**Identification of Fake Indian Currency using Convolutional Neural Network**

**ABSTRACT:**

The progression of shading printing innovation has expanded the rate of Fake currency copying notes on a large scale. Albeit electronic monetary exchanges are turning out to be more popular and the utilization of paper cash has been diminishing as of late, banknotes still remain in distribution attributable to their dependability and straight forwardness in use. Few years ago, the printing should be possible in a printing-houses, yet presently anybody can print a money paper with most extreme exactness utilizing a straightforward laser printer. As an outcome, the issue of duplicate currency rather than the authentic ones has been increases generally. India had reviled the problems like defilement and dark cash and fake of money notes is likewise a big issue to it. To handle this problem, a deep learning-based framework is proposed to identify the fake Indian currency. The spyder tool has been used to identify the fake currency. The outcome will classify whether the Indian currency note is Real or Fake.

**INTRODUCTION**

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1.Introduction :

Counterfeit currency is a major issue around the world, it influencing the economy of various countries. Therefore, fake currency is not approved by the government. In India Reserve Bank of India is only give the approval to banks for generating the currency. In India many of the people have been working on daily basis, hence workers, farmers and uneducated people facing the problems with the counterfeit currency. They are unable to identify the fake currency. In order to overcome these problems researches proposed the various algorithms with development of image processing methods. The image processing algorithms such as recognition, identification of denomination, counterfeit detection and currency classification. These are used in automatic counting machines, vending machines and automatic transactions. But counterfeit detection and classification is challenging issue in many applications.

The conventional methods based on colour, size, texture and shape identify the fake currency. Edge detection, Watermarking, feature extraction, segmentation methods have been used to detect the fake currency. The major steps involved in the process of identification and recognition of fake currency is creating database of particular country, converting RGB to grayscale image, segmentation is used to segment the logo, currency value, number and signature of the governor. In the conventional methods feature extraction is major issue to detect the fake currency and these are also providing the less accuracy. To overcome this problem deep learning with convolutional neural networks (CNN) came into the picture. In this paper four predefined networks i.e Alexnet, Resnet50, Darknet53 and Googlenet have been used to detect the fake Indian currency. In order to detect fake Indian currency large database with different value currency under various angles and illumination conditions required.

**SCOPE OF THE PROJECT**

In this paper different predefined convolutional neural networks have been used to extract the features of real and fake Indian currency with the best detection confidence.

**OBJECTIVE**

In this paper, the automatic system is designed for identification of Indian currency notes and check whether it is fake or original. The training set and testing set features are extracted using predefined convolutional neural networks (CNN). In this paper four networks i.e Alexnet, Resnet, Googlenet, Darknet53 have been used for extracting the features. After extracting the features using CNN classification is carried out using Support Vector Machine (SVM), whether the test image is real currency or fake currency.

**EXISTING SYSTEM:**

* In today's world scenario, paper currency is economical in the sense that its face value is greater than intrinsic value. It is also more elastic and stable, paper currency can be counted quickly, it is easy to move and safe to store. These all are the main reasons because of which counterfeit currency recognition is crucial. Fake currency cannot be identified by human vision and due to this recognition of forged currency notes has become crucial problem because counterfeiters are using new and improved methods. The methods currently existing to determine whether the notes are real cannot be accessed by the common people and are also complex hardware based methods.
* There are no applications or devices available through which fake currencies can be detected and identified easily by common people. The main purpose of the project is to identify Indian paper currency with a new methodical approach using Generative Adversarial Networks(GAN). In this system, the Indian currency note features would be primarily extracted using Convolutional Neural Networks (CNNs).

**EXISTINGSYSTEM DISADVANTAGES:**

* They fail to encode the position and orientation of objects.
* It tends to be much slower because of operations like maxpool.

**LITERATURE SURVEY**

**Title:** A survey on banknote recognition methods by various sensors.

**Author:** J. Lee, H. Hong, K. Kim, and K. Park,

**Year:** 2017

**Description:**

Despite a decrease in the use of currency due to the recent growth in the use of electronic financial transactions, real money transactions remain very important in the global market. While performing transactions with real money, touching and counting notes by hand, is still a common practice in daily life, various types of automated machines, such as ATMs and banknote counters, are essential for large-scale and safe transactions. This paper presents studies that have been conducted in four major areas of research (banknote recognition, counterfeit banknote detection, serial number recognition, and fitness classification) in the accurate banknote recognition field by various sensors in such automated machines, and describes the advantages and drawbacks of the methods presented in those studies. While to a limited extent some surveys have been presented in previous studies in the areas of banknote recognition or counterfeit banknote recognition, this paper is the first of its kind to review all four areas. Techniques used in each of the four areas recognize banknote information (denomination, serial number, authenticity, and physical condition) based on image or sensor data, and are actually applied to banknote processing machines across the world. This study also describes the technological challenges faced by such banknote recognition techniques and presents future directions of research to overcome them.

**Title:** Recognition system for euro and Mexican banknotes based on deep learning with real scene

images

**Author:** D. Galeana Pérez and E. B. Corrochano,

**Year:** 2018

**Description:** This article presents a robust and efficient system for euro and Mexican banknote recognition. A high banknote recognition and classification rate was achieved using neural networks and deep learning with real scene images taken with both sunlight and artificial light. Without extracting characteristics by hand, the convolutional neural networks was fed with raw images. Analysis and experiments were carried out on banknotes based on key features, such as; watermarks, portraits on the bills, bill value written in words and numbers, and the complete banknotes. It was concluded that both the color information and some regions of the banknotes, as well as the banknote denomination written in words and numbers and the complete banknote, is the appropriate information to achieve a high rate of banknote classification and recognition. The experimental results show that the proposed approach is promising with quite remarkable results; it performs an efficient and robust classification using real scene images taken with both sunlight and artificial light and is invariant to banknote rotation and translation. A high recognition rate was achieved for Mexican banknotes and for euros. At present, the results contained herein are an improvement over those reported in the state of the art.

**Title:** Automated detecting fake currency system

**Author:** B. Sai Prasanthi, D. Rajesh Setty,

**Year:** 2015

**Description:** 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.

**Title:** A Survey on Fake Indian Paper Currency Identification System

**Author:** P. Julia Grace, A. Sheema

**Year:** 2016

**Description:** Counterfeit currency detection is a major issue around the world, influencing the economy of pretty much every nation including India. The utilization of fake money is one of the significant issues looked all through the world now days. The forgers are getting more earnestly to find as a result of their utilization of profoundly trend setting innovation. One of the best techniques to quit forging can be the utilization of fake location programming that is effectively accessible and is proficient.

**Title:** Forensic investigation of counterfeit coins

**Author:** M. Hida, T. Mitsui, and Y. Minami,

**Year:** 1997

**Description:** Counterfeit coins were investigated using X-ray fluorescence (XRF) for a quantitative analysis without any pretreatment and by a metallic microscope for observation of their microstructures. Copper, nickel, iron, zinc, manganese, chromium, cobalt and lead were detected by XRF. Cluster analysis was applied to classify the counterfeit coins using their major six elements (Cu, Ni, Fe, Zn, Mn and Cr). The analytical results showed that the eighty-nine counterfeit coins could be divided into three groups, which were dependent upon the content of iron, chromium and zinc. Many bent micro-structures were observed at the letter and figure position and at the edge using a metal microscope after chemical etching.

**PROPOSED SYSTEM**

* The conventional methods based on colour, size, texture and shape identify the fake currency. Edge detection, Watermarking, feature extraction, segmentation methods have been used to detect the fake currency. The major steps involved in the process of identification and recognition of fake currency is creating database of particular country, converting RGB to grayscale image, segmentation is used to segment the logo, currency value, number and signature of the governor. In the conventional methods feature extraction is major issue to detect the fake currency and these are also providing the less accuracy. To overcome this problem deep learning with Xception network came into the picture.
* A Xception Architecture is proposed for Fake Indian Currency detection achieves a success rate of good prediction, outperforming the existing work.

**PROPOSED SYSTEM ADVANTAGES:**

* It vastly outperforms it on a larger image classification dataset.
* It slightly outperforms Inception v3 on the ImageNet dataset.