.

Authentic Images	Duplicate Images	Irrelevant Images
Figure 1	Figure 2	Figure 3

2. Building model: - To build the model properly we require good quality of dataset. There may be small amount irrelevant images which are not required for our model. So, we normalize the data set, means we remove unnecessary images/data from the data set. By doing this, the data set becomes more precise and the model will be more accurate. We split the main dataset into train (train_images, train_labels) and test (test_images, test_labels) dataset. Which is generally 75% for training and 25% for testing.

3. Model training: - Now we have a precise dataset to build the model. First the model is trained with the training dataset. While training process, the model learns the pattern and type of images, along with the labels of those images. With this the model remembers which labels are for what type of images.
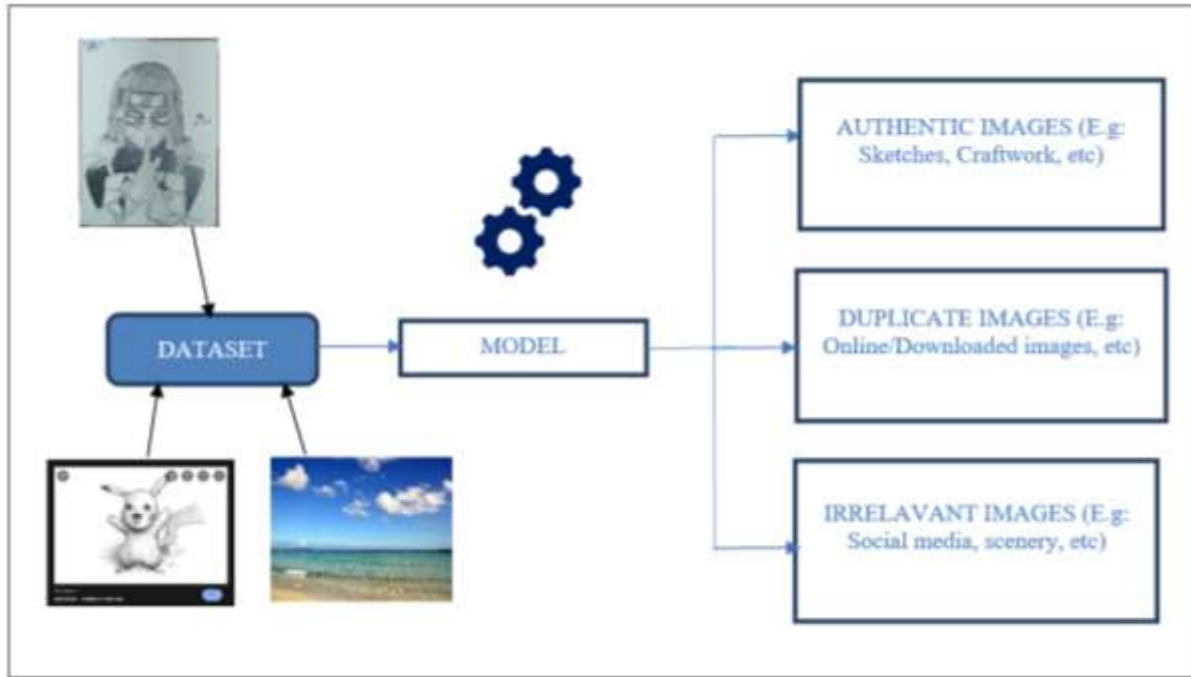
4. Model predicting: - Finally, the model is tested with the test dataset to check the accuracy of the model. The model will be used to predict the label of each sample in the test set. Whenever user will upload their post on ArtsValley, the model will process the posts and return the label for that post. Weather it is an authentic post, or duplicate post or irrelevent post.

The machine learning model will be placed on the ArtsValley server. Hence, it will be activated only when user will upload their post on ArtsValley. And their will be posted only if the post is authentic, else user will get a feedback of duplicate or irrelevant post. The entire process will be done before final posting on the ArtsValley, resulting to the consistency of the platform as user will not able see irrelevant posts on the ArtsValley.

4. Conclusion

After doing research on our machine learning model, we believe that it will help to main the consistency of the platform ArtsValley. So that many artists user will able to explore the virtual exhibition and artworks and craftworks. This model aims to categorize posts uploaded from user and allow only those which authentic and real posts and not to allow which fake and irrelevant for ArtsValley. It'll increase the passion about artwork in numerous artists. The artwork participated by artists will get ranked/ votes by people. The response from the users will motivate artists to keep doing their work. Not everyone wants to vend their arts some people just want to express their work in society. This will increase the interest of newcomers. It will induce equal openings for every artist. thus, our software will give both consistency and learning to artists and users.

References

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