A Narrative Mechanism of Artificial Image Classification and discovery Using Machine Learning Algorithms

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ABSTARCT: Machine learning is an application of artificial intelligence that provides systems with ability to automatically learn and improve from experience without being explicitly programmed. There are some of the problems humanity in general and business are facing that we can solve using ML. Human can detect and classify the images up to certain extent, as technology is growing rapidly and simultaneously to such extent, we can achieve much more higher standards. Human can perform it manually with certain accuracy whereas computer can achieve it with machine learning techniques. Support vector machine, a supervised learning algorithm, which is used for classification and regression problems. Convolutional neural network is a artificial neural network widely used for image/objection detection(accuracy). Hybrid Method such as SMCN algorithms to be used for image classification and detection (accuracy).

INTRODUCTION:

A support vector machine (SVM) is a supervised machine model that uses classification algorithm for two-group classification problems. After giving an SVM model sets of labeled training data for each category, they're able to categorize new text. Compared to newer algorithms like neural networks, the two main advantages: higher speed and better performance with a limited number of samples. This makes the algorithm very suitable for text classification

problems, where it's common to have access to a dataset of at most a couple of thousands of tagged samples. A Convolutional neural network (CNN) is a neural network that has one or more convolutional layers and is used mainly for image processing, classification, segmentation and also for other auto correlated data. Rather than looking at an entire image at once to find certain features it can be more effective to look at smaller portions of the image. By finding feature difference classification has achieved, later CNN to be applied for that classified image to find the accuracy of the image.CNN is the most preferable algorithm for finding the accuracy of the image.

LITERATURE REVIEW

Image classification can be done using another supervised learning algorithm KNN. K-Nearest Neighbours (k-NN) is a supervised machine learning algorithm i.e. it learns from a labeled training set by taking in the training data X along with it's labels y and learns to map the input X to it's desired output y. The k-NN algorithm is arguably the simplest of the machine learning algorithms. The model only consists of the training data, that is, the model simply learns the entire training set and for prediction gives the output as the class with the majority in the 'k' nearest neighbours calculated according to some distance metric. The overall content revolves around the image classification ,it is not a huge task for a person to distinguish between natural and the artificial images, but when it comes to a machine it is a major and complex because it is not like every time, can get the same images. So for that machine learning has come into picture, the machine has to analyze and come to a conclusion for a problem. In machine learning support vector machine is used for the classification of natural and artificial images by comparing all the features from the pictures. And further CNN is used to find the accuracy of the natural image.

METHODOLOGY:

Classification and detection(accuracy) can be implemented in two major steps like for classification, support vector machine algorithm is used, and for further for image accuracy convolutional neural network is Image used.
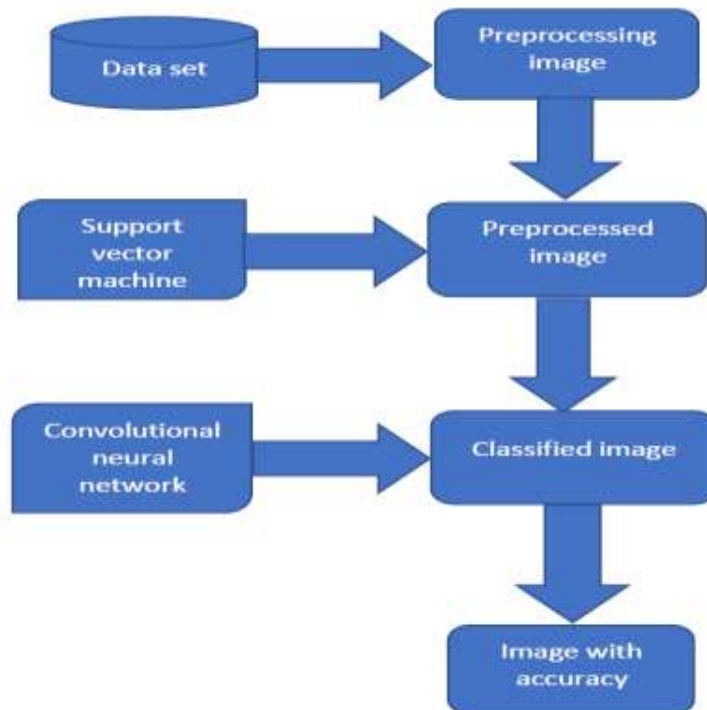
Figure1: Implementation of Image Classification

SUPPORT VECTOR MACHINE:

 SVM is one of the most popular Supervised Learning algorithms, which is used for Classification as well as Regression problems. However, primarily, it is used for Classification problems in Machine Learning.The goal of the SVM algorithm is to create the best line or decision boundary that can segregate n-dimensional space into classes so that can be easily put the new data point in the correct category in the future. This best decision boundary is called a hyperplane. SVM chooses the extreme points/vectors that help in creating the hyperplane. These extreme cases are called as support vectors, and hence algorithm is termed as Support Vector Machine.
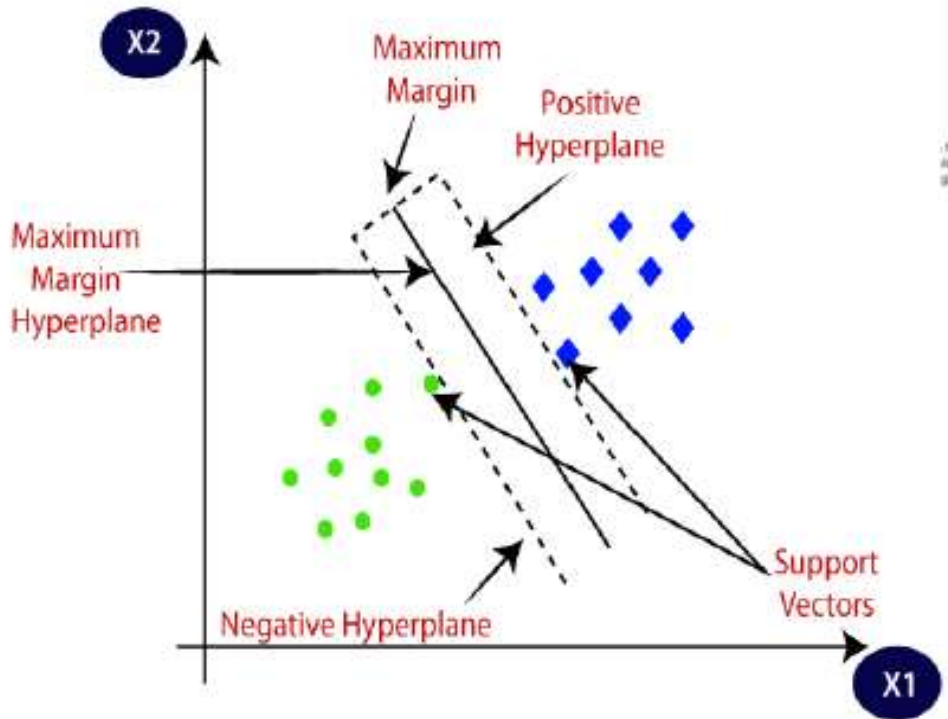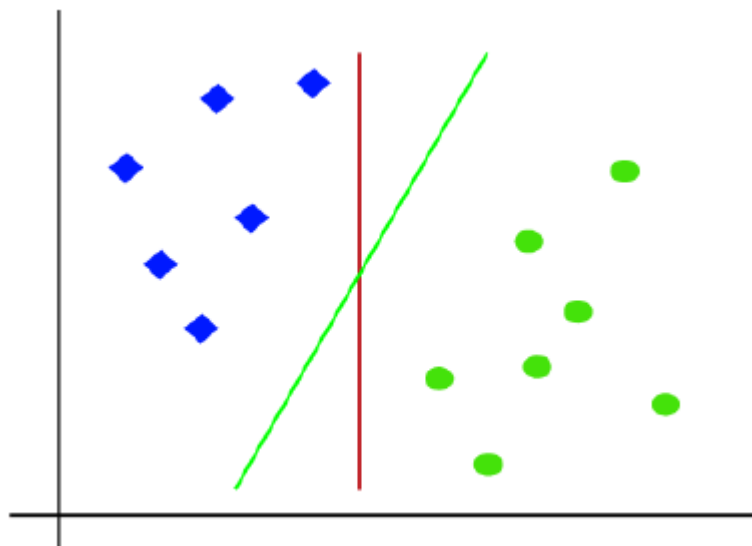
Figure2: Hyper plane

Figure3: Creating Hyper plane

CONVOLUTIONAL NEURAL NETWORK:

CNN is a Deep Learning algorithm specially designed for working with Images and videos. It takes images as inputs, extracts and learns the features of the image, and classifies them based on the learned features. CNN has various filters, and each filter extracts some information from the image such as edges, different kinds of shapes (vertical, horizontal, round), and then all of these are combined to identify the image. It is too much computation for an ANN model to train large-size images and different types of image channels. The next disadvantage is that it is unable to capture all the information from an image whereas a CNN model can capture the spatial dependencies of the image. Another reason is that ANN is sensitive to the location of the object in the image i.e if the location or place of the same object changes, it will not be able to classify properly. This algorithm is inspired by the working of a part of the human brain which is the Visual Cortex. The visual Cortex is a part of the human brain which is responsible for processing visual information from the outside world. It has various layers and each layer has its own functioning i.e each layer extracts some information from the image or any visual and at last all the information received from each layer is combined and the image/visual is interpreted or classified.

COMPONENTS OF CNN:

The CNN model works in two steps: feature extraction and Detection . Feature Extraction is a phase where various filters and layers are applied to the images to extract the information and features out of it and once it's done it is passed on to the next phase i.e Detection where they are detected based on the target variable of the problem.

A typical CNN model looks like this:

➢ Input layer
➢ Convolution layer + Activation function
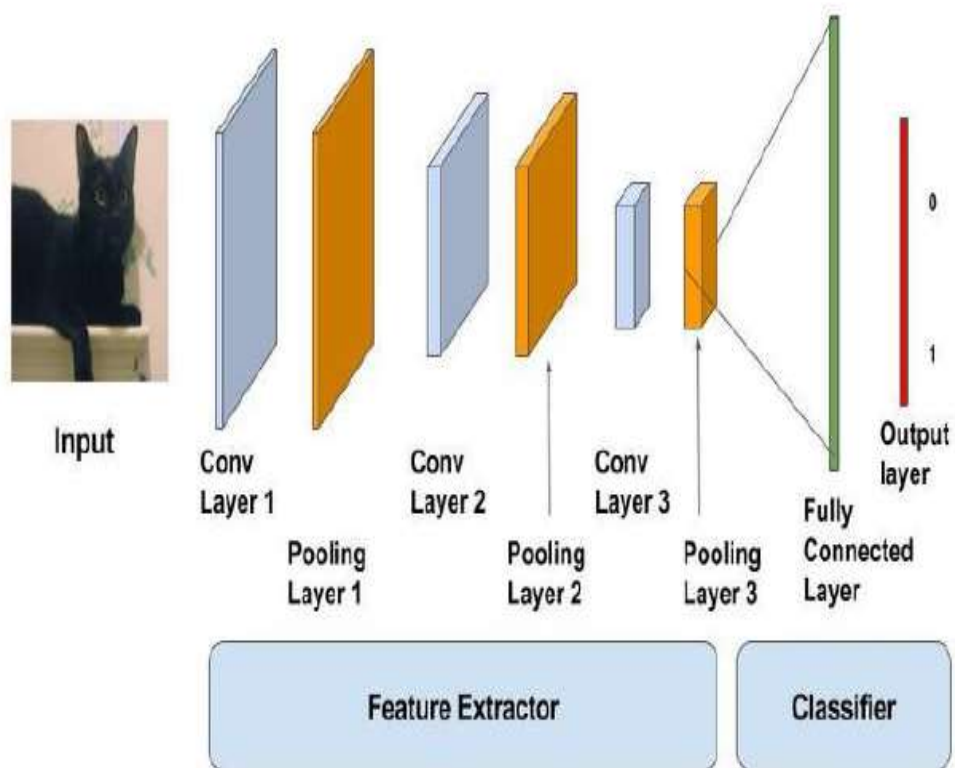➢ Pooling layer
➢ Fully Connected Layer

Figure4: CNN Model

RESULT ANALYSIS:

By applying cnn to the set of natural images ,accuracy has been obtained.

Figure5: OUTPUT 1:The natural image of rose accuracy:0.9542	Figure6: OUTPUT 2:The natural image of hibiscus accutracy:0.9432

| Figure7: OUTPUT 3:The natural image of sunflower accuracy:0.8764 | Figure8: OUTPUT 4 :The natural image of lotus accuracy :0.8976 |

Figure9: OUTPUT 5:The natural image of jasmine accuracy:0.8679

CONCLUSION:

As a conclusion, based on the result, it can be seen that developing the artificial image classification and detection can be implemented by applying the supervised machine learning techniques like support vector method and convolutional neural network. The system has accomplished several objectives like establish a complete system for classification and detecting the accuracy through the machine learning techniques. The system is able to classify the image and detect the accuracy of the image shown in the result.

Future Enhancements: The research on the hybrid CNN-SVM model is in its early stage and can be further improved. In future, the proposed model can be improved for classification and detection of natural and artificial images in different languages such as French, English, Hindi, Bengali, etc. Some optimizing techniques can also be investigated to boost the classification performance.

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