



FAKE CURRENCY DETECTION WITH MACHINE LEARNING ALGORITHM AND IMAGE PROCESSING

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ABSTRACT

The topic of determining if a particular sample of cash is counterfeit is addressed in this article. The indicated colours, width, and serial numbers are only a few of the classic techniques and approaches that may be used to identify counterfeit cash. Image processing has led to the proposal of several machine learning algorithms that provide 99.9 percent accuracy for the counterfeit cash in this era of improved computer science and high computational approaches. Colour, form, paper width, and picture filtering on the note are entities that may be detected and recognised using algorithms. This study presents a technique for detecting counterfeit money by using K-Nearest Neighbours in conjunction with image processing. The computer vision job is well-suited to KNN because of its excellent accuracy for tiny data sets. To ensure accurate data and information about the entities and properties associated with money, a banknote authentication dataset has been developed using advanced computational and mathematical techniques. In order to achieve the desired outcome with precision, data processing and extraction make use of machine learning algorithms in conjunction with image processing.

INTRODUCTION

In this century where the majority of people are aware of technology and how it works, many of them indulge in unlawful activities. One of such activities is the production of fake currency which is practiced to deceive people. In this proposal, it is focused on this illegitimate practice and try

to bring forward a solution for it. According to a survey, the maximum number of cases of counterfeit in India still relate to fake currency, There were 132 cases of counterfeit currency in 2018, which shot up 37 percent to 181 in 2019[7]. In Order to stop this fraudulent activity, a system is proposed that can be integrated into electronic devices that will detect the fake note as soon as it is scanned by the device. Some of the techniques which are considered are used previously and include KNN which will be utilized in the proposed system with enhanced accuracy. K-nearest neighbors (KNN) is an algorithm that stores all the available data and classifies a new data point based on the similarity. This means when new data appears then it can be easily classified into a good suite category by using the KNN algorithm [6]. Usually, the Euclidean distance is used as the distance metric. Then, it assigns the point to the class among its k nearest neighbors (where k is an integer).

LITERATURE REVIEW

“Accelerating business growth with big data and artificial intelligence,” Artificial Intelligence (AI) is considered to be the fourth industrial revolution. Artificial Intelligence with the help of big data has transformed all industries around the world Artificial intelligence refers to the simulation of human or animal intelligence in computational systems so that they are programmed to think like Intelligent beings and mimic the actions of intelligent entities. Computational systems which have programmed intelligence can solve different real-world problems far more accurately and efficiently than computational systems that are deterministic and hardcoded. Since many problems in business and business analytics cannot be solved by deterministic systems, AI plays a major role in tackling problems in the business world Machine learning and deep learning which are subsets of the field of AI is widely used to solve and optimize many problems in business such as marketing, credit card fraud detection, algorithmic trading, customer service, portfolio management, product recommendation according to the needs of customers, insurance underwriting. AI and big data have revolutionized the business world and this paper discusses some AI and big data technologies that are currently being used to accelerate business growth.

“Oversampling based Classifiers for Categorization of Radar Returns from the Ionosphere,” The process of manually checking, validating, and excluding data in an ionospheric verylow-frequency (VLF) analysis during extreme events is a labor-intensive and time-consuming task. However, this task can be automated through the utilization of machine learning (ML) classification techniques. This research paper employed the Random Forest (RF) classification algorithm to automatically classify the impact of solar flares on ionospheric VLF data and erroneous data points, such as instrumentation errors and noisy data. The data used for analysis were collected during September and October 2011, encompassing solar flare classes ranging from C2.5 to X2.1. The F1-

score values obtained from the test dataset displayed values of 0.848; meanwhile, a more detailed analysis revealed that, due to the imbalanced distribution of the target class, the per-class F1-score indicated higher values for the normal data point class (0.69–0.97) compared to those of the anomalous data point class (0.31 to 0.71). Instances of successful and inadequate categorization were analyzed and presented visually. This research investigated the potential application of ML techniques in the automated identification and classification of erroneous VLF amplitude data points; however, the findings of this research hold promise for the detection of short-term ionospheric responses to, e.g., gamma ray bursts (GRBs), or in the analysis of pre-earthquake ionospheric anomalies.

“Automatic Indian New Fake Currency Detection Technique,” In India, 'currency' is the means of Transaction so there is more value for currency in our social and economic development. Here, currency exists in the form of coins, banknotes and electronic data. Fake money or counterfeit notes is the dangerous or acute problem in front of whole world, and India is also a part of this fake currency. Modernization in the financial system is a milestone in protecting the economic development and now a days Indian government has become conscious about this so demonetization of Rs 1000 and Rs 500 notes is the latest example of it. But again we have Rs 2000 as a new currency in market. so as the highest value note there is a chance that corrupt people will try to make it as a counterfeit. So main objective of this paper is to study different key features of new genuine currency and use such techniques to detect and verify new currency circulated by Reserve Bank Of India. There are Different techniques which are used to distinguish between counterfeit notes and genuine one. By using different components of Digital Image processing such as image processing, image segmentation, characteristics extraction, comparing images etc. we can extract the features of genuine notes. It is a very challenging task for detecting fake currency.

“Fake currency detection using image processing, The advancement of color printing technology has increased the rate of fake currency note printing and duplicating the notes on a very large scale. Few years back, the printing could be done in a print house, but now anyone can print a currency note with maximum accuracy using a simple laser printer. As a result the issue of fake notes instead of the genuine ones has been increased very largely. India has been unfortunately cursed with the problems like corruption and black money .And counterfeit of currency notes is also a big problem to it. This leads to design of a system that detects the fake currency note in a less time and in a more efficient manner. The proposed system gives an approach to verify the Indian currency notes. Verification of currency note is done by the concepts of image processing. This article describes extraction of various features of Indian currency notes. MATLAB software is used to extract the features of the note. The

proposed system has got advantages like simplicity and high performance speed. The result will predict whether the currency note is fake or not.

“A Review on Fake Currency Detection using Image Processing,” Fake Indian Currency Note (FICN) is a term used by officials and media to refer to counterfeit currency notes circulated in the Indian economy. However several central and state agencies are working together and the Ministry of Home Affairs has constituted the Fake Indian Currency Notes Co-ordination Centre (FCORD) to curb this menace. We propose a new approach to detect fake Indian notes using mobile camera and Image processing. We will convert Indian currency into more the 150+ different currencies values to help tourist all over the world. In this project we match features between two images using Brute-Force Matching with ORB Descriptors. After applying BFMatcher with ORB we get Matcher Object and by using knnMatch we get the list of best k matches depending upon the value of K. currency duplication also known as counterfeit currency is a vulnerable threat on economy. Although fake currency is being printed with precision, the Crime Investigation Department (CID) says that they can be detected with some effort. Currency printed by local racketeers can be detected easily as they use the photographic method, hand engraved blocks, lithographic processes and computer colour scanning. In counterfeit notes, the watermark is made by using opaque ink, painting with white solution, stamping with a dye engraved with the picture of Mahatma Gandhi. Tourists are the most vulnerable people to fake currencies, because they don't know the proper and precise way of finding the difference between fake and real currencies note. So automatic identification of currencies using image processing technique will be helpful to these peoples. It is also be useful at other workplaces. . The system designed to check the Indian currency note with denominations 10, 20, 50, 100, 200, 500 and 2000. It will pre-process the digital pictures and organise the prepared arrangement of information and it will distinguish in monetary forms. This paper proposes a convenient and cheapest method for identifying Indian currencies. At the end of the process user can know whether the currency note is fake or real and it's equivalent currency value into more than 150 countries

“Fake Currency Detection,” Great technological advancement in printing and scanning industry made counterfeiting problem to grow more vigorously. As a result, counterfeit currency affects the economy and reduces the value of original money. Thus it is most needed to detect the fake currency. Most of the former methods are based on hardware and image processing techniques. Finding counterfeit currencies with these methods is less efficient and time consuming. To overcome the above problem, we have proposed the detection of counterfeit currency using a deep convolution neural network. Our work identifies the fake currency by examining the currency images. The transfer learned convolutional neural network is trained with two thousand currency note data sets to learn the feature

map of the currencies. Once the feature map is learnt the network is ready for identifying the fake currency in real time. The proposed approach efficiently identifies the forgery currencies of 2000 with less time consumption.

“Automatic Cash Deposit Machine With Currency Detection Using Fluorescent And UV Light,” Authentication is an important part of any secure operation and concept is applicable for trustworthy Automatic Teller Machine which ensures that, only individuals with corroborated identities can log on to the system or access system resources. In this paper, I survey the literature to describe the ways that ATMs have influenced these aspects of security, and conclude with suggestions for further research. ATM system follows four digit PIN authentication process for user validation. Many researchers suggest the additional authentication process such as biometric, thumb and face validation. Now a days we are aware of the ATM which make the task of money withdraw more flexible. In addition to this banks are introducing Cash deposit machine (CDM) that makes easy to deposit cash to user account. As day by day this process is becoming easier, hackers started their job to disturb the ATM process. This paper describes basic ATM attacks.

“A Review on Fake currency detection using feature extraction,” Fake currency identification is a serious problem all around the world, affecting the economies of almost every country, including the United States. India. The prospective agreements are to make use of either the currency's synthetic qualities or Make use of its physical look. The procedure The information presented in this study is dependent on physical conditions. The appearance of the Indian currency It has been received that calculations are being prepared. remove the highlights, such as security string, intaglio printing (RBI logo) and distinctive characteristics proof imprints, which have come to be accepted as Indian currency security highlights To accomplish this, system that is becoming increasingly strong and precise, the All three highlights have received a conclusive score. Intertwined to distinguish between authentic and fake monetary benchmarks The finding of counterfeit money The suggested system has an accuracy of one hundred percent. Another utilised parameter The mean square blunder, which is around 1%, is used to quantify the presentation of the proposed system. It may be accepted by ordinary persons as well, who are frequently faced with the problem of distinguishing between genuine and counterfeit monetary standards.

CONCLUSION AND FUTURE WORK

After running the algorithms and looking at the data, we can say that all three of them did a fantastic job of identifying fake and real notes in the dataset. As we saw in the last part, KNN, however, fared better than the other two. With just two false positives, it achieved a 99.9 percent accuracy rate in detecting counterfeit currency. The data set was little, thus this finding is constrained. Its present

performance may not hold up in a real-world setting due to its small sample size (1372 samples). Using this as a foundation, we suggest compiling a much bigger dataset with realistic images of actual and counterfeit banknotes. The resulting model will be much more accurate thanks to this. In addition, highly accurate deep learning techniques for image processing, such as Convolutional Neural Networks (CNNs), may be used with a big data collection. In addition, the project may skip the wavelet processing and go straight to picture analysis using CNN. The system may become more handy and easy to use as a result of this. In addition, with the aid of CNN, consumers will be able to instantly click on an image and have it validated, which is advantageous for financial institutions. Therefore, the aforementioned steps may be accomplished to enhance the project's strength and professionalism [10].

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