



REVIEW PAPER ON INDIAN CURRENCY DETECTION FOR VISUALLY IMPAIRED

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Abstract: Fake currency is the money produced without the approval of the government, creation of it is considered as a great Offence. The elevation of color printing technology has increased the rate of fake currency note printing on a very large scale. Years before, the printing could be done in a print house, but now anyone can print a currency note with maximum accuracy using a simple laser printer. This result in the issue of fake notes instead of the genuine ones has been increased very largely. It is the biggest problem faced by many countries including India. We hereby propose an application system for detecting fake currency where image processing is used to detect fake notes. We will find out dissimilarities between the image under consideration and the prototype. CNN classifiers will be used to detect fake currency. The proposed app for fake currency detection will be simple, accurate and easy to use.

Keywords: Currency Detection, Image Processing, CNN

fake currencies, because they don't know the proper and precise way of finding the difference between fake and real currencies. So automatic identification of currencies using image processing techniques will be helpful to these peoples. it is also useful at other workplaces. The system is designed to check the Indian currency note with denominations 10, 20, 50, 100, 200, 500 and 2000. It will pre-process the digital pictures and organise the prepared arrangement of information and it will distinguish in monetary forms. This paper proposes a convenient and cheapest method for identifying Indian currencies. At the end of the process user can know whether the currency note is fake or real and it's equivalent currency value into more than 150 counties

The assistive technology is one of the most basic and important systems that helps a person with a disability to work around his challenges. This project presents progressive efforts for developing an assistive technology for visually impaired so that they can lead their life independently both socially and financially.

I. INTRODUCTION

Now Currency duplication also known as counterfeit currency is a vulnerable threat to the economy. Although fake currency is being printed with precision, the Crime Investigation Department (CID) says that they can be detected with some effort. Currency printed by local racketeers can be detected easily as they use the photographic method, hand engraved blocks, lithographic processes and computer colour scanning. In counterfeit notes, the watermark is made by using opaque ink, painting with white solution, stamping with a dye engraved with the picture of Mahatma Gandhi. Tourists are the most vulnerable people to

II. LITERATURE SURVEY

A literature survey is the utmost significant step in any kind of investigation. In this section, we briefly analyse the related work on Indian Currency Detection for Visually Impaired.

[1] Anju Yadav, Tarun Jain, Vivek Kumar Verma, Vipin Pal. "Evaluation of Machine Learning Algorithms for the Detection of Fake Bank Currency in IEEE." Issue in (June 03, 2021) In this paper. Nowadays it is required that bank or ATM machines must have some system that can

identify the forged note from the genuine note. To determine the legitimacy of the banknote, artificial intelligence and Machine learning (ML) can play a vital role to design such a system that can identify forged notes from the genuine bank currency. The algorithm used is item SML (Supervised Machine Language). SML algorithm is applied to the banknote authentication data set taken from UCI ML repository on three different train test ratios 80:20, 60:40, 70:30. The method which shows highest ratio accuracy is considered to be performing better and showing higher accuracy results.

[2] Kalpana Gautam. "Indian Currency Detection using Image Recognition Technique in IEEE." Issue in (July 04, 2020).

Many software methods are used for paper currency recognition. It is the easy way to extract the visible features of the currency and then find out whether the currency is genuine or not like currency size and color but it is complex to recognize the currency whether it is duplicate or the genuine based on the hidden features of the currency like watermark feature. The techniques and algorithms used in this paper are: PCA algorithm, LBP algorithm, Euclidean Distance.

[3] Akanksha Upadhyaya, Dr. Vinod Shokeen, Dr. Garima Srivastava. "Anal-ysis of Counterfeit Currency Detection Techniques for Classification Model in IEEE." Issue in (2018)

This paper describes to help the individual in checking the originality of currency, an android app has been developed for detection, The system would enable the individual to detect some of the features of currency i.e. watermark, optically variable ink, security thread, latent image etc. The techniques used in this paper are, Security thread using neural network, Pattern recognition. This paper provides a quick overview about various methodologies and their respective accuracy rate for detection of originality of currency. The effort is also made to analyze and compare the prediction and classification statistical technique i.e. logistic regression and LDA.

[4] Georgie V Rajan, Dincy M Panicker, Nisha Elizabeth Chacko , Jayalekshmi Mohan, Kavitha V.K. "An Extensive Study on Currency Recognition System Using Image Processing in IEEE." Issue in (2,3 March 2018)

In this paper, The aim of the currency recognizing system is to help people to identify fake notes and also helps to reduce human effort. Digital image processing is a wide area which provides an accurate solution to this problem. In digital image

processing, MAT-LAB is used to extract the features of paper currency. The techniques used in this paper are: Image Acquisition, Image Pre-processing, Edge Detection, Feature Extraction, Image segmentation, Authentication. In this system, accuracy is more important than a millionth of a second. By using digital image processing, analysis of paper currency is more efficient on the basis of cost and time consuming than existing systems.

[5] Devashree R. Patwardhan¹ , Swarali Namjoshi , Vrinda Valunj, Pratibha Shikhare , Prof. Anjali Shejul. "Currency Recognition System Using Image Processing." Issue in (2015)

This paper explains, each country has its own different currency so it is a very complicated task for people to recognize the currency. In the manual currency recognition system, there are many problems. We will be developing this system to overcome those problems which have been faced. The techniques used in this paper are to obtain the image of the target currency (e.g.: Camera, Scanner, etc) and use Image pre-processing algorithms to change the nature of the image in order to extract required information.

III. PROPOSED APPROACHES

A. Problem Statement

Post demonetization, the sizes of the Indian currency notes have drastically changed. For example, the new Rs.100 and Rs.200 notes have similar physical dimensions. Though the color of such notes is very contrasting, this difference is beneficial only to those blessed with eyesight. The population of the visually challenged in India is a staggering 36 million. These people have a hard time identifying these new notes (even the Braille and small dots and holes on these notes seem to fade away with prolonged usage). This project aims to relieve some of their problems using assistive technology.

B. System Architecture:

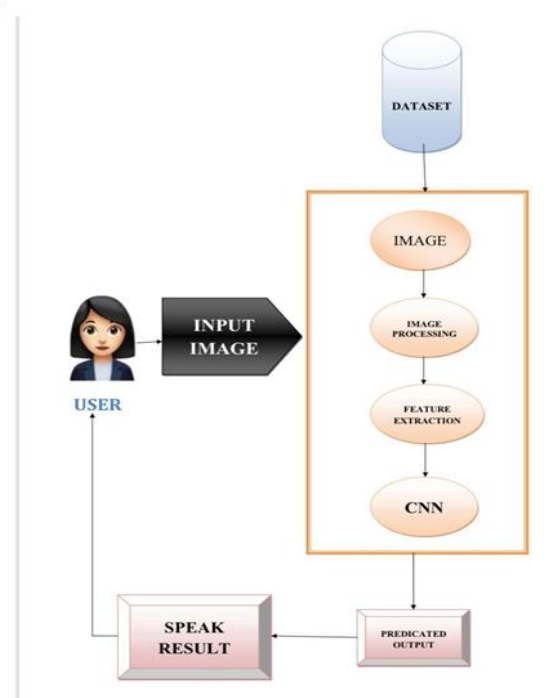


Fig. System Architecture

The steps of a currency recognition system based on image processing are as follows –

1. Image Acquisition
2. Pre-processing
3. Edge Detection
4. Image Segmentation
5. Feature Extraction
6. Comparison

Finally, the output is displayed as a pop up or can also be given as an audio output for the visually impaired.

Dataset:

The whole architecture is made by the PyQT library used in python language. PyQT library gives all the necessary stuff related to GUI design. PyQT provides us with a display screen, buttons and so on. So, in this way PyQT helps us in designing GUI.

Image Processing:

After designing the GUI, another task is to authenticate valid users for operating applications. To deal with this task, we are using MySQL database to store data of username and password and through this, users can authenticate easily.

Predicated Output:

Another task is to pre-process the input image which can be done by the OpenCV library of python. By using this library, the image is converted into grayscale image, contour image and smoothen image.

Speak Result:

In this system we detect the Indian currency based currency dataset and apply image processing with the help of machine learning techniques.

IV. METHODOLOGY

A. Algorithm:

In general, the CNN deep learning model is used to train and evaluate each image through a series of convolution layers, pooling, applying filters, completely connected layers, and applying an activation function known as 'ReLU' to isolate the object with probabilistic values ranging from 0 to

1. A Convolution Neural Network is made up of two Convolutional layers, two max pooling layers, two ReLU layers and two fully connected layers, with the input image passing through all of them and the output coming after the Fully Connected layers. Convolutional layers were used to remove the images characteristics. The input is a coloured image, which is separated into RGB channels; the filter size is 3x3. CNN is a powerful algorithm for image processing. CNN's used for image classification and recognition because of its high

accuracy. The CNN follows a hierarchical model which works on building a network, like a funnel, and finally gives out a fully connected layer.

B. Mathematical Model:

Let 'S' be the system

$$S = I, O, P, F_s,$$

$$S_s$$

Where,

I = Set of input

O = Set of

output

P = Set of technical processes

F_s = Set of Failure state

S_s = Set of Success state

Identify the input data I_1, I_2, \dots, I_n

I = (Input Data (Text, Image), Dataset (Indian Currency))

Identify the output applications as O_1, O_2, \dots, O_n (Currency Detection)

Identify the Process as

P

P = (Image pre-processing, Image Processing, Gray-scale, smoothing, Edging, segmentation, feature extraction, classification, show result)

- Identify the Failure state as F_s

F_s = (If data set not loaded, If not predicted, if more time required to predict

- Identify the Success state as S_s

P = (Correct prediction within time)

V. CONCLUSION

Out of all this, our methodology has proven that it provided the most accurate results in finding the name, origin and value or denomination of the currency using image processing techniques with 93.3 % accuracy and within in less time i.e. average of 5.3 seconds. This is much better than some other crude algorithms like pixels to pixels. We have chosen only a few currencies. In future we will progress it to maximum currencies.

VI. REFERENCES

- [1] Anju Yadav, Tarun Jain, Vivek Kumar Verma, Vipin Pal, "Evaluation of Machine Learning Algorithms for the Detection of Fake Bank Currency in IEEE." June 03, 2021.
- [2] Kalpna Gautam "Indian Currency Detection using Image Recognition Technique in IEEE, July 04, 2020.
- [3] Akanksha Upadhyaya, Dr. Vinod Shokeen, Dr. Garima Srivastava, "Analysis of Counterfeit Currency Detection Techniques for Classification Model in IEEE." 2018.
- [4] Georgie V Rajan, Dincy M Panicker, Nisha

Elizabeth Chacko , Jayalekshmi Mohan, Kavitha V.K, “An Extensive Study on Currency Recognition System Using Image Processing in IEEE.” 2-3 March 2018.

[5] Tushar Agasti, Gajanan Burand, Pratik Wade and P Chitra, “Fake currency detection using image processing 14th ICSET” 2017.

[6] Komal Vora, Ami Shah, Jay Mehta “A Review Paper on Currency Recognition System International Journal of Computer Applications (0975 – 8887), Volume 115 – N0”, 20, April 2015.

[7] Chinmay Bhurke, Meghana Sirdeshmukh, Prof. Mrs. M.S.Kanitkar, “Currency Recognition Using Image Processing International Journal of Innovative Research in Computer and Communication Engineering, Vol. 3, Issue 5” May 2015.

[8] B.Sai Prasanthi, D.Rajesh Setty “Indian Paper Currency Authentication System- A Quick Authentication System” International Journal of Scientific & Engineering Research, Volume 6, Issue 9, September-2015

[9] Devashree R. Patwardhan¹ , Swarali Namjoshi , Vrinda Valunj , Pratibha Shikhare , Prof. Anjali Shejul, “Currency Recognition System Using Image Processing” 2015.

[10] Fake Indian Currency Note [Online]. Available: https://en.wikipedia.org/wiki/Fake_Indian_currency_note

[11] Trupti Pathrabe G and Swapnili Karmore, “Int. JE. CompTrends Tech 152-156” 2011.

[12] Kavya B R, Devendran B, “Indian Currency Detection And Denomination Using Sift” International Journal of Science, Engineering and Technology Research (IJSETR), Volume 4.