IRJMETS
e-ISSN: 2582-5208
International Research Journal of Modernization in Engineering Technology and Science
Volume:03/Issue:06/June-2021 Impact Factor- 5.354 www.irjmets.com

CURRENCY DETECTOR APP FOR VISUALLY IMPAIRED

Ms. Vaishali Puranik*1, Ms. Rakshita Madan*2, Mr. Shiva Chaudhary*3, Mr. Pratik Kumar*4, Ms. Sakshi Mittal*5

*1Assistant Professor, Computer Science Department, Krishna Engineering College, Ghaziabad, Uttar Pradesh, India.

*2,3,4,5Student, Krishna Engineering College, Ghaziabad, Uttar Pradesh, India.

ABSTRACT

In this journal, we presented a mobile currency recognition device that recognises Indian currency in various views and scales. We created a dataset for Indian currency on the Android operating system in this paper. The dataset was then subjected to an automated mobile recognition scheme using a smartphone and the scale-invariant function transform (SIFT) algorithm. SIFT was designed to be the most stable and effective local invariant function descriptor available. Color conveys valuable knowledge and principles during the object definition and matching processes. Many items cannot be properly categorised until they have colour features. Currency recognition, especially for currency notes, is one of the most significant issues confronting visually disabled individuals. In this system, we present a basic currency recognition system that is used on Indian banknotes.

Keywords: Currency Recognition, Segmentation, Features Extraction, Template Matching, Text To Speech, Edge Detection, SIFT, Android Application, Image Processing.

I. INTRODUCTION

The failure of people with visual disabilities to identify paper currencies is attributable to the resemblance of paper texture and scale between the various types. Some people had a lot of trouble with their banking transfers. This application will assist visually impaired people in recognising currency. In this programme, blind people will talk and offer commands to open cameras, and the camera will take a picture of the note and tell the user how much rupee note it is using speech medium. This framework converts commands provided by blind people into text using speech recognition. Speech recognition is an interdisciplinary subfield of computational linguistics that advances methodologies and technologies that allow the recognition and conversion of spoken language into text. This device has a text-to-speech principle that allows to read the meaning of a note and then translates the text value into speech. You can translate text to speech on Android. Not only can you translate it, but you can also speak text in a number of different languages.

PROPOSED SYSTEM:

- People will use this programme to open the camera on their mobile, and the camera can take a snapshot of the money note and inform the user how much it is in voice. The command provided by the blind patient is converted to text using speech to text translation in this Android project. Speech Recognition is a technique that helps people to supply applications with spoken feedback. This Android programme employs the text-to-speech principle to read the value of a note to the recipient before converting the text value to speech.
- The paper money note has various fields and written languages to identify. Each area on the banknote has its own meaning in the identification process. Figures 1 and 2 depict the front and back views of a recent 500 rupee note from India.
- An acquisition system can search or collect these fields and process them for identification. Many image processing techniques were used in this process, including image enhancement, filter ring, segmentation, feature extraction, classification, and so on.

Identification and salient features on the front of the new Rs 500 note, as highlighted by RBI:

1. Examine the ledger of denomination numeral.
2. The denomination numeral's latent picture
3. Devanagari denomination numeral
4. The orientation and relative location of Mahatma Gandhi's portrait have been altered.
5. When a note is held, the colour of the windowed security thread switches from green to blue.

e-ISSN: 2582-5208
International Research Journal of Modernization in Engineering Technology and Science
Volume:03/Issue:06/June-2021 Impact Factor- 5.354 www.irjmets.com

6. Guarantee clause, Governor's signature with commitment clause, and moved RBI logo to the right.
7. Watermarks for portraits and electrotypes
8. Number panel with numerals increasing in size from small to large on the top left and bottom right sides
9. On the bottom right, a numeral denomination with a rupee sign in colour shifting ink (green to blue).
10. On the right, there is an Ashoka Pillar emblem.

II. METHODOLOGY

To create something means learning many other things on the way, and those are the following things used in the application.

2.1 CNN

Deep Learning, also known as Deep Neural Network, refers to Artificial Neural Networks (ANN) with many layers. It has been regarded as one of the most effective instruments in recent decades, and has gained widespread acceptance in the literature due to its ability to process massive amounts of data. Deeper secret layers have recently started to outperform traditional approaches in a variety of areas, most notably pattern recognition. The Convolutional Neural Network is a prominent deep neural network (CNN). It gets its name from the mathematical linear operation between matrices known as convolution. CNN is composed of many layers, including a convolutional layer, a non-linearity layer, a pooling layer, and a fully-connected layer. Pooling and non-linearity layers do not have constraints, but convolutional and completely connected layers do. In machine learning challenges, the CNN performs admirably. Particularly impressive were the applications dealing with picture data, such as the largest image classification data collection (Image Net), computer vision, and natural language processing (NLP), and the results obtained. In this paper, we will clarify and describe all of the elements and key problems associated with CNN, as well as how these elements function. Furthermore, we will discuss the parameters that influence CNN production. This paper suggests that the readers are familiar with machine learning and artificial neural networks.

2.2 SIFT (Scale Invariant Feature Transform)

SIFT, which stands for Scale-Invariant Feature Transform, was introduced in 2004 by D. Lowe of the University of British Columbia. SIFT means for image size and rotation invariance. Since this algorithm is copyrighted, it is included in OpenCV's Non-free module.

Locality: since features are local, they are resistant to occlusion and clutter (no prior segmentation) Person characteristics may be matched to a vast catalogue of items.

Quantity: Even small objects can generate a large number of features.

Efficiency: consistency that is similar to real-time.

Extensibility: can be readily generalised to a wide variety of different function forms, each of which adds robustness.

2.3 Tensorflow

TensorFlow is a free and open-source end-to-end software for developing Machine Learning applications. It is a symbolic math library that uses dataflow and differentiable programming to perform various tasks related to deep neural network training and inference. It enables developers to build machine learning software by using a variety of technologies, libraries, and community resources.

TensorFlow 2.4, the most recent iteration of Google's flagship deep learning platform, has finally been announced. TensorFlow 2.0 includes a slew of long-awaited enhancements. This article will go into how to build basic classification and regression models with TensorFlow 2.4 in a nutshell.

2.4 Methodology of Implementation

"Image Acquisition" : refers to the act of obtaining an image from an external source, such as hardware, for processing.

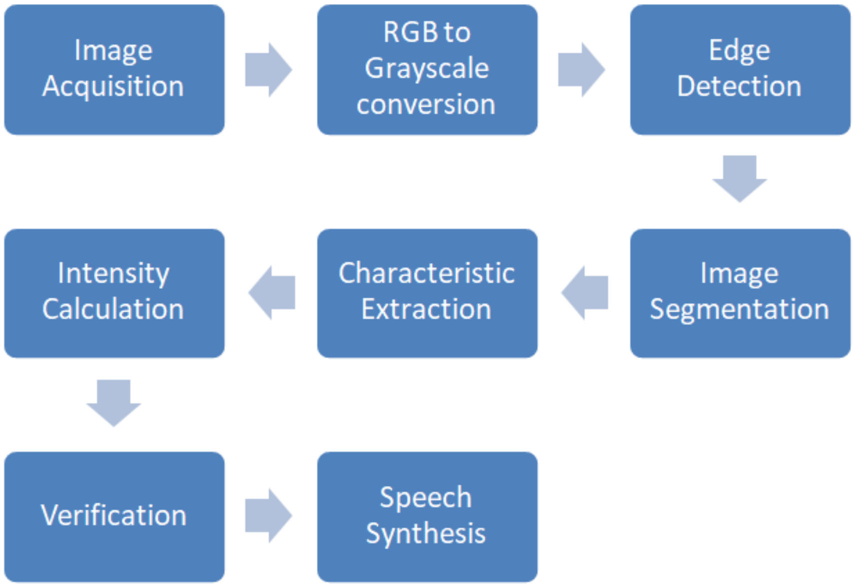
Binarization of an Image: "Binarization of an image" refers to the process of converting an image from grayscale to binary using a thresholding mechanism. The binary text form image would take up very little storage space.

Segmentation: The method of dividing an image or text into sections in order to use them for image processing functions such as feature extraction, detection, and so on is referred to as "Segmentation."

e-ISSN: 2582-5208
International Research Journal of Modernization in Engineering Technology and Science
Volume:03/Issue:06/June-2021 Impact Factor- 5.354 www.irjmets.com

Feature Extraction: “Feature Extraction” refers to the method of extracting features that serve as important as well as necessary characteristics such as symbols, text, and so on.

Recognition: "Recognition" refers to the method of distinguishing features after extraction.



III. SYSTEM DESIGN AND DEVELOPMENT

3.1 Pre-processing

The primary aim of pre-processing is to enhance the optical quality of images while also increasing the effect of datasets. Pre-processing of images refers to processes that are usually performed prior to the main data interpretation and information retrieval. Photo preprocessing, also known as image reconstruction, is the method of correcting distortion, loss, and noise introduced by the imaging process. Image pre-processing will significantly improve optical inspection performance. Image interpolation is used for image adjustment. Interpolation is a technique that is often used for activities such as zooming, spinning, and shrinking. When doing image processing, it is important to remove noise. Noise, on the other hand, may have an effect on segmentation and pattern matching. When running a smoothing operation on a pixel, a pixel's neighbour is used to do any conversion. Following that, a new pixel value is created.

3.2 Match input image with datasets

To validate feature similarities, we examine whether the key points in the test image are spatially consistent with those in the retrieved pictures. We employ the widely used geometric verification (GV) process, which involves fitting a fundamental matrix to determine the number of main points in the test image that are spatially compatible with those in the retrieved images.

Classification: In the voting process, each recovered image contributes votes to its image class (type of bill) based on the amount of spatially compatible key points it contains (computed in the previous step). As a result, the class with the most votes is declared the winner.

3.3 Audio output generation

Script files contain the document codes that have been accepted. The text to speech converter is then used to load these files and show the audio performance of text content. Users who are blind can customise their speech rate, speed, and vocabulary.

IV. RESULT AND DISCUSSION

To detect the currency, an Android-based framework is developed. The opencv-2.4 architecture is used for image analysis and matching. The system has been reviewed on Android 4.0 and higher. For each form of currency, eight images are taken for data set creation: four for the front side and four for the back side. As seen in above figure, we capture the image using an Android handset, which is then used as an input image. We've already saved a lot of image data in our dataset and from that dataset. The picture is identified from a stored dataset using the SIFT and GrabCut algorithms. The audio will be produced following the matching phase.

V. CONCLUSION

To address the popular targeting challenge for blind users, we proposed a mobile currency recognition programme that recognises Indian currency to assist blind people in their everyday lives in this project. The production of this project is in the form of regional audio. The SIFT algorithm outperforms the current HOG algorithm in terms of accuracy and recall value. When compared to current algorithms, the SIFT algorithm is reasonably efficient. This analysis would be expanded so that the classification will be used to equate original and forgery currency. International languages that can be found globally can be added. To create currency note identification software for visually disabled and semi-visually impaired people using a low-cost cell phone.

VI. REFERENCES

[1] A report on "DISABLED PERSON" based on data collected in a state survey.

[2] P. Viola and M. J. Jones, “Robust real-time face detection,” In IJCV 57(2), pp. 137– 154, 2004.

[3] S. Singh, S. Choudhury, K. Vishal and C. V. Jawahar, Currency Recognition on Mobile Phones, 22nd International Conference on Pattern Recognition (ICPR), Sweden, (24 August 2014), pp: 2661-2666, IEEE

[4] Jiheon OK, Korea Rep Euisun Choi, Korea Rep “Fast Country Classification of Banknotes.” IEEE 2013.

[5] Ravina Mithe, Supriya Indalkar, Nilam Divekar”Optical Character Recognition” International Journal of Recent Technology and Engineering (IJRTE), March 2013.

[6] Binod Prasad Yadav, C. S. Patil, R R Karhe, P. H. Patil, “Indian Currency Recognition and Verification System Using Image Processing”, Volume 4, Issue 12, December 2014.

[7] Dipti Pawade, Pranchal Chaudhari, Harshada Sonkamble, “Comparative Study of Different Paper Currency and Coin Currency Recognition Method'', International Journal of Computer Applications (0975 - 8887) Volume 66- No.23, March 2013

[8] Ethan Rublee, Vincent Rabaud, Kurt Konolige , Gary Bradski “ORB: an efficient alternative to SIFT or SURF”, IEEE International Conference on Computer Vision 2011.

[9] Trupti Pathrabe,et.al “A Novel Approach of Embedded System for Indian Paper Currency Recognition”, International Journal of Computer Trends and Technology-May to June Issue 2011.

[10] Michael Calonder, Vincent Lepetit, Christoph Strecha, “BRIEF: Binary Robust Independent Elementary Features”, 2010. A. Hinwood, ,et.al, “Bank note recognition for the vision impaired”, Australasian Physical & Engineering Sciences in Medicine Volume 29 Number 2, 2006.E Rosten and T Drummond. "Machine learning for high-speed corner detection," European Conference on Computer Vision, 2006