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## **DETECTION OF FAKE CURRENCY USING IMAGE PROCESSING**

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### **ABSTRACT**

Counterfeiting of currency notes poses a significant threat to the stability of financial systems and the trust of the general public. The emergence of advanced technologies has made it easier for counterfeiters to produce convincing fake currency. In response to this challenge, this project presents a "Fake Currency Detection System" designed for Android devices. The Fake Currency Detection System for Android is a mobile application that leverages the power of image processing and machine learning to identify counterfeit currency notes. This application is designed to empower individuals, businesses, and financial institutions to quickly and accurately detect counterfeit money, thereby reducing the circulation of fake currency. The detection of fake currency using image processing is a critical application that safeguards financial institutions, businesses, and individuals from the financial losses associated with counterfeit money. This abstract provides an overview of the typical approach, highlighting the key steps in the process. Continued research and development in this field will lead to more sophisticated and reliable counterfeit currency detection.

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### **I. INTRODUCTION**

Enhance economic stability, prevent financial losses, build consumer trust, leverage technological advancements, ensure legal compliance, serve educational purposes, and make a positive global impact by addressing the challenge of counterfeit currency. The availability of technology-based counterfeit detection systems can act as a deterrent to counterfeiters. Detecting fake currency using image processing is a challenging task that requires various techniques and algorithms. This dataset should include various denominations and orientations of the currency. Gather a large dataset of genuine and counterfeit currency notes. Extract discriminative features from the preprocessed images. Common features include color histograms, texture features, and edge-based features. Ensure that your fake currency detection system complies with legal and ethical standards. Detecting fake currency using image processing is an important application of computer vision and image analysis techniques. The primary goal is to distinguish genuine currency from counterfeit notes by analyzing their visual features. Here's some relevant background information Genuine currency notes often have several security features that are challenging for counterfeiters to reproduce. These features can include watermarks, holograms, microprinting, color-shifting ink, and more. Image processing techniques can be used to detect and verify these security features.

#### **Problem Statement**

The problem of fake currency detection involves developing robust, accurate, and efficient methods and technologies to identify counterfeit banknotes and prevent their circulation within the financial system.

#### **Goals And Objectives**

1. In the application, you may aim for real-time processing of currency notes during transactions or batch processing for bulk verification.
2. To Develop a user To high-quality images of genuine Indian currency notes from various denominations.
3. To implement a real-time detection system that can process images of currency notes in seconds and provide immediate feedback on their authenticity.
4. To counterfeit detection systems into existing financial systems and currency counting machines used by banks and businesses.
5. Depending on a friendly interface for the system, allowing users to easily understand the verification results.

### **II. RELATED WORK**

Vivek Sharan, Amandeep Kaur, and Parvinder Singh Explained that Technology is continuously changing our lives. Day by day, it makes our lives easy, but some challenges and issues exist. Counterfeit currency is one of them. It happens because of the production and circulation of currency without the permission of an authorized system. Some people use scanning and printing technology to produce such notes and circulate them around us,

which is a kind of forgery. It leads to personal loss and degrades the Country's economy. Such notes are very similar to the original, which becomes a problem for ordinary people to identify the authenticity of the currency, especially for visually impaired people.

1Asha Banu S.M.,<sup>2</sup> Sandhya S, 3 Vijaya Sundari T Explained that The fake currency notes are detected using image processing employing MATLAB in this paper. This project aims to provide the best techniques in image acquisition, and image segmentation. The work uses CANNY's algorithm to extract the notes' features much more effectively. Algorithms for image processing are used to extract the options. The technique used here functions well with the recently introduced denominations of 500 and 2000. The recommended strategy provides a practical means of detecting fake currency that is supported by physical inspection.

Pushpa R N1, Ganesh Prasad M3, and Hithesha H G5 Explained that The problem of detecting fake currency notes is crucial for maintaining the integrity of the economy. In recent years, there has been a surge in the use of deep learning models for detecting counterfeit currency using image processing. For Human beings it is very difficult to identify fake currencies, So automatic systems for the detection of fake currency are important. In this project, we propose a Convolutional Neural Network (CNN) model for detecting fake currency notes. To train our model, we use a dataset of images containing both genuine and fake currency notes of different denominations. The dataset is preprocessed by resizing all images to a fixed size and normalizing the pixel values. The pre-processed images are then split into training and validation sets for training and testing the model, respectively. This project is modeled as a CNN for automatic feature extraction and classification.

Aman Bhatia, Vansh Kedia, and Anshul Shroff Explained that This paper deals with the matter of identifying the currency if the given sample of currency is fake. Different traditional strategies and methods are available for fake currency identification based on the colors, width, and serial numbers mentioned. In the advanced age of Computer science and high computational methods, various machine learning algorithms are proposed by image processing that gives 99.9currency. Detection and recognition methods over the algorithms include entities like color, shape, paper width, and image filtering on the note. This paper proposes a method for fake currency recognition using K-Nearest Neighbours followed by image processing. KNN has a high accuracy for small data sets making it desirable to be used for the computer vision task.

### III. METHODOLOGY

1. **DATA COLLECTION:** High-quality images of both sides of each currency note should be captured. Ensure good lighting and resolution. Images should be taken from different angles and orientations, as counterfeiters use various techniques to mimic genuine notes.
2. **DATA PREPROCESSING:** Standardize the image size and format. Normalize the images to ensure consistent lighting and contrast.
3. **TRAINING AND TESTING MODEL:**
  - CNN Convolutional Neural Networks (CNNs) is a powerful tool for image classification and object detection tasks, including the detection of fake currency using image processing. CNN-based fake currency detection requires expertise in deep learning, image processing, and computer vision Convolutional layers are the fundamental building blocks of CNNs. CNNs are trained using a loss function, which measures the difference between the predicted output and the actual target.
4. **COMPARISON AND SELECTION MODEL:** Gather a dataset of genuine and fake currency notes. It's important to have a diverse dataset that includes various denominations, conditions, and angles of the notes Prepare the data set by standardizing the images. This may involve resizing, cropping, and enhancing the quality of the images to ensure consistency. Optimize the model's hyperparameters using the validation dataset to achieve the best performance. Currency counterfeiters often evolve their methods, so it's crucial to keep your detection system up to date.
5. **OUTCOMES:** Image enhancement techniques such as contrast adjustment, noise reduction, and image resizing are often applied to improve the quality of currency images before analysis. Various features can be extracted from currency images, including watermark features, security thread features, microprinting features, and color features. Texture analysis can be performed to detect patterns and textures characteristic of genuine banknotes. Security threads are embedded in genuine banknotes and can be detected using

image processing methods. Comparing the color distribution in a currency image to that of genuine banknotes can help in detecting fake currency.

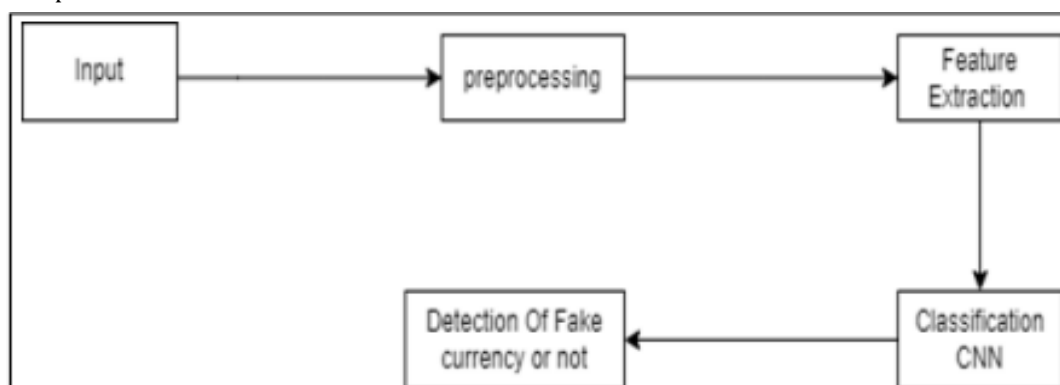
#### IV. PROPOSED SYSTEM

Gather a comprehensive dataset of genuine and counterfeit currency notes. Ensure that the dataset covers various denominations, countries, and currency types. Apply image enhancement techniques to improve the quality of the images, such as contrast adjustment and noise reduction. Use techniques like transfer learning if you have limited data or fine-tune pre-trained models to improve accuracy. The application should provide a clear result indicating whether the currency is genuine or counterfeit.

#### V. ARCHITECTURAL DESIGN

##### Dataflow diagram

In the Data Flow Diagram, we Show the flow of data in our system in DFD0 we show the base DFD in which the rectangle presents input as well as output and the circle shows our system, In DFD1 we show the actual input and actual output of system input of our system is text or image and output is rumor detected likewise in DFD 2 we present operation of the user as well as admin.



#### VI. CONCLUSION

The development of a fake currency detection android application is a significant step toward ensuring the integrity of financial transactions and preserving trust in the monetary system. By implementing advanced technologies such as image processing, machine learning, and database integration, the application can accurately identify counterfeit currency notes, providing users and businesses with a powerful tool to combat counterfeiting. By addressing the challenges posed by counterfeit currency, the application contributes to the stability of financial systems, the prevention of economic losses, and the promotion of secure financial transactions in society.

#### VII. REFERENCES

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