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Fake Indian Paper Currency Recognition for Blind and Visually Impaired People

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ABSTRACT: This paper helps the visually impaired people or blind people to identify the fake currency notes using an Android App. The output of the app is a voice command that will help the blind people to identify the amount and fake currency. There are so many available option on currency for fake currency identification for normal human being but blind people can't see it. So We will developed android application for that people using Optical Character Recognition algorithm of Machine Learning and Image Processing. Our system offering user friendly, efficient solution to blind people for manage their currency effortlessly. The system captures an image of the currency using a smartphone camera and processes it through image processing techniques and OCR algorithm. This solution enhances financial security and independence for blind and visually impaired users by offering an efficient and user-friendly method for fake currency.

KEYWORDS: Image processing, Image classification, Morphological operations, Machine learning, Counterfeit detection.

I. INTRODUCTION

The Fake Currency Identification for Blind and Visually Impaired People project is designed to assist individuals who struggle to distinguish between genuine and counterfeit currency notes. Existing solutions, like the Mani app, can identify denominations but fail to verify authenticity. Our proposed system leverages machine learning-based Optical Character Recognition (OCR) and image processing to detect key security features such as watermarks, security threads, microtext, and color-shifting ink to differentiate between real and fake notes. The system will be implemented as a mobile application, utilizing a camera to scan currency and analyse its authenticity in real time. A text-to-speech (TTS) module will provide audio feedback, informing users whether the note is genuine or counterfeit. Unlike deep learning models, which require extensive computational power, our lightweight machine learning approach ensures fast, accurate, and efficient processing on low-powered devices, making it practical for real-world use. Additionally, the system will be designed to work under varying lighting conditions and for different currencies, ensuring robustness and reliability. By providing an accessible, efficient, and easy-to-use solution, this project aims to enhance financial security and empower visually impaired individuals with greater independence in handling cash transactions.

II. LITERATURE SURVEY

An End-to-End Indian 2024 CNN Paper Currency Recognition:

Developed an Android application, "Roshni Currency Recognizer," designed specifically for blind and visually impaired individuals to identify Indian paper currency using a Convolutional Neural Network (CNN) algorithm. The app leverages deep learning-based image processing to accurately recognize denominations and verify authenticity by analysing key security features such as watermarks, security threads, and microtext. By employing





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CNN for feature extraction and classification, the system ensures high accuracy in counterfeit detection

Currency Recognition System for Visually Impaired Persons:

Developed a website-based Currency Recognition System for Visually Im- paired Persons using the YOLO-v3 CNN model to accurately identify Indian paper currency. The system leverages deep learning-based image processing to search, extract, and analyze patterns, identification marks, and security features such as watermarks, security threads, and microtext. These extracted features are then compared with original banknote images to determine authenticity.

Fake currency identification using KNNs:

This research paper presents an innovative approach to detecting counterfeit currency using the K-Nearest Neighbors (KNN) algorithm in a machine learning-based web application designed for sighted individuals. The extracted features are then analyzed using the KNN classification model, which compares them with a dataset of authentic banknotes to determine their legitimacy. The web-based platform provides users with a fast, efficient, and user-friendly counterfeit detection tool, making it accessible for general users, businesses, and financial institutions.

III. EXISTING SYSTEM



Fig 1. Existing System Architecture

This diagram illustrates the existing system architecture of the Roshni – Currency Recognizer App, designed to identify Indian currency denominations using a deep learning model. Here's an explanation of each step:

1. IPCD (Manual + Crowdsourcing):

A dataset of Indian currency images is collected through manual efforts and crowdsourcing.





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- Data Augmentation: The collected images are augmented (e.g., through rotation, scaling, brightness adjustment) to increase dataset diversity and improve model robustness.
- Deep Learning Framework: A deep learning model is trained using the augmented dataset to recognize currency denominations. This is done using frameworks like TensorFlow.
- 4. Trained TF Model: The trained model is obtained, which can now classify currency images accurately.
- Compression (.tflite): The trained model is compressed into TensorFlow Lite (.tflite) format to make it lightweight and suitable for mobile deployment.
- 6. Model Deployment: The compressed model is deployed to a mobile application for real-time currency recognition.
- 7. Roshni App Usage:

The user inputs a currency note image into the Roshni app. The model processes the image and identifies the currency denomination. The app gives an audio output (e.g., "20 Rupees") to assist visually impaired users.

IV. PROPOSED SYSTEM



Fig 2. Proposed System Architecture

This diagram illustrates a currency recognition and authentication system using image processing techniques. Here's a brief explanation of each step:

1. Image Acquisition:

A currency note image is captured using a mobile device.

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- 2. Pre-Processing: The image is cleaned and enhanced to improve clarity and accuracy for further analysis.
- Edge Detection: Edges and outlines of the note are detected to help isolate key features.
- 4. Feature Extraction: Unique features (e.g., patterns, numbers) are identified from the image.
- Prediction: The system predicts the denomination and authenticity of the currency (e.g., "20 Rupees", "Not fake").
- 6. Voice Output: The result is converted to audio and delivered to the user through the app.

This system helps users identify both the value and genuineness of a currency note using a smartphone.

V. METHODOLOGY

Algorithm 1 : Optical Character Recognition (OCR)

Algorithm 2: Image Processing Algorithm:

1. Optical Character Recognition:

Optical Character Recognition (OCR) is a technology that has revolutionized the way we process and store documents. OCR enables machines to convert scanned images of printed or handwritten text into digital text that computers can read and process. This technology has made it possible to digitize vast amounts of information, making it easier to search, store, and analyse data. This article will explore how OCR works, including the algorithms and techniques used to recognize characters and convert them into digital text.

2. Image Processing Algorithm:

This algorithm refers to a set of methods applied to digital images for enhancing, analyzing, and extracting meaningful information. Some common algorithms include:

-Thresholding: Simplifies images by converting grayscale images into binary format based on pixel intensity, useful in OCR for segmenting text from the background.

-Edge Detection: Identifies the boundaries of objects within an image, useful for isolating text regions.

-Morphological Operations: Modifies image shapes to remove noise or enhance features, often used to improve OCR accuracy.

-Template Matching: Compares image segments with predefined templates, useful in character recognition.





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VI. EXPERIMENTAL RESULTS



Fig 3. Result 1

Fig 3.1 Result 2

Fig 3.2 Result 3





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VII. CONCLUSION

This Project Focuses on the problem of Indian paper currency recognition for Blind and visually impaired people and presents end-to end automated solution. The large dataset contains images from varied background conditions and different illumination and orientation. The Fake Currency Detection System for Visually Impaired People is an innovative solution that empowers individuals with visual impairments to independently verify currency authenticity. By leveraging advanced image processing and machine learning algorithms, this system provides: The Fake Currency identification system using Optical character recognition and Image Processing techniques is an innovative solution for counterfeiting. The system's ability to accurately detect counterfeit currency notes can help prevent financial losses and maintain economic stability.

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