International Journal of Creative and Open Research in Engineering and Management
ISSN: **3108-1754 (Online)**
Volume 02 Issue 08 Augustl-2026 | Impact Factor: 3.5

Indian Currency Note Recognition for Visually Impaired with Audio Feedback

Supriya V, Sanjana K S, Neha N, Pallavi M, Venu M

ECE/ K S School of Engineering and Management / VTU, Bengaluru, India
ECE/ K S School of Engineering and Management / VTU, Bengaluru, India
ECE/ K S School of Engineering and Management / VTU, Bengaluru, India
ECE/ K S School of Engineering and Management / VTU, Bengaluru, India

Corresponding Author Email: sanjanagowda.1215@gmail.com | ORCID: https://orcid.org/xxxx-xxxx-xxxx-xxxx

How to Cite this Article:

V, S., S, S. K., N, N., M, P. & M, V. (2026). Indian Currency Note Recognition for Visually Impaired with Audio Feedback. International Journal of Creative and Open Research in Engineering and Management, 02(8), 1-9. https://doi.org/10.55041/ijcope.v2i8.069

https://doi.org/10.55041/ijcope.v2i8.069

Abstract—

Handling currency notes in everyday situations is something most people do easily, but it can be challenging for visual impairment people. Because of this difficulty, they often depend on others for assistance, which reduces their sense of independence in managing financial activities. To overcome from this issue, the work proposes a system named Indian Currency Note Recognition for Visually Impaired with Audio Feedback.

The system is built to automatically identify Indian currency notes using digital image processing and computer vision techniques. It takes images either from a live camera or stored files and processes them using a digital image process and CNN. The model learns important visual patterns from the notes and classifies them into their correct denominations, even when the images are not perfect due to factors like poor lighting, blur, or background disturbances.

Once the currency is identified, the detected value is transformed into voice output through a Text-to-Speech (TTS) module, allowing users to hear the detected value instantly. The entire system is optimized to be lightweight so that it can run efficiently on smartphones and embedded devices. This enables practically to use in real world. Overall, the proposed approach helps improve accessibility and supports visually impaired individuals in performing financial tasks more independently.

Keywords—Indian Currency Note Recognition, Visual Impairment Assistance, Deep Learning, Convolutional Neural Network (CNN), Computer Vision, Image Classification, Audio Feedback System, Text-to-Speech (TTS), Assistive Technology, Real-Time Currency Detection, Accessibility System, Smart Assistive Application, Financial Independence, Mobile-Based Recognition System, Embedded Systems.

I. INTRODUCTION

Money is an essential part of everyday life, and identifying currency notes is a routine activity during financial transactions. Although this task is straightforward for most people, it becomes challenging for individuals with visual impairment because Indian currency notes often have similar dimensions, color patterns, and textures. As a result, they may depend on others to identify currency denominations, reducing their confidence and limiting their ability to perform financial transactions independently [1].

Recent advancements in artificial intelligence, computer vision, and deep learning have enabled the development of intelligent assistive technologies that can analyze visual information and provide accurate results in real time. Currency recognition is one such application that assists individuals with visual impairment by automatically identifying banknotes and providing voice-based feedback, thereby improving accessibility and supporting independent money management [2], [3].

Several researchers have proposed currency recognition systems using image processing and deep learning methods. While many of these systems have achieved good recognition accuracy, some require powerful computing devices, operate effectively only under controlled lighting conditions, or are not optimized for lightweight embedded platforms. In addition, certain approaches do not provide efficient real-time audio feedback, which is essential for visually impaired users. These limitations highlight the need for a practical, lightweight, and reliable currency recognition system that can perform accurately in real-world environments [4],[8].

To address these challenges, this work proposes an Automated Indian Currency Note Recognition System for Visually Impaired Individuals. The proposed system acquires images from a live camera or stored image files and processes them using image preprocessing techniques together with a Convolutional Neural Network (CNN) for currency denomination recognition. After successful identification, the recognized denomination is converted into speech through a Text-to-Speech (TTS) module, enabling users to receive immediate audio feedback. The primary objective of this research is to develop an accurate, efficient, and user-friendly system that supports independent financial transactions while remaining suitable for deployment on smartphones and embedded devices.

II. LITERATURE REVIEW

A. Soam et al. (2026), in "Cash Eye", proposed a machine learning-based system to assist visually impaired individuals in identifying Indian currency notes. The recognized denomination is communicated through an assistive output mechanism, enabling users to perform financial transactions independently. Experimental results indicated improved recognition accuracy and enhanced accessibility in real-time applications. However, the study mainly focused on recognition performance and did not evaluate the system on lightweight embedded platforms or under diverse real-world environmental conditions. [1]

S. A. Shreya et al. (2025) presented a real-time Indian currency recognition system based on image acquisition and computer vision techniques. The system processes captured currency images, identifies the denomination, and generates immediate voice feedback through a Text-to-Speech (TTS) module. The proposed framework demonstrated reliable real-time recognition and improved accessibility for visually impaired users during financial transactions. However, the authors did not provide a detailed evaluation of the system under varying lighting conditions, cluttered backgrounds, or partially visible currency notes, which may influence practical performance. [2]

J. L. Mathew et al. (2025) developed a blind assistance system using a Sequential Convolutional Neural Network (CNN) for Indian currency recognition. The CNN automatically extracts significant visual features from currency note images and accurately classifies different denominations, even when images contain moderate blur or noise. Experimental observations confirmed the effectiveness of deep learning for

real-time currency recognition. However, the work mainly concentrated on improving recognition accuracy and provided limited discussion regarding computational efficiency and deployment on resource-constrained embedded devices. [3]

R. Maganti et al. (2024) introduced a deep learning-based currency identifier to assist visually impaired individuals in recognizing Indian currency denominations. The system analyses captured images and presents the recognized denomination through an accessible output interface, reducing dependence on external assistance during financial transactions. Experimental evaluation demonstrated improved recognition accuracy and enhanced user accessibility. However, the study provides limited information regarding system performance under varying illumination conditions and practical deployment on lightweight embedded hardware. [4]

M. Khalid et al. (2024) proposed a YOLOv9-based smart glasses system for real-time currency recognition. The wearable platform integrates object detection with smart glasses to identify currency notes while users interact with their surroundings. Experimental results demonstrated the feasibility of combining advanced deep learning with wearable assistive technology for improved portability and user convenience. However, the computational complexity of the YOLOv9 model may increase hardware requirements and affect battery life during continuous real-time operation. [5]

B. S. Panda et al. (2024) presented an image-processing-based currency recognition system to improve financial independence for visually impaired individuals. The proposed method applies image enhancement and classification techniques to improve recognition performance under different environmental conditions. The recognised denomination is communicated through an assistive feedback mechanism to support user interaction. However, the study provides limited discussion regarding real-time processing speed and implementation on low-resource embedded systems. [6]

G. Adline Macriga et al. (2023) proposed a computer vision-based currency detector for visually impaired users. The system captures currency note images and applies image processing algorithms to identify different denominations with improved reliability. The recognized denomination is presented through an accessible feedback mechanism to assist users during financial transactions. However, the system performance may be affected by image quality, illumination changes, and background complexity encountered in practical environments. [7]

A. C. S. Abilash et al. (2022) developed a currency recognition system using machine learning and image processing techniques. The proposed framework performs feature extraction and classification to recognize Indian currency notes efficiently and provides audio output for user accessibility. Experimental evaluation demonstrated satisfactory recognition accuracy with efficient processing speed. However, the study does not extensively evaluate recognition performance under challenging real-world conditions such as folded or partially occluded currency notes. [8]

P. Saini et al. (2022) proposed a lightweight transfer learning approach for Indian currency recognition. The system utilizes pre-trained deep learning models to improve classification accuracy while reducing computational complexity. The lightweight architecture makes the model suitable for smartphones and embedded devices. However, the study provides limited information regarding long-term real-time deployment and optimization for highly dynamic environmental conditions. [9]

S. V. Tresa Sangeetha et al. (2022) developed a currency recognition application using MIT App Inventor for visually impaired individuals. The application captures currency images, identifies denominations, and delivers the recognized value through voice feedback using a simple and user-

friendly interface. However, the application mainly focuses on mobile implementation and does not evaluate recognition performance under different practical imaging conditions. [10]

K. Thakur et al. (2022) proposed an automatic Indian currency identifier using image analysis techniques. The system recognizes currency denominations without requiring external assistance, thereby improving accessibility and user independence. Experimental observations demonstrated reliable recognition performance for daily financial transactions. However, the study does not discuss computational efficiency or system adaptability for embedded hardware platforms. [11]

R. Vishwasi et al. (2022) presented a Raspberry Pi-based CNN model for Indian currency recognition. The proposed system combines embedded hardware with deep learning algorithms to provide portable and real-time currency recognition. The recognized denomination is delivered through an assistive output mechanism suitable for visually impaired users. However, the performance of the embedded platform may be influenced by hardware limitations and varying environmental conditions. [12]

J. Bagrecha et al. (2021) proposed Virtual Eye, an Android application that provides object and currency recognition for visually impaired users. The process involves image processing techniques to analyze captured images and deliver accessible feedback for independent daily activities. However, the work primarily focuses on mobile application development and provides limited analysis of recognition accuracy under complex real-world scenarios. [13]

G. Bhutkar et al. (2021) developed a mobile-based currency recognition application for visually impaired individuals. The proposed system combines image processing and mobile computing techniques to identify Indian currency denominations and generate audio feedback for user convenience. Experimental results demonstrated improved accessibility during financial transactions. However, recognition accuracy may decrease when currency images contain shadows, poor illumination, or partial occlusions. [14]

J. Jhaveri et al. (2021) introduced Divya-Drishti, an intelligent assistive system designed to support visually impaired individuals in performing daily activities independently. The framework integrates multiple recognition techniques to improve accessibility, usability, and user interaction through automated assistance. However, the study focuses on general assistive applications and provides limited discussion on optimizing currency recognition performance under real-time operational conditions. [15]

V. CONCLUSION

The proposed Indian Currency Note Recognition system with Audio Feedback demonstrates the effectiveness of artificial intelligence-based assistive technology in supporting visually impaired individuals during financial transactions. The integration of computer vision techniques and a Convolutional Neural Network (CNN) enables the system to extract relevant visual patterns from currency images and classify different denominations efficiently. The approach shows the capability to maintain reliable recognition performance even when input images are affected by factors such as illumination variation, image blur, and background interference.

The incorporation of a Text-to-Speech (TTS) module improves the usability of the system by providing immediate auditory information about the identified currency value. This eliminates the requirement for visual confirmation and allows users to access currency information independently. Furthermore, the lightweight and portable nature of the proposed framework makes it suitable for implementation on compact computing platforms, supporting the development of practical and affordable assistive solutions.

The outcomes of this research highlight the potential of embedded artificial intelligence systems in improving accessibility, confidence, and independence among visually impaired users.

Future work can focus on increasing robustness for challenging cases such as folded, damaged, or partially visible currency notes, supporting multiple regional languages for voice feedback, optimizing the model for low-power hardware, and integrating the system with wearable assistive devices for enhanced mobility and user convenience.

REFERENCES

[1] A.Soam, V.Tyagi, H.Rastogi, A.Jaishwal, and A.Gupta, "Cash Eye – Currency Detection for Blind People Using Machine Learning", International Journal of Computer Techniques, vol. 13, no. 2, pp. 658–662, 2026.

[2] S. A. Shreya, M. D. A. I. Siddique, and S. Tasnim, "Real-Time Currency Detection and Voice Feedback for Visually Impaired Individuals," arXiv preprint arXiv:2510.20267, Oct. 2025.

[3] J. L. Mathew, A. C. Vinoy, R. H. A., B. Moozhippurath, A. D. C., and D. Korikkara, "Blind Assist System for Currency Recognition Using Sequential CNN," in Proc. IEEE ICTEST, 2025, doi:10.1109/ICTEST64710.2025.11042604.

[4] R. Maganti, J. Gutla, Y. Mallampalli, and Y. Sandeep, "Innovative Currency Identifier for the Blind using Deep Learning," in Proc. AUTOCOM, 2024.

[5] M. Khalid, H. B. Ul Haq, Z. Janjua, H. M. M. Akhtar, and H. M. Yousaf, "YOLOv9-Based Smart Glasses for Real-Time Recognition of Currency Notes," Journal of Computing & Biomedical Informatics, vol. 8, no. 1, pp. 1–12, 2024.

[6] B. S. Panda, D. T. Devi, N. Asritha, G. S. Harish, and G. A. S. Varma, "Enabling Visual Independence: Image Processing for Currency Recognition in the Visually Impaired Community," Journal of Nonlinear Analysis and Optimization, vol. 15, no. 1, pp. 1961–1966, 2024.

[7] G. Adline Macriga et al., "Currency Detector for Visually Impaired," in Proc. ICCEBS, 2023.

[8] A. C. S. Abilash et al., "Currency Recognition for the Visually Impaired People," IEEE, 2022.

[9] P.Saini et al., "Indian Currency Recognition: A Lightweight Transfer Learning Approach for Visually Impaired", in Proc. PDGC, 2022.

[10] S. V. Tresa Sangeetha et al., "Currency Detection App for Blind People Using MIT App Inventor," in Proc. ICPECTS, 2022.

[11] K. Thakur et al., "Construction of Indian Currency Identifier for Visually Impaired," International Journal of Recent Technology and Engineering, vol. 11, no. 4, pp. 42–45, 2022.

[12] R. Vishwasi et al., "A Raspberry Pi Based CNN Model for Indian Currency Detection for Visually Impaired People," in Proc. ICESC, 2022.

[13] J. Bagrecha et al., "VirtualEye: Android Application for the Visually Impaired," in Recent Trends in Intensive Computing. IOS Press, 2021, pp. 263–271, doi:10.3233/APC210204.

[14] G. Bhutkar et al., "Currency Recognition App for Visually Impaired Users in India," in IFIP Working Conference on Human Work Interaction Design, 2021.

[15] J. Jhaveri et al., "Divya-Drishti: An Independent Aid for the Visually Impaired," SSRN Electronic Journal, 2021.