National Conference on
"Role of Engineers in Nation Building" organized by VIVA Institute of Technology, Mumbai
(6th and 7th March 2020)
International Journal of Engineering Research & Science (IJOER)
ISBN:[978-93-5391-287-1] ISSN: [2395-6992] [Vol-6, Issue-3, March-2020]

Multicurrency Calculator with Fake Currency Detection Using Image Processing

Maitreyee Mishra[1], Sumit Popalkar[2], Tejal Palkar[3], Prof. Karishma Raut[4]

[1]Department of EXTC, MUMBAI University, MUMBAI-32
Email: maitreyeemishra1999@gmail.com
[2]Department of EXTC, MUMBAI University, MUMBAI-32
Email: sumitpopalkar.99@gmail.com
[3]Department of EXTC, MUMBAI University, MUMBAI-32
Email: tejal.palkar06@gmail.com
[4]Department of EXTC, MUMBAI University, MUMBAI-32
Email:karishmaraut@viva-technology.org

Abstract*—It is not easy for people to recognize currencies from different countries. Our aim is to help people solve this problem. However, currency recognition systems which are based on image analysis entirely are not sufficient. Our proposed system is based on image processing and it helps to make the process automatic and robust. Color as well as shape information are used in our algorithm. There are approximately 50 currencies all over the world and each of them look totally different. For example the size of the paper is different, the same as the color and pattern. The staffs who work for the money exchanging have to distinguish different types of currencies and that is a difficult job. They have to recall the symbol of each currency. This may cause some problems (e.g. wrong recognition), so they need an efficient and accurate system to help their work. The aim of our system is to help people who need to recognize different currencies, and work with convenience and efficiency.*

Keywords—color, currencies, image, recognition, shape

I. INTRODUCTION

Automatic recognition of fake Indian currency note is significant in many applications such as automated goods seller machine and automated goods tellers machine. This system is used to detect the correct Indian currency note. The system consists of eight steps consisting of image acquisition, grey scale conversion, edge detection, feature extraction, image segmentation, comparisons of images and output. Automatic machines are more helpful in banks because banks faces the problem of counterfeit currency notes or destroyed notes. Therefore involving machine makes note recognition process organized and precise.

Automatic machine is more important to discover fake currency note in every country. This system is designed to check the Indian currency note of 100, 500 and 2000 rupees. The system will display currency is original or fake and its currency denomination. It is very important to grow automated system to get feature and recognize Indian currency note in various areas such as banking, ATM machine, shopping mall, Bus station and railway station.

We put forward a system for automated currency recognition using image processing techniques. The proposed method can be used to recognize both the country or origin as well as the denomination or value of a given banknote. Only paper currencies have been considered. This method works by first identifying the country of origin using certain assumed areas of interest, and then take out the denomination value using characteristics such as size, color, or text on the note, depending on how much the notes within the same country vary. We have considered 5 of the most traded currencies and their denominations. Our system is able to accurately and quickly identify these test notes.

International Journal of Engineering Research & Science (IJOER)
ISBN:[978-93-5391-287-1] ISSN: [2395-6992] [Vol-6, Issue-3, March-2020]

TABLE 1
COMPARISON BETWEEN MAIN METHOD

Sr.No.	Title	Publication and Year	Work Done
1	Automatic Recognition of Fake Indian Currency Note.	IEEE 2016	Principal component Analysis is used for recognition.
2	Design and Implementation of Paper Currency Recognition with Fake Currency Detection.	IEEE 2016	Symmetrical mask is used to consider specific signs of paper currency.LBP is used as texture analysis technique.
3	Feature Fusion for Fake Indian Currency Detection.	IEEE 2017	Mean square error was computed between the security features of real and fake currency.
4	Currency Recognition System Using Image Processing.	IEEE 2017	Segmentation of note and template matching is used for classification.
5	Fake currency detection using image processing.	ICSET 2017	The results are shown in a GUI made in MATLAB which shows extracted features like security thread and serial number.
6	Fake Indian Paper Currency Identification System.	IJARCSSE 2016	Time series data and Fourier power spectra are used.
7	Image Based Currency Recognition System.	IJPAM 2017	Image analysis and image processing techniques are used.
8	Currency Recognition System Using Image Processing.	IRJET 2017	Gaussian function in hidden layer and output layer in the place of sigmoid function are used for the recognition of known features and rejection of unknown patterns.
9	An Intelligent Paper Currency Recognition System.	ICCMIT 2015	Co-relation between images is used using radial basis function network.
10	Paper Currency Recognition System.	IJETTCS2016	Texture feature is used. Gray level co-occurrence matrix and LBP operator is used.
11	Identification of Paper Currency Techniques.	IJSTE 2016	Pre-processing and feature extraction technique are used.
12	Fake Indian Currency Detection.	IJPAM 2018	Techniques such as Intagelio printing, optically variable link, identification mark, latent picture are used to detect fake currency.

Above is the table for Literature survey. 12 papers have been studied by us which includes 6 papers of fake currency detection and 6 papers of denomination of currency or its origin. Each paper shows different ways of detection and denomination of currencies respectively. Variousdifferent methods like Segmentation, Image Processing, Texture Feature, LBP, Intagelio Printing etc. are used as pre-processing for the currencies.

II. METHODOLOGY

The Proposed system consists of basic pre-processing steps for image to determine whether the currency is fake or original. Basic Morphological Operations such as Grey Scale Conversion, Feature Extraction, Extracting the Region Of Interest are used. Disk Method is applied to the image in which the pixels are converted accordingly in circular or rectangular shapes. Noise is removed and converted into Black and White. In disk method, dark becomes darker and light becomes lighter. These are the few methods used for pre-processing of the image. I. Pre-processing The simplest way to get the data without over- fitting and under fitting is

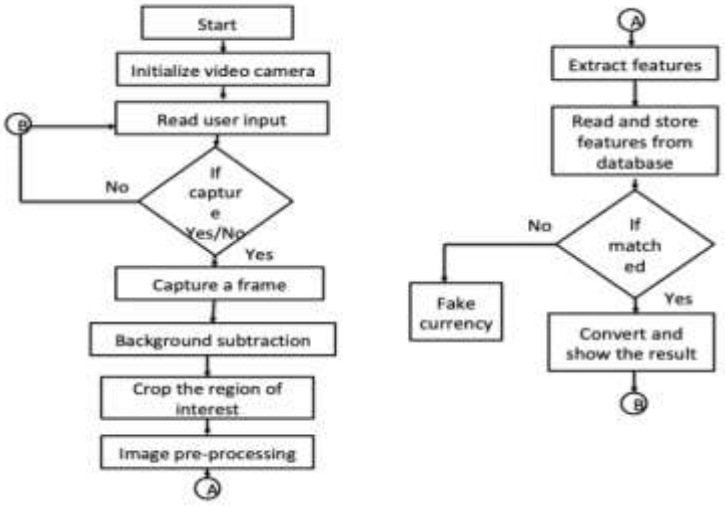
International Journal of Engineering Research & Science (IJOER)
ISBN:[978-93-5391-287-1] ISSN: [2395-6992] [Vol-6, Issue-3, March-2020]

to pre-process the dataset. The main aim behind the data pre-processing is that to add a value to the base value which is the data-set generated. The main advantage of data pre-processing is to get a better training-set. The method that we use in our experiments (AFCRS) it requires an input image shape of 64x 64 x 3, where 3 refers to the R, G, B (red, green, blue) components of a colored image and the image must be 64 x 64 pixels in size. We then apply the following three types of image preprocessing for the original datasets, and we also choose our first filter beginning with 64.

a)Image Re-scaling we'd like to re-scale the image to form the model knowledge in a perfect format so the coaching is improved, particular, and faster. we've re-scaling think about keras. to use this issue, we'd like to import the library from keras pre- process as "ImageDataGenerator". If the re-scaling issue is none or zero, no re-scaling is applied, or we have a tendency to multiply the info by the worth provided. this is often done when applying all alternative transformations. For our model AFCRS, we have a tendency to use a re-scaling issue as: rescale=1/255 for each coaching and testing data-sets.

b)Image cutting we want to snip the image for improve and correct knowledge .We even have shear vary consider keras. this is often to be foreign from the keras pre-processing library. For our model AFCRS, we tend to use a cutting vary as short range=0.2. in most of cases Shear vary could be a Shear angle in counter-clockwise direction in degrees, that is additionally referred to as shear intensity. 19

c)Perspective Transformations Applied perspective transformations on coaching knowledge to rivet the vary of zoomrange=0.2 to induce the correct results by learning in associate degree correct manner. Zoom vary could be a float or lower, higher vary for random zoom. this is often additionally done by mercantilism a library from keras pre-processing.



IV.RESULT

1. Grey scale conversion:

FIGURE 1:Conversion of 2000/- Rupee Note

National Conference on
"Role of Engineers in Nation Building" organized by VIVA Institute of Technology, Mumbai
(6th and 7th March 2020)
International Journal of Engineering Research & Science (IJOER)
ISBN:[978-93-5391-287-1] ISSN: [2395-6992] [Vol-6, Issue-3, March-2020]

2. Finding the region of interest:

FIGURE 2:ROI of 2000/- Rupee Note

FIGURE 3: GUI for Pre-processing of 10/- Rupee Note with the Calculation of Overseas Currencies into INR

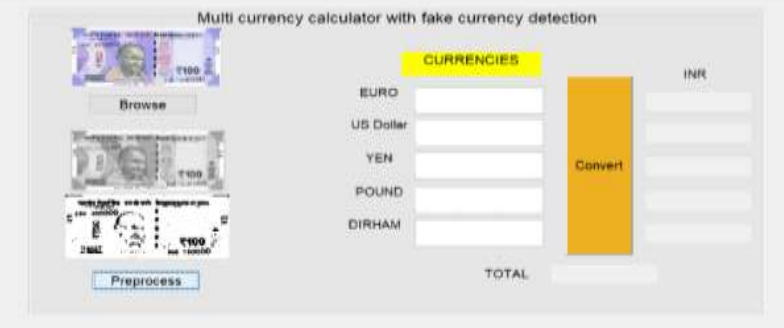


FIGURE 4: GUI for Pre-processing of 100/- Rupee Note with the Calculation of Overseas Currencies into INR

FIGURE 5: GUI for Pre-processing of 2000/- Rupee Note with the Calculation of Overseas Currencies into INR

International Journal of Engineering Research & Science (IJOER)
ISBN:[978-93-5391-287-1] ISSN: [2395-6992] [Vol-6, Issue-3, March-2020]

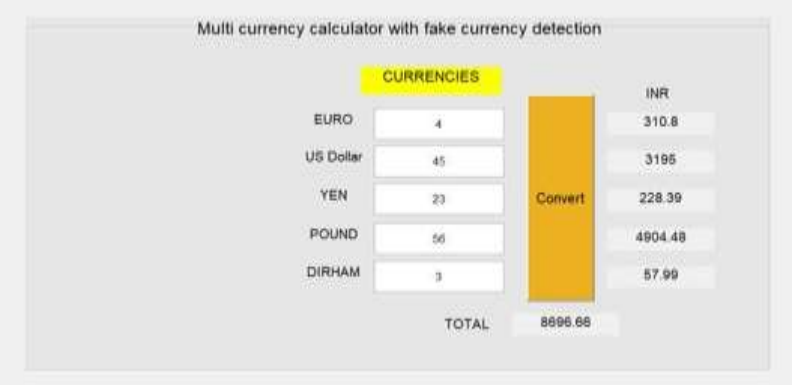


FIGURE 4:Example of Conversion of Overseas Currencies into INR

The above result shows some of the pre-processing steps such as Gray-scale conversion and obtaining the Region of Interest. Also, conversion of different values of different currencies to Indian Rupees has been done. The proposed system uses different valued currency notes such as 10, 100 and 2000 rupees.

V.CONCLUSION

Thus,the proposed system till now concludes the GUI which shows the conversion of different overseas currencies into Indian (INR) rupees. Here, the overseas currencies used are: Euro, Dirham, Pounds, Yen and US Dollar. The current values of the currencies have been stored in the database/program to convert it into Indian Rupees accordingly.

Also, different valued notes of rupees 10, 100 and 2000 are used as for the detection of fake currency or original currency. The pre-processing steps such as grey scale conversion and region of interest are shown. The region of interest is found based on the parameters such as security thread. Hence till now, we conclude with the GUI and the pre-processing steps i.e. grey scale conversion and finding the region of interest.

REFERENCES

[1] Sonali R. Darade, Prof. G. R. Gidveer, "Automatic Recognition of Fake Indian Currency Note", 2016 International Conference on Electrical Power and Energy Systems (ICEPES) Maulana Azad National Institute of Technology, Bhopal, India. Dec 14-16, 2016.

[2] Sahana Murthy, Jayanta Karamathur, B. Roja Reddy, "Design and Implementation of Paper Currency Recognition with Fake Currency Detection", 2016 Online International Conference on Green Engineering and Technologies (IC-GET).

[3] Neeru Rathee, Arun Kadian, Rajat Sachdeva, "Feature Fusion for Fake Indian Currency Detection", 2016 International Conference on Computing for Sustainable Global Development (INDIACom).

[4] Vedasamhitha Abburu, Saumya Gupta,"Currency Recognition System Using Image Processing", Proceedings of 2017 Tenth International Conference on Contemporary Computing (IC3), 10-12 August 2017, Noida, India.

[5] Achal Kamble, Prof. Mrudula Nimbarte, "Fake currency detection using image processing", IOP Conf. Series: Materials Science and Engineering 123246536 (72809107) 052047.

[6] P. Julia Grace, A. Sheema, "Fake Indian Paper Currency Identification System", Grace et al., International Journal of Advanced Research in Computer Science and Software Engineering 6(7), July- 2016, pp. 340-345.

[7] B. Vanajakshi, D. Gowthami, N. Mounika, "Image Based Currency Recognition System", International Journal of Pure and Applied Mathematics Volume 114 No. 11 2017, 11-18.

[8] Yaojia Wang, Siyuan Lin, "Currency Recognition System Using Image Processing", International Research Journal of Engineering and Technology (IRJET) Volume: 04 Issue: 03 | Mar -2017.

[9] Muhammad Sarfraj, "An Intelligent Paper Currency Recognition System", International Conference on Communication, Management and Information Technology (ICCMIT 2015).

[10] O. Rama Devi, J. Rajendra Prasad, "Paper Currency Recognition System", International Journal of Emerging Trends & Technology in Computer Science (IJETTCS) Volume 5, Issue 2, March - April 2016.

International Journal of Engineering Research & Science (IJOER)
ISBN:[978-93-5391-287-1] ISSN: [2395-6992] [Vol-6, Issue-3, March-2020]

[11] Snehlata Sahu, Toran Verma, "Identification of Paper Currency Techniques: A Survey", IJSTE - International Journal of Science Technology & Engineering | Volume 2 | Issue 12 | June 2016.

[12] B.V.Subba Rao, M.Sundara Babu "Paper Currency Recognition System", International Journal of Emerging Trends & Technology in Computer Science (IJETTCS) Volume 5, Issue 2, March - April 2016.

[13] S. R. Rimitha, Manjunath Mulimani, Shashidhar G. Koolagudi, "Currency Recognition System Using Image Processing", Proceedings of 2017 Tenth International Conference on Contemporary Computing (IC3), 10-12 August 2017, Noida, India.

[14] Tushar Agasti, Gajanan Burand, Pratik Wade, P.Chitra "Fake Currency Detection using Image Processing", IOP Conference Series : Material Science and Engineering.

[15] Sagar S. Rajebhosle, Devang S. Gujrathi,"Currency Recognition System using Image Processing", International Research Journal of Engineering and Technology, volume: 04 issue: 03 |Mar -2017