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"Currency Recognition Application"

Prof. Priyanka Fulsaundar[1], Puja Mangale[2], Pradnya Ransing[3], Ritesh Kadam[4]
[1]*Asst.Professor,* [2, 3, 4]*Fourth-Year Student*
Information Technology, Dhole Patil College of Engineering, Pune, India

Abstract: ***The Currency Detection Android Application with Image Processing is an innovative solution designed to empower visually impaired individuals and assist travelers in identifying and managing paper currency notes with accuracy and convenience. This application leverages advanced image processing techniques, including edge detection, color analysis, texture recognition, and optical character recognition (OCR), to extract crucial features from currency notes. Machine learning models, including convolutional neural networks (CNNs) and recurrent neural networks (RNNs), are employed to recognize currency denominations based on these extracted features. The application provides real-time audio feedback, announcing the recognized denomination, and features a user-friendly interface with voice-guided instructions, catering to both visually impaired and sighted users. A comprehensive currency library ensures coverage of major world currencies, with regular updates to accommodate new designs and security features. Offline functionality further enhances accessibility. The project's scope encompasses primary functionalities, target audience, supported currencies, technological considerations, and acknowledges project limitations.***

Keywords: Currency Recognition, Android Application, Image Processing Currency Denomination, User Interface, Real-time Exchange Rates.

I. INTRODUCTION

A. Background

The handling of paper currency is a crucial aspect of daily life, especially for visually impaired individuals and international travelers.

This report discusses the development of a Currency Detection Android Application, which harnesses image processing and machine learning to facilitate accurate and independent currency recognition.In an era characterized by rapid technological advancement, the development of applications that foster social inclusivity is a testament to the positive impact technology can have on our lives. This project is dedicated to the creation of a cutting-edge currency detector application, a solution designed to empower visually impaired individuals and simplify financial transactions for businesses and individuals alike.

B. Objective of the Project

The main objectives of this project are as follows:

1) *Accessible Currency Identification:* Enable blind users to accurately identify and differentiate various currency denominations by utilizing smartphone technology.
2) *User-Friendly Interface:* Provide an intuitive and easy-to-navigate interface, designed with accessibility features to cater to the unique needs of blind users.
3) *Real-Time Detection:* Ensure real-time and efficient currency recognition, enabling users to confidently participate in financial transactions without delays or dependence on sighted assistance.
4) *Currency Database:* Maintain an up-to-date database of currency denominations for different countries, allowing users to seamlessly manage both local and international currencies.
5) *Audio and Tactile Feedback:* Incorporate audio cues and haptic feedback to provide users with sensory information, reinforcing the app's ability to accurately identify banknotes. Scope of the Project

II. LITERATURE SURVEY

1) Paper currency recognition for colour images based on Artificial Neural Network

Jyothi,Ch Ratna,Y. K.Sundara Krishna,and V. Srinivasa Rao [1] introduced four different kinds of currencies through computer vision.The typical Accuracy rate was 93.84%.

2) An intelligent paper currency recognition system

Sarfraz,et al author [2] proposed an Android paper currency recognition system that applied to Saudi Arabian papers.Recognizing paper currency methods that relies on some features and correlations between two currency Images

3) Design and evaluation of neural networks for coin recognition by using GA and SA.

Mitsukura, Y. 'ukumi, M., Akamatsu, N, [3] Mitsukura proposed a way to fashion a neural network using a simulated annealing and genetic algorithm. The comparable traits of the pictures of coins (i.e., size, colour, weight, and pattern) reason hassle for forex recognition. The proposed scheme located numerous capabilities and additionally the recognition rate turned into about 98%

4) Design and implementation of Indian paper currency authentication system based on feature extraction by edge-based mentation using Sobel operator

Mirza, R., Nanda, V [4] Proposed a method uses three extracted functions from the banknote along with identity mark, watermark, and safety thread Results shows the system gives good performance for images with low noise with accuracy 98.3%

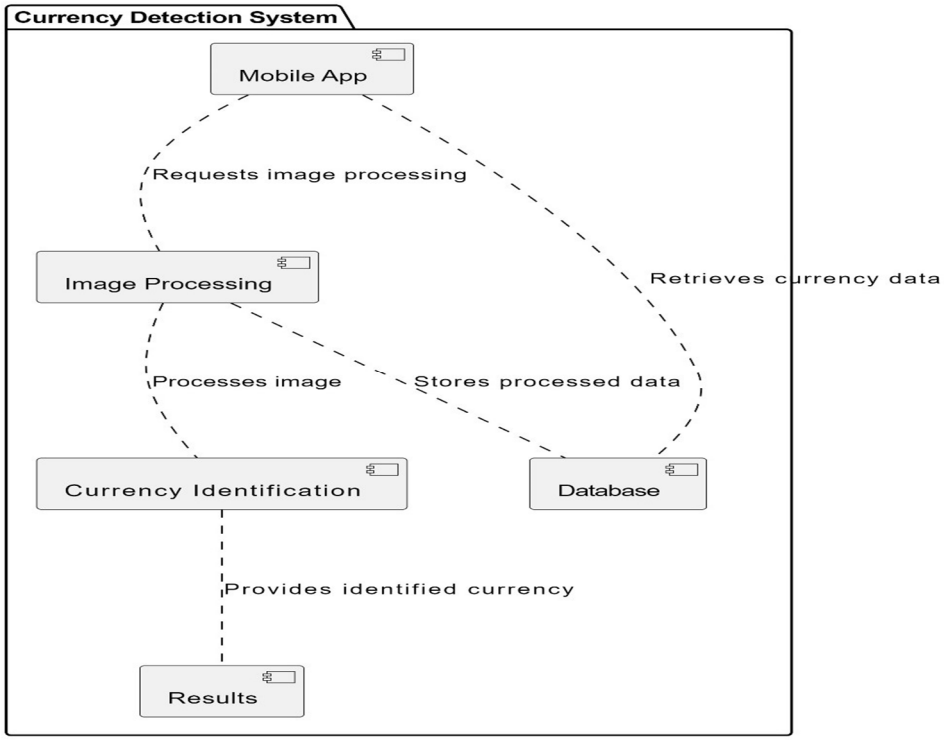
5) Evaluating colour descriptors for object and scene recognition. IEEE Trans

Van De Sande, K.E., Gevers, T., Snoek, C.G.[5] Done Comparison between the local colour descriptors with grey value descriptors. They use the evaluation framework of Mikolayzcyk and Schmid to the amount of local grey value invariants. The results show the strategy which mixes colour information and SIFT gives better results

III. SYSTEM ANALYSIS AND PROPOSED ARCHITECTURE

The currency detector system aims to empower visually impaired individuals by providing an accessible and user-friendly solution for currency recognition. Current challenges include limited accessibility and dependence on external assistance.

1) *Components:* Image Capture, Image Processing, Text-to-Speech, User Interface, Currency Database.
2) *Flow:* Capture image, process for currency identification, convert to speech, present results via accessible interface.
3) *Accessibility:* Voice guidance, high contrast, large font options, gestural input support, screen reader compatibility.
4) *Platform:* Android development using Java/Kotlin, Android Accessibility API integration.
5) *Security:* Encryption, secure communication, regular updates.
6) *Future Enhancements:* Real-time currency updates, multi-currency support, collaboration with currency authorities.



IV. RESEARCH METHODOLOGY

A. Data Collection

Data collection involves the acquisition of a diverse dataset of currency images from various countries. This dataset serves as the foundation for training and testing the machine learning models used in currency recognition.

B. Image Processing Techniques

Image processing techniques encompass a series of procedures, including edge detection, color analysis, texture recognition, pattern matching, and optical character recognition (OCR). These techniques are instrumental in extracting relevant features from currency notes.

C. Machine Learning Models

Machine learning models, specifically convolutional neural networks (CNNs) and recurrent neural networks (RNNs), are employed to recognize currency denominations based on the extracted features. Training and fine-tuning of these models are essential for achieving high accuracy.

V. CONCLUSION

The Currency Detection Android Application, powered by image processing and machine learning, serves as a valuable tool for currency recognition, with significant advantages for both visually impaired individuals and travelers. It streamlines financial management and reduces the margin of error. While not without its limitations, its positive impact is clear.

The development of the currency detection application represents a significant step forward in leveraging technology for social inclusivity and accessibility in the financial realm. With a foundation built on meticulous data collection, machine learning model training, and integration into an Android application, this project has the potential to bring tangible benefits to a diverse user base.

For visually impaired individuals, the application promises newfound independence, empowering them to confidently manage currency notes ultimately enhancing their quality of life.

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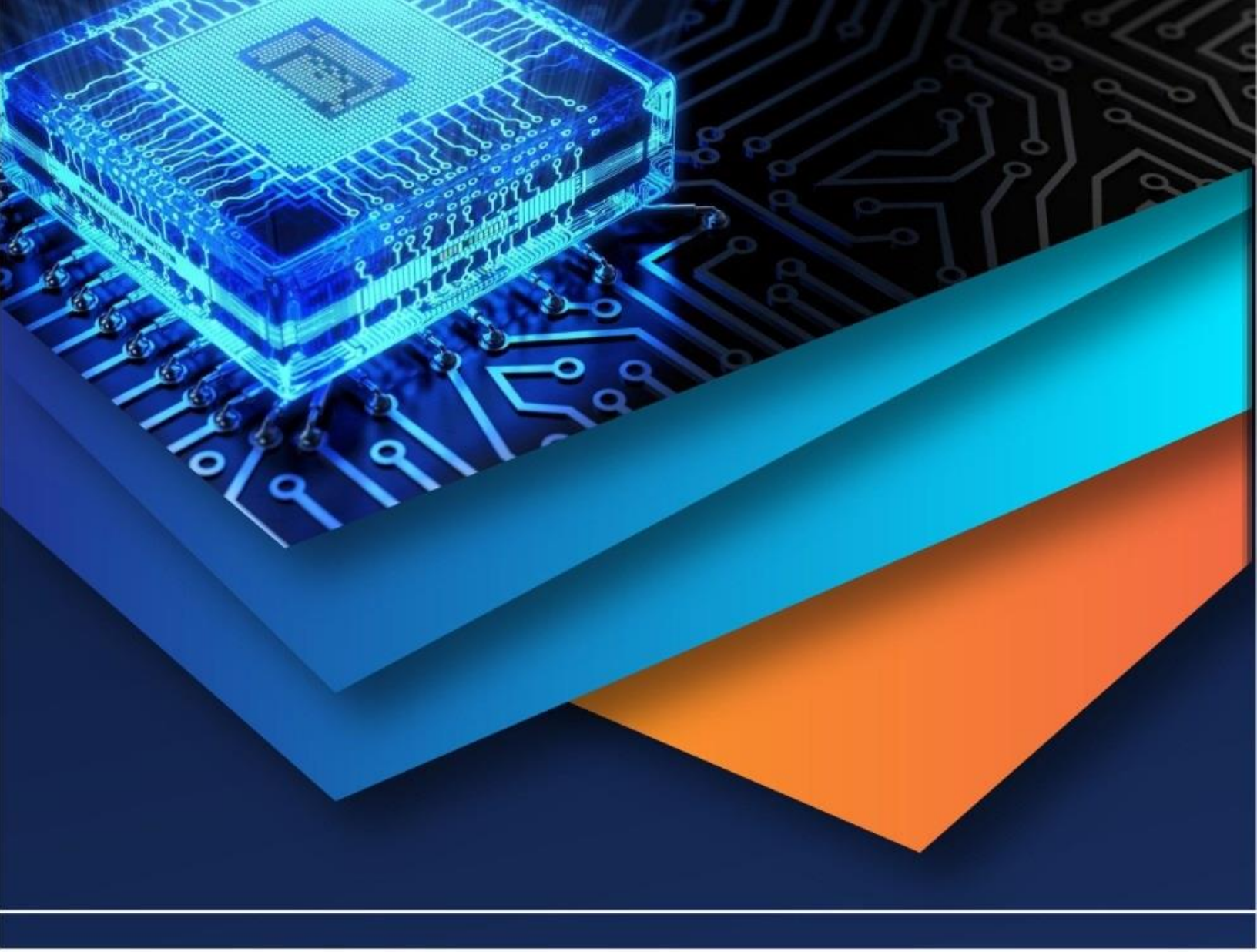
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