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Analysis of Images and EMOJI's for Sentiment Detection

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ABSTRACT

Analysis of images and emoji's are quite important in the today's growing digital world. On an average there are millions of pictures and emoji symbols used in many of the digital platforms like FB, Twitter, Instagram. This makes the service provider creating an anxiety in determining the kind of images that are being used by the applicants. Not only for service providers, there is an anxiety for an average man to find, out of curiosity to determine what are the comments and emoji's being used by the people who viewed his/her photo which is being posted in social media platform. For that purpose, we see preferable and easy method for identifying the type of emotion a reviewer is willing to express for a photo that is posted. AlexNet is a model which is trained using many sets of image data and can be used in the classification along with Deep Convolutional Neural Networks. Deep learning helps in prediction of emotions given a picture. Training has to be performed before the prediction of new images and emoji's, so we train an visual sentiment classifier which not only helps in sentiment capture but also the type of environment based on a photo taken.

Key words: Sentiment Detection, CNN's, Deep learning, Emotion capture, In-depth analysis

1. INTRODUCTION

Online platforms today have made such a huge business with billions of users, because the people like to share, express, judge, react with all things happening across the world. Most of them prefer to share their feelings towards an event through pictures rather than the text as it is very convenient to do so.

If the images are labelled with text, the sentiment can be captured through the text written using many available software's. For unlabeled pictures, we have to perform the analysis to recognize their status. Status varies based on the images, for a picture containing the human face we can divide the status into three categories namely: a positive opinion, negative opinion, neutral opinion. But for the images which represent the environment there are many such as: Trees, Seas, Vehicles, Parks and many more. There are a lot of challenges to be faced while determining the opinions from the images, to build a better model we make use of deep learning techniques along with the general convolution neural networks. As these techniques have an intellectual property of learning more about the picture along with its attributes such as behavior etc. [5]

The model which is used should be robust as it predicts some billions of posts flowing over the social network, for that the image data available to us is divided into three categories: Training set, Validation set and Test set. There is a need to make the training dataset transparent because, the training dataset should be ideal and contain all the required information to correctly predict the new upcoming images. Before testing the model, validation of the trained dataset has to be made so that the model develops (learns) while the validation takes place too. And further the model can be tested on the test set. [6]

Remaining paper is organized in the following way. Section II discusses the most recent (Literature Survey) works done in image classification and sentiment analysis. Section III explains about the dataset collection and several other techniques along with the existing methodologies and show us how we improve our analysis and prediction. Section IV describe the proposed system for analysis and sentiment detection. Section V tells about the results obtained through experimentation. Section VI says about the discussions and finally Section VII concludes this paper with all the required basic knowledge regarding the analysis and detection.

2. LITERATURE SURVEY

Analysis of Images and Sentiment Detection is very exciting task because though it appears to be an improvement in the technology, it involves a lot of process to be undergone before achieving the desired results. [1] The case study from a researcher depicts that several processing and data retrieval is made to analyze and predict the sentiments in variety of formats. Because of the large amounts of data available, processing such data would require more than a former machine learning, involving deep learning methodologies. [2]

The first approaches evolved based on the given set of images, the frameworks of supervised and semi-supervised than convert some features of images into emotions that can be further classified. To order to make it more effective Borth et al, Yuan et al. and Jou et al. bridged the gap between to attain more of an emotional content from an image objects through visual representations. [3]

While using the deep compositional architectures gained from Krizhevsky et al. It correctly classifies all the images on a large scale which in turn uses deep CNN's with tens of thousands of parameters as layered classifiers. The kind of learning provided to the dataset has to be adjusted which varies based on the scenarios that could be unsupervised i.e. without any prior knowledge the data is trained or supervised i.e. with providing a historical dataset and learning can be done through it. [4]

In the idea of deep learning, many publishers and researchers have made several assumptions and worked-out many models which starts from a basic text analysis to the deep learning technique of image analysis making significant improvements while proceeding further. In some cases, where there is no measure of semantic and syntactic structures developers came up with an idea of joint feature learning which enhances the performance. [8]

3. DATA SET AND EXISTING METHODS

In the existing methods, dataset collection is done through considering several online platforms such as flickr and Facebook. The emotion captured from a text or maybe an image could be divided into five different scaled labelled as completely positive, positive, neutral, negative and completely negative. [7] Based on the dataset examined results are shown as an example in the below diagram.

Table 1: Table displaying emotions based on given data

Index	Word	Sentiment
1	Miss	Negative
2	Well	Positive
3	Good	Positive
4	Great	Positive
5	Like	Positive
6	Better	Positive
7	Enough	Positive
8	Happy	Positive
9	Love	Positive
10	Sad	Negative
11	Angry	Negative
12	Pain	Negative

In the table example, only two emotions are been captured based on the set of data given in Word column. More the data is increased to thousands more ways of categorizing them into five different sectors as labeled. In general most of the sentiment analyzers use the common flowchart for identifying the emotions in the given data or an image. [9] The flowchart looks as follows:

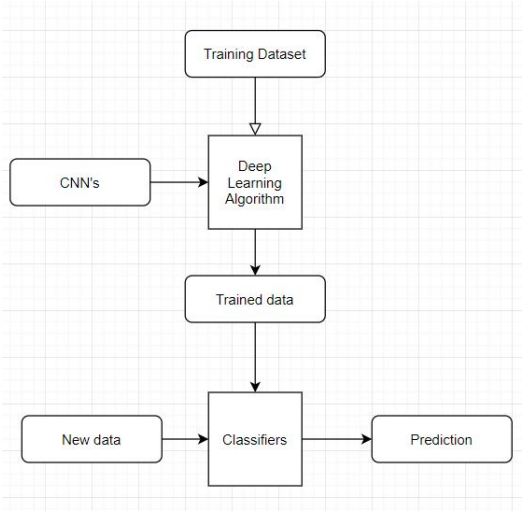

Figure 1: Process flow of predicting sentiments

As shown in above figure, existing methodologies create a dataset of training is given as an input to the deep learning algorithm and based on the type of CNN techniques used, the model generates the trained set and further provided to the classifiers along the new data available.

This makes the prediction of the new dataset upon examining the results of the trained data and thus predicts.

4. PROPOSED SYSTEM AND ARCHITECTURE

In our model architecture is designed in the following way, First the input taken from data sources corresponding to online platform is given to train the CNN's and then directly used on the testing dataset to predict the sentiments. Though the results are not exactly matched sometimes we make use of progressive CNN's i.e. once the prediction of an image is captured then it adds the image to the training set which helps in making the prediction more accurate in the next further analysis. [10] This method is very efficient to use and decreases the chance of falsifying prediction.

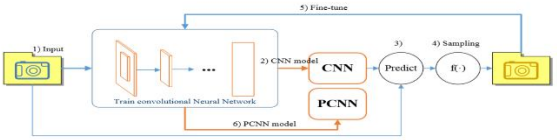

Figure 2: Making use of CNN's in a repeated manner to get precise results

The use of convolution neural networks has a wide range of applications, in the proposed system it mainly serves two purposes i.e. image classification and the sentiment prediction. This happens through a series of layered networks used in conjunction with each other. The below figure depicts how the both purposes are served using CNN's in a detailed way. [11]

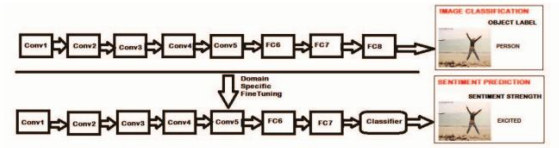

Figure 3: Layers of CNN's used in conjunction of analysis

Moving towards the deep learning techniques used along with the convolutional neural networks, the figure shown below is the kind of transformation happening at the CNN's level as combining with the deep learning methodologies [12]. First image is a normal photo considered (a) which is passed towards the CNN's thus obtaining the sampled image of (a) i.e. (b). From the image (b) obtained it is further processed to the second layer resulting in the image (c). And finally, image (c) is passed to the last inception layer of neural network and the (d) image is obtained.

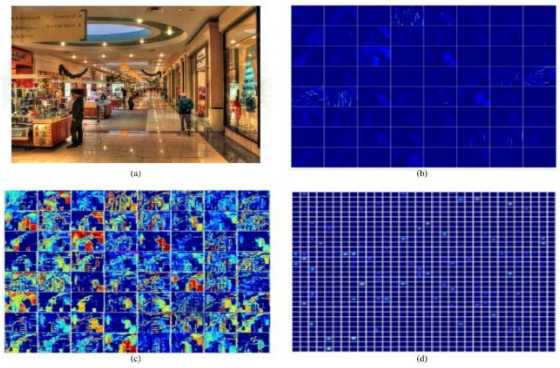

Figure 4: Sampled results obtained in Different levels of CNN's

5. ANALYSIS AND RESULTS

To make the model look simple, the whole system is shown in compressed design as follows.

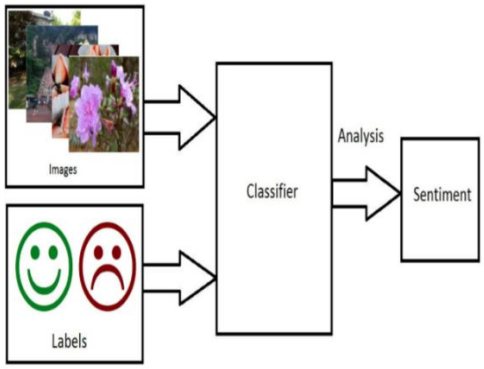

Figure 5: Compressed design

There are several readings which are being tabulated and examined, the collected table contains the kind of method which is used, the coefficient variable values, predicted vales, recorded values and also the accuracy of the prediction made. Based on all these values training set is enhanced making the probability accuracy rate to maximize to one (1) value. The table is shown below.

Table 2: Gathered results from the model design

Method	α	β	Pred_neg	Pred_pos	Rec_neg	Rec_pos	Accuracy
Visual feature	-	-	0.3878	0.8352	0.4385	0.8043	0.7169
Textual feature	-	-	0.4122	0.8439	0.4692	0.8109	0.7356
TISC(1)	0.054	0.448	**0.6596**	0.8177	0.2385	0.9652	**0.8051**
TISC(2)	0.284	0.244	0.5574	0.8185	0.2615	0.9413	0.7915
TISC(3)	0.030	0.578	0.4787	0.8286	0.3462	0.8935	0.7729
TISC(4)	0.300	0.340	0.4058	0.8371	0.4308	0.8217	0.7356
TISC(5)	0.792	0.798	0.3610	0.8768	**0.6692**	0.6652	0.6661

Here are some of the images along with the predicted sentiments, the images classified are generally shown in two types: First set of pictures are captures of human faces and their respective emotions, second one's are the images of surroundings which represent the environment [13].

Figure 6: Face expressions

Figure 7: The above (a) represents nature i.e. Trees, (b) represents Seas and Oceans (c) represents Buses and (d) represents Houses.

6. CONCLUSION

Finally, analysis of images and sentiment prediction using deep learning techniques of CNN's would be more appropriate than the regular method of using machine learning algorithms. This method finds an effective way in predicting among all the images captured. As in everyday digital platforms are gaining a greater number of users and many pictures are shared across world-wide and there is a great necessity for many data analytical engineers to use this type of techniques in predicting the sentiments. Customer feedback is the more important thing for an application to get success, so analyzing their sentiments, feelings and behavior based on the response provided is crucial task and there is a huge scope in future for such type of analysis and prediction. More the data is converted into an organization's relatable information, high will be the turnover of that firm.

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