



“VeriCash: Machine Learning Based Currency Verification”

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Abstract: Many countries are affected by the matter of fake notes. Indian is one among them. With the improved technology, anyone can print fake notes. These notes are produced without legal sanction of the state and continues production of such kinds of notes can degrade countries economy. When such counterfeited notes are produced and circulated, it becomes impossible for ordinary citizens to distinguish whether the money is real or fake because they differentiate according to physical appearance. The biggest challenge for many countries like India is the detection of fake currency. Even if banks and other big organizations have automatic machines designed to identify counterfeit currency notes, ordinary people can hardly differentiate between them. Nowadays recognition of fake currency has become challenging issue for many researchers. The identification involves many steps like edge detection, feature extraction, image segmentation, image acquisition, grayscale conversion, and comparison of images. This paper provides some related works of paper-currency recognition and has explained the spread of various currency recognition systems. Choosing the right feature would improve overall system performance. The goal of this work is to review previous papers and literature, identify the benefits and disadvantages of every method.

Keywords –Image Processing, Feature Extaction, CNN, Deep Learning.

I. INTRODUCTION

In this paper to provide a comprehensive overview of the use of machine learning and RFID/NFC technology for counterfeit currency detection. We believe that our proposed system has the potential to significantly enhance the security and reliability of currency notes, and provide a more effective means of detecting fake currency[1]. In this paper use of OCR, face recognition, and Hough features for fake banknote detection. We believe that our proposed hybrid model has the potential to significantly enhance the security and reliability of banknotes, and provide a more effective means of detecting counterfeit banknotes[2]. Author Have Represented ORB keypoint detection is utilized to identify and extract the distinctive features of Bangladeshi currency notes. ORB analysis is used to compare the key points of the input image with a database of key points for each note This comparison enables the system to accurately identify the denomination of the currency note[3]. This paper proposed deep convolutional neural network approach is an effective tool for counterfeit currency detection. The approach utilizes deep learning techniques and edge detection to accurately and efficiently detect counterfeit currency based on visual features extracted from images[4]. Author have represented the proposed machine learning approach utilizing KNN algorithm and SVC is an effective tool for detecting counterfeit currency. The system utilizes a dataset of high-quality images of both genuine and counterfeit currency, captured using a camera, and combines image processing and machine learning techniques to achieve high accuracy in counterfeit detection[5]. In this paper the system utilizing SVM algorithm for the detection of fake bank currency is an effective tool for financial institutions, businesses, and individuals. The system analyzes the visual features of banknotes and accurately classifies them as either genuine or counterfeit[6]. The image processing technique utilizing segmentation, edge detection, feature extraction, and grayscale conversion is an efficient tool for the authentication of Indian paper currency. The technique can accurately identify the authenticity of Indian paper currency by analyzing its texture, design, and other security features[7]. Author have Represented CNN-based counterfeit Indian currency recognition system using a Generic Adversarial Network (GAN) is an effective tool for financial institutions, businesses, and individuals to identify and prevent counterfeit Indian currency. The system utilizes a CNN-based discriminator and currency[8].

II. LITERATURE SURVEY

Paper Name : Effective Identification of Black Money and Fake Currency using NFC, IOT and Android

Authors : J.Refonaa , Ginnu George Sebastian, Dilip Ramanan

Description In India eradicating black money has become a major issue.though government has taken several steps to readicate black money but reports on government policy shows that steps taken by govenmant was not very successful. But with the advent new technologies it is possible to completely remove black money from market.This paper describes a smart way using modern advanced technology to eradicate black money and fake currency in a simple and efficient manner. This can be achieved by using one of the most popular technology like NFCs or high frequency RFID tag. These tags can be integrated inside the currency and each paper currency can be tracked and accounted at all time and place. This paper puts forward a cost efficient solution to long time problem of black money.

Paper Name : Evaluation of Machine Learning Algorithms for the Detection of Fake Bank Currency

Authors : Anju Yadav, Vivek Kumar Verma , Vipin Pal

Description : 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 the financial 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 paper six supervised machine learning algorithms are applied on dataset available on UCI machine learning repository for detection of Bank currency authentication. To implement this we have applied Support Vector machine, Random Forest, Logistic Regression, Naïve Bayes, Decision Tree, K- Nearest Neighbor by considering three train test ratio 80:20, 70:30 and 60:40 and measured their performance on the basis various quantitative analysis parameter like Precision, Accuracy, Recall, MCC, F1-Score and others. And some of SML algorithm are giving 100 per cent accuracy for particular train test ratio

Paper Name : Counterfeit Currency Detection using Deep Convolutional Neural Network

Authors : Counterfeit Currency Detection using Deep Convolutional Neural Network

Description : Counterfeit Currency Detection using Deep Convolutional Neural Network
Paper Name : Credit Card Fraud Detection Using RUS and MRN Algorithm • **Authors :** Anusorn Charleonnann

Description : Counterfeit money refers to fake or imitation currency that is produced with an idea to deceive. According to recent reports, demonetization led to all-time high inflow of fake notes into banks, resulting in a spike in suspicious transactions. The existing works to detect a counterfeit note are mostly based on image processing techniques. This paper deals with Deep Learning in which a convolution neural network(CNN) model is built with a motive to identify a counterfeit note on handy devices like smart phones, tablets. The model built was trained and tested on a self-generated dataset. Images are acquired using the smart phone camera and fed to the CNN network. The results obtained are encouraging and can be improvised by further research and improvements in the architecture of Deep CNN model. The testing accuracy obtained is about 85.6per cent, training and the validation accuracy were 98.57per cent and 96.55per cent respectively

Paper Name : Efficient Image Processing Technique for Authentication of Indian Paper Currency

Author name: Rencita Maria Colaco, Rieona Fernandes, Reenaz, Sowmya S

Description : Now a days due to the development in color printing technology the rate of counterfeit notes production and distribution is increasing. This is a massive problem, faced by almost all the countries. It affects the economy, sine it compromises the security of the real economy. Such counterfeit currencies are used to fuel nefarious motives, usually involving terrorist activities. According to the research, developing countries like India have been impacted by this very negatively. Even after the steps taken in 2016 to remove the counterfeits, by executing the demonetization of 500 and 1000 rupees bank notes in India the counterfeits of the new notes have begun circulating. This is due to the highly advanced technology adopted by the counterfeiters which makes the tracking of these counterfeit notes hard. This has become a very critical issue and the negative impact due to the counterfeit currency keeps rising. The only one solution for this problem for a common man is to detect the fake currency, by using the fake currency detector machine. These machines are used in banks and large scale business, but for

a small business or for a common man these machines are not affordable. This paper gives the complete methodology of fake note detector machine, which is affordable even for a common man. By implementing the applications of image processing techniques we can find out whether the currency notes are fake or not. Image processing technique consists of a number of operations that can be performed on an image, some of which include image segmentation, edge detection, gray scale conversion etc. The proposed system will have advantages like simplicity, reliability and costs less.

III. PROJECT REQUIREMENT

Software Interfaces:

1. Operating System: Windows 10
2. IDE: Android Visual Studio.
3. Programming Language : Java.

IV. EXTERNAL INTERFACE REQUIREMENT AND FIGURES

User Interface

Application Based Fake Currency Detection App.

Hardware Interface

RAM : 8 GB

As we are using Machine Learning Algorithm and Various High Level Libraries

Laptop

RAM minimum required is 8 GB.

Hard Disk : 40 GB

Data Set of CT Scan images is to be used hence minimum 40 GB Hard Disk memory

Processor : Intel i5 Processor

Android Visual Studio IDE that Integrated Development Environment is to be used and data loading should be fast hence Fast Processor is required

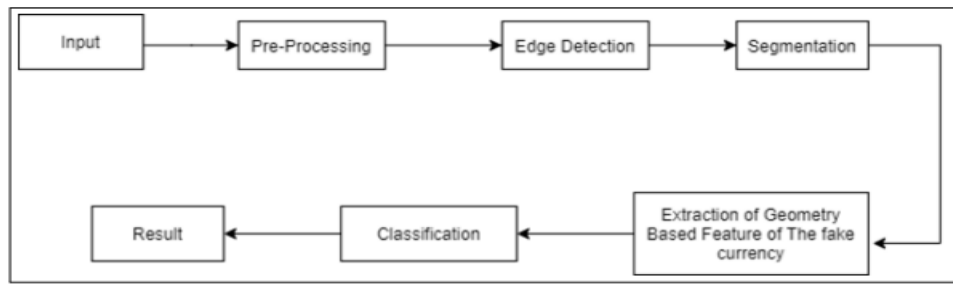
IDE : Android Visual Studio Best Integrated Development Environment as it gives possible suggestions at the time of typing code snippets that makes typing feasible and fast.

Coding Language : Java

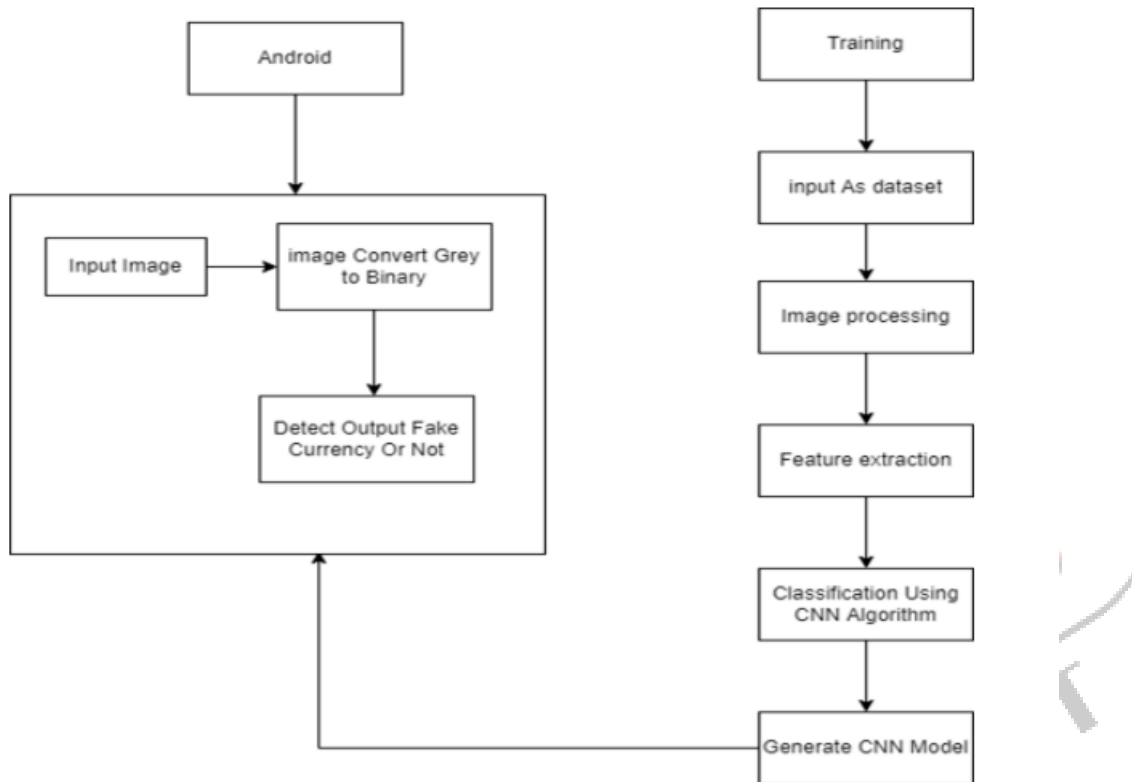
Highly specified Programming Language for Machine Learning because of availability of High Performance Libraries.

Operating System : Windows 10

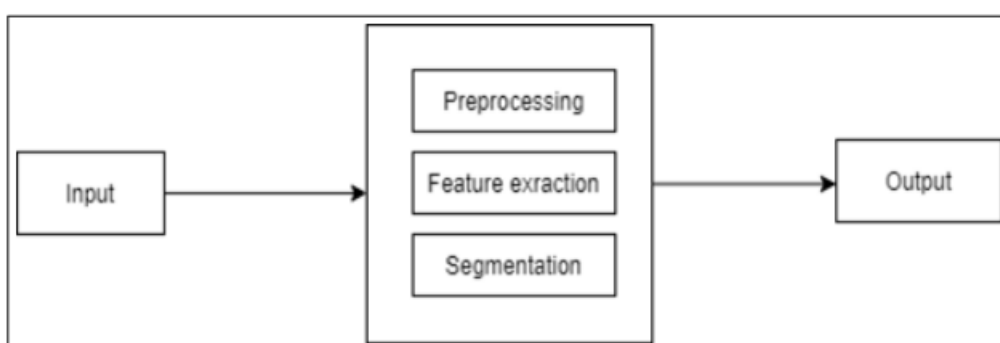
Figures



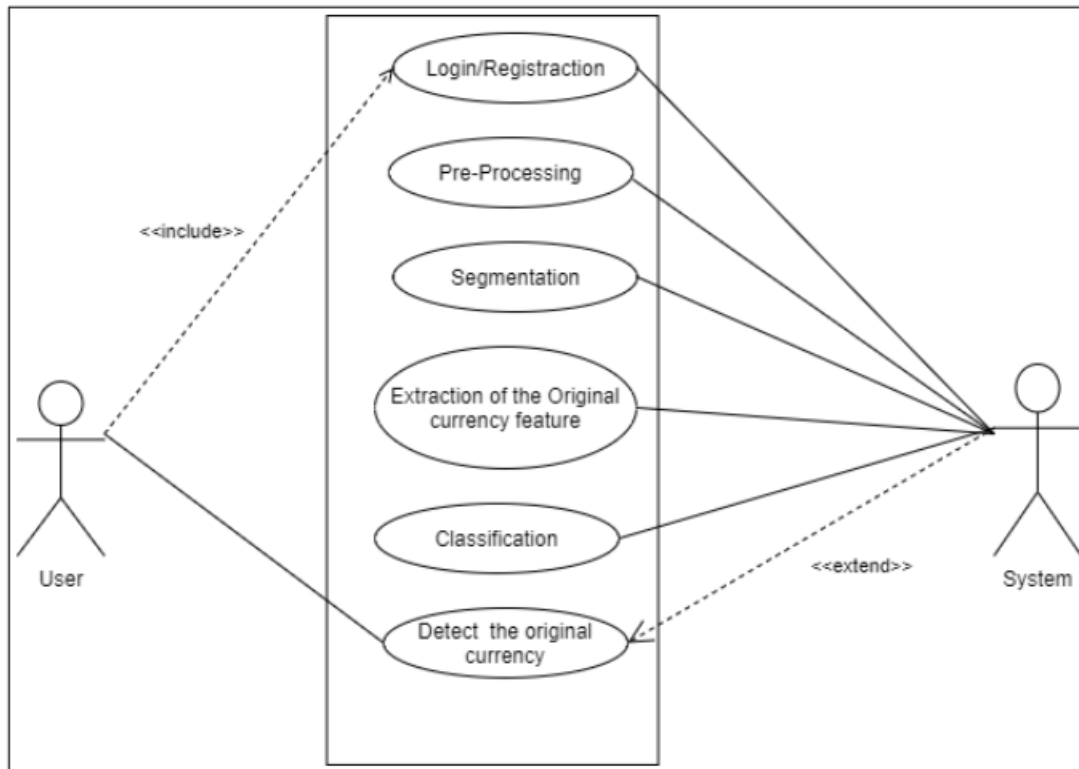
System Architecture



DFD Diagram



Use Case Diagram



V. CONCLUSION AND FUTURE WORK

This project of creating an android application for fake currency detection using machine learning is a practical and innovative solution to combat financial fraud. By integrating machine learning algorithm into mobile application, users can easily and quickly determine the authenticity of currency by scanning an image. This Android application is user-friendly, with a simple and intuitive interface that allows users to easily scan currency images and receive an immediate response on their authenticity. This application also secure, with appropriate measures to protect user data and prevent fraudulent activity. Overall, the development of an Android application for fake currency detection using machine learning has the potential to provide a convenient and reliable solution for individuals and businesses to identify counterfeit currency and prevent financial losses.

In the future, we can create a fake currency detection software with live camera video that will be able to recognise whether a specific note is real or phoney.

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