

FAKE CURRENCY DETECTION USING MOBILE

Batch No.:02

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Outline

- **Abstract**
- **Introduction**
- **Research Objective**
- **Problem Definition**
- **Scope of the Project**
- **Literature Review**
- **Implementation of Existing system**
- **Conclusion**
- **References**

Abstract

ABSTRACT

- India's rapid economic growth in recent years has been marred by longstanding issues like corruption, black currency, and fake money notes.
- Despite the Reserve Bank of India (RBI) implementing strong security features in genuine currency, counterfeit notes have become a significant problem.
- The advent of advanced color printing technology has made it easier for both local and foreign racketeers to produce large quantities of counterfeit Indian currency.
- Counterfeit currency, although often produced with great precision, can still be distinguished with some effort.
- A proposed model employs a three-layered Deep Convolutional Neural Network (Deep ConvNet) to efficiently detect counterfeit Indian currency notes, achieving an impressive accuracy of 96.6%.
- This technological advancement offers a promising solution to combat the counterfeit currency issue and helps safeguard the integrity of India's financial system.

INTRODUCTION

Introduction

- Fake currency detection is a critical process employed to identify counterfeit money within the financial system.
- It serves as a safeguard against fraudulent currency transactions and the erosion of trust in financial institutions.
- Counterfeit currency is designed to mimic genuine money, making its detection a challenging and ever-evolving task.
- Modern counterfeit detection methods leverage advanced technologies, including machine learning and computer vision.
- These techniques enable the automated analysis of currency notes, identifying discrepancies and irregularities.
- Fake currency detection plays a vital role in maintaining the integrity of financial transactions and upholding the security of currency systems.

Research Objective

Research objective

- Develop a highly accurate and efficient system for identifying counterfeit banknotes.
- Employ deep learning techniques, specifically convolutional neural networks, to analyze security features on genuine currency notes.
- Distinguish between genuine and counterfeit currency by scrutinizing these security features.
- Provide a reliable and cost-effective solution that can be utilized by banks, businesses, and individuals.
- Aim to mitigate the negative impact of counterfeit currency on the economy and enhance overall financial security.
- The system's intended users include financial institutions, businesses, and individuals, making it a versatile and accessible tool for counterfeit currency detection.

Problem Definition

Problem Definition

- Counterfeiting of currency is a pressing issue with significant economic implications, necessitating a robust solution.
- The primary challenge is to develop an automated system capable of accurately distinguishing between genuine and counterfeit currency notes.
- The solution relies on a dataset that encompasses images or features from both legitimate and counterfeit bills.
- The effectiveness of the system will be gauged based on its ability to minimize false positives.
- It should also maximize true positives, ensuring that genuine currency notes are not mistakenly classified as counterfeit.
- The ultimate goal is to reliably identify counterfeit notes, providing a robust defense against counterfeit currency in circulation.

Scope of the Project

Scope of the Project

- Explore advanced security measures to counter evolving counterfeiting techniques.
- Extend the system's capability to recognize counterfeit versions of different currency notes from various regions.
- Integrate the system with banking and financial institutions to enhance real-time counterfeit detection in ATMs and cash handling systems.
- Develop mobile applications for users to verify currency authenticity using their smartphones, improving accessibility.
- Utilize data analytics and pattern recognition to detect trends in counterfeit currency production, aiding law enforcement efforts.
- Consider global implementation to address counterfeit currency issues internationally by collaborating with other nations.

Literature Review

Comparison Table For Existing Systems

Publication	Journal Name	Title of Project	Technology Used	Architecture	Key Contributions
Journal of Research in Computer and Communication Technology	International Journal of Research in Computer and Communication Technology	Fake Currency Detection Using Image Processing and Other Standard Methods	Image Processing, MATLAB, Various Anti-counterfeit Techniques	Various Anti-counterfeit Techniques, Image Processing, MATLAB	The paper discusses various counterfeit methods, including watermarking, optically variable ink, security threads, latent images, and others. It also introduces a MATLAB tool for fake currency detection using image comparison.
IOP Conference Series: Materials Science and Engineering	IOP Conference Series: Materials Science and Engineering	Fake Currency Detection using Image Processing	Image Processing, MATLAB	Image Processing	The paper discusses a system for detecting fake currency notes using image processing and MATLAB. It extracts various features from Indian currency notes, such as security threads, serial number, Mahatma Gandhi portrait, and identification marks. The system calculates the intensity of each feature and classifies the currency note.

Journal Name	Title Of Paper	Technology Used	Architecture	Key Contributions	Our View on the paper
International Research Journal of Engineering and Technology (IRJET)	INDIAN FAKE CURRENCY DETECTION USING COMPUTER VISION	ORB (Oriented FAST and Rotated BRIEF), Brute-Force matcher	ORB (Oriented FAST and Rotated BRIEF), Brute-Force matcher	Developing a computer vision-based approach for Indian paper currency detection. Extracting currency features and creating datasets for currency detection. Using ORB and BF matcher in OpenCV to accurately detect the denomination of Indian banknotes.	This research presents a computer vision-based approach for detecting Indian paper currency authenticity. It utilizes the ORB feature extractor and a brute-force matcher in OpenCV to accurately detect the denomination of Indian banknotes.
International Research Journal of Engineering and Technology (IRJET)	Automatic Indian Fake Currency Detection Technique	Image Processing, Feature Extraction	Image Processing	Developing a module for automatic detection of genuine and counterfeit Indian currency notes, focusing on the new features.	The research presents a computer vision-based approach for detecting Indian paper currency authenticity. It utilizes the ORB feature extractor and a brute-force matcher in OpenCV to accurately detect the denomination of Indian banknotes.

Journal Name	Title Of Paper	Technology Used	Architecture	Key Contributions
International Journal of Computer Science and Information Technologies (CSIT)	Money to ATM – Fake Currency Detection	Mixed signal processing, Pattern recognition, Image processing	The system proposes a web application-based architecture.	The key contribution of this paper is to introduce a system called MTA (Money to ATM) to enable the deposit of money into ATMs, including currency checking to detect fake notes. This aims to make rural banking more flexible and easier, reducing the need for people to visit banks for transactions.
International Journal of Engineering and Advanced Technology (EAT)	Real Time Fake Currency Note Detection using Deep Learning	Convolutional Neural Network (CNN), Deep Learning, Transfer Learning	Alex Net with fine-tuning	Efficiently identifies counterfeit currency in real-time.

Implementation of Existing System

- The system starts with capturing an image of the currency note under ultraviolet light using a simple digital camera or scanner.
- The acquired RGB image is converted to grayscale to carry intensity information. This is an essential step before further analysis.
- The system detects edges in the grayscale image. This process identifies points in the image where brightness changes sharply, helping to highlight key features.
- Image segmentation is performed to subdivide the image into different regions based on the features of interest, such as security threads, serial numbers, and more.
- The system extracts features like the security thread, serial number, Mahatma Gandhi portrait, and identification mark from the segmented regions.
- Intensity of each extracted feature is calculated and compared to a predefined threshold (e.g., 70%). If the calculated intensity is above the threshold for all features, the currency note is considered genuine; otherwise, it's identified as fake.

Result

- The system begins by collecting a wide range of real and counterfeit currency images and prepares them for analysis.
- It employs a specialized machine learning model, like a Convolutional Neural Network (CNN), to learn the unique visual and structural features that distinguish real from fake currency notes.
- Users can easily verify currency authenticity by taking pictures with a mobile or PC application, which communicates with the model.
- The system also checks for security features specific to the currency, such as watermarks or holograms.
- Regular updates and user feedback help the system stay effective against evolving counterfeit methods.
- The system ensures compliance with legal and ethical standards, while a quality control process reviews flagged notes to confirm authenticity.

Conclusion

- The system provides a trustworthy solution for currency authenticity.
- It uses data and advanced computer models to distinguish between genuine and counterfeit money.
- Accessible through mobile and PC apps for easy verification.
- The system checks for hidden security features, adding an extra layer of protection.
- It adapts to new counterfeit techniques, ensuring ongoing effectiveness.
- Operating within legal boundaries, it instills trust in financial transactions.

References

- https://www.academia.edu/download/36927524/564-1508-1-PB_2.pdf
- <https://iopscience.iop.org/article/10.1088/1757-899X/263/5/052047/meta>
- <https://ieeexplore.ieee.org/abstract/document/9432274/>
- <https://www.academia.edu/download/58955614/V8I4201914.pdf>
- https://www.researchgate.net/profile/Surendra-Chauhan-2/publication/354142164_INDIAN_FAKE_CURRENCY_DETECTION_USING_COMPUTER_VISION/links/61270f661f50fb262ff19e78/INDIAN-FAKE-CURRENCY-DETECTION-USING-COMPUTER-VISION.pdf
- https://www.irjmets.com/uploadedfiles/paper/issue_6_june_2022/26965/final/fin_irjmets1656321191.pdf
- https://metbhujbalknowledgecity.ac.in/icitc2021/proceeding/36_Fake%20Currency%20Detection%20Using%20Image%20Processing.pdf

Thank You!