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DETECTING COUNTERFEIT BANKNOTES WITH MACHINE LEARNING

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Abstract
The one important asset of our country is Bank currency and to create discrepancies of money miscreants introduce the fake notes which resembles to original note in thefinancial market. During demonetization time it is seen that so much of fake currency is floating in market. In general, by a human being, it is very difficult to identify forged note from the genuine not instead of various parameters designed for identification as many features of forged note are similar to original one. To discriminate between fake bank currency and original note is a challenging task. So, there must be an automated system that will be available in banks or in ATM machines. To design such an automated system there is need to design an efficient algorithm which is able to predict weather the banknote is genuine or forged bank currency as fake notes are designed with high precision. In this project six supervised machine learning algorithms are applied on dataset available on UCI machine learning repository for detection of Bank currency authentication

Introduction:

Financial activities are carrying out in every second by many persons in which one most important asset of our country is Banknotes. Fake notes are introduced in the market to create discrepancies in the financial market, even they resemble to the original note. Basically they are illegally created to complete various task. In 1990 forgery issue is not much of concern but as in late 19th century forgery has been increasing drastically. In 20th century technology is increasing very vastly that will help the frauds to generate fake note whose resemblance is like genuine not and it is very difficult to discriminate them. This will lead to financial market to its lowest level. To stop this and to conduct smooth transaction circulation forged bank currency must be conserved. As a human being it is very difficult to identify between genuine and forged bank currency. Government have designed banknote with some features by which we can identify genuine. But frauds are creating fake note with almost same features with nice accuracy that make it very difficult to identify genuine note. So, now a days it

is required that bank or ATM machines must have some system that can identify the forged note from the genuine note. To determine the legitimacy of the banknote artificial intelligence and Machine learning(ML) can play a vital role to design such a system that ca identify forged note from the genuine bank currency. Now a days, supervised machine learning (SML) approaches for classification problem is widely used. For medical disease its shows even promising results. Few authors have only applied SML algorithms on bank currency authentication. To identify weather a note is genuine or fake we have to develop an automation system. Initially, the input is an image of note and from different image processing techniques we can extract the features of note. Further these images are given as an input to the SML algorithms to predict whether note is original or fake. In review we can see that not much of work is done on this side.

Literature Survey:

2.1.TusharAgasti,GajananBurand,PratikWade and P. Chitra,-Fake currency detection using image processing

Fake Currency has always been an issue which has created a lot of problems in the market. The increasing technological advancements have made the possibility for creating more counterfeit currency which are circulated in the market which reduces the overall economy of the country. There are machines present at banks and other commercial areas to check the authenticity of the currencies. But a common man does not have access to such systems and hence a need for a software to detect fake currency arises, which can be used by common people. This proposed system uses Image Processing to detect whether the currency is genuine or counterfeit. The system is designed completely using Python programming language. It consists of the steps such as gray scale conversion, edge detection, segmentation, etc. which are performed using suitable methods.

EshitaPilania,BhavikaArora,Recognition of Fake Currency Based on Security Thread Feature of Currency

In the last few years a great technological advances in color printing, duplicating and scanning, counterfeiting problems have become more serious. In past only authorized printing house has the ability to make currency paper, but now a days it is possible for anyone to print fake bank note with the help of modern technology such as computer, laser printer. Fake notes are burning questions in almost every country. Counterfeit notes are a problem of almost every country but India has been hit really hard and has become a very acute problem. Fake Indian currency of 100, 500 and 1000 rupees seems to have flooded the whole system and there is no proper way to deal with them for a common person. There is a need to design a system that is helpful in recognition of paper currency notes with

fast speed and in less time. Our system describes an approach for verification of Indian and other countries currency banknotes. The currency will be verified by using image processing techniques.

2.3 Nayana Susan Jose, SherminSiby, JubyMathew,MrudulaDas,Android- Based Currency Recognition System for Blind,

In recent years, a lot of illegal counterfeiting rings manufacture and sell fake coins and at the same time fake note currency is printed as well which have caused great loss and damage to the society. Thus it is imperative to be able to detect fake currency We propose a new approach to detect fake Indian notes using their images. Currency image is represented in the dissimilarity space, which is a vector space constructed by comparing the image with a set of prototypes. Each dimension measures the dissimilarity between the image under consideration and a prototype. In order to obtain the dissimilarity between two images, the local key points on each image are detected and described. Based on the characteristics of the currency, the matched key points between the two images can be identified in an efficient manner. A post processing procedure is further proposed to remove mismatched key points. Due to the limited number of fake currency in real life, SVM is conducted for fake currency detection, so only genuine currency are needed to train the classifier.

2.4 Komal Vora, Ami Shah, Jay Mehta, A Review Paper on Currency Recognition System,

In this paper, an algorithm based on the frequency domain feature extraction method is discussed for the detection of currency. This method efficiently utilizes the local spatial features in a currency image to recognize it. The entire system is pre-processed for the optimal and efficient implementation of two dimensional discrete wavelet transform (2D DWT) which is used to develop a currency recognition system. A set of coefficient statistical moments are then extracted from the approximate efficient matrix. The extracted features can be used for recognition, classification and retrieval of currency notes. The classification result will facilitate the recognition of fake currency mainly using serial number extraction by implementing OCR. It is found that the proposed method gives superior results.

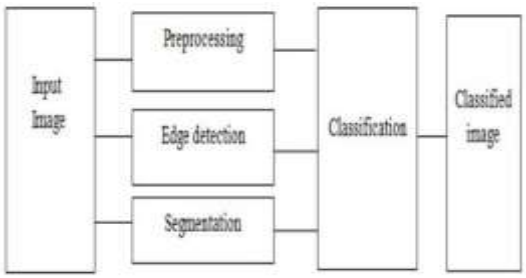
PROPOSED SYSTEM:

In proposed systems, we are using standard machine learning models like logistic regression, SVM, Navie bayes classification techniques. By company the accuracy of each model logistic regression gives better accuracy than other models. Logistic Regression is binary classification model. It follows probabilistic approach to classify currency note is false (or) original. We have visualized the dataset taken from UCI ML repository using different types of plotting, pre-processed data.

Architecture:

YOLOv3 (You Only Look Once, Version 3) is a real-time object detection algorithm that identifies specific objects in videos, live feeds, or images. YOLO uses features learned by a deep convolutional neural network to detect an object. Versions 1-3 of YOLO were created by Joseph Redmon and Ali Farhadi. The first version of YOLO was created in 2016, and version 3, which is discussed extensively in this article, was made two years later in 2018. YOLOv3 is an improved version of YOLO and YOLOv2. YOLO is implemented using the Kera's or OpenCV deep learning libraries.

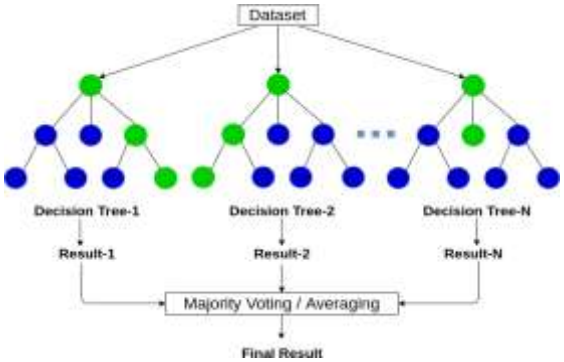
System architecture



ALGORITHM DESCRIPTION

Random forest

- Random Forest is a trademark term for an ensemble of decision trees.
- In Random Forest, we've collection of decision trees (so known as "Forest").
- Toclassify a new object based on attributes, each tree gives a classification and we say the tree "votes" for that class.
- The forest chooses the classification having the most votes (over all the trees in the forest).



Logistic Regression

- It is a classification not a regression algorithm.
- It is used to estimate discrete values based on given set of independent variable(s).
- it predicts the probability of occurrence of an event by fitting data to a logit function. Hence, it is also known as logit regression.

Module Descriptions:

Dataset: The dataset used is Indian currency. The dataset contains various Indian currencies, euro's, dollars.

Upload image: In this module user can upload currency image, based on input image it will show type of currency note and percentage of note.

Classification: Classification represents the matter of distinctive to that of a group of classes a new observation belongs, on the idea of a training set of data having observations whose category membership is known.

Test & Train Set: A training dataset could be a dataset of eg's used for learning, that is to fit the parameters for eg, a classifier. A test dataset could be a dataset that is independent of the training dataset, but follows a similar likelihood distribution as the training dataset. If a model fit to the training dataset conjointly fits the test dataset well, a lowest overfitting takes place.

Prediction: We compare the given input image with trained data (Yolov3) in CNN algorithm by using Random forest classifier to detect the fake percentage of currency.

Evaluation of All Models

Conclusion

Hand Gesture recognition and voice conversion for dumb and deaf person was successfully executed using image processing. The method takes image as input and gives text and speech as an output. Implementation of this system gives up to 90% accuracy and works successfully in most of the test cases.

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