Fake Currency Detection

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Abstract— *Increase in technology like scanning, color printing results in duplication of currency. Hence it is important to detect counterfeit. In the project firstly image acquisition is done then pre-processing is applied to the image. The pre-processing include crop, smooth and adjust. Then the image is converted into gray color. After conversion the image segmentation will be applied and features are extracted . Then counterfeit is detected by comparing features of images.*

Keywords—Pre-processing, banker, coins, Bank notes, Currency

1. INTRODUCTION

Since the beginning of civilization, societies have relied substantially on the ability to trade with one another, the ability to trade with one another is fundamental to the existence of our society as we know it. This ability to trade with one another is often a key enabling factor to an individual societies' strength to both survive and progress.
Trade has evolved from the elementary system of bartering to the complex combination of banknotes, coins, and electronic currency in use today. Interestingly what was once a system of trade facilitated by items of real intrinsic comparable value, has now evolved to a system where the primary medium for exchange holds no intrinsic value, yet value is exchanged.
The value held within promissory notes was not concrete, the reputation of the issuing bank for keeping their promise directly influenced the actual trading power held in each note. For an issuing authority to keep their promise, their stocks of precious metals must match the amount redeemable in circulation, widespread counterfeiting led to an inability to redeem promissory notes. Therefore the level of counterfeit notes in circulation of a specific issuing authority at any moment influenced their reputation and thus trading power.
Every year Reserve bank of India face the counterfeit currency notes or destroyed notes. Handling of large volume of counterfeit notes imposes additional problems. Therefore, involving machines with the assistance to the human experts, makes notes identification process simpler and efficient. For the detection of forged notes (take a bank as example) it needs to identify the denomination every time they use the device which consist of ultraviolet light. The bank employee keeps the paper currency note on the device and try to find whether the watermark identification, serial number and other characteristics of the notes are proper to get the denomination and check its authentication. This increases the work of the employee. Instead, if the banker uses this system, the result could be more accurate . Same is the case with areas such as shopping malls, investment firms where such systems can be used. Immediate need is to make an easier way to identify the currency notes

2. SYSTEM MODEL AND ASSUMPTIONS

The printing house has the ability to make counterfeit paper currency, but it is possible for any person to print counterfeit bank notes simply by using a computer and a laser printer at house. Therefore the issue of efficiently distinguishing counterfeit banknotes from genuine ones via automatic machines has become more and more important.
TruptiPathrabe and SwapniliKarmore [4] introduced a new technique to improve the recognition ability and the transaction speed to classify the Japanese and U.S. paper currency. This compares two types of data sets, time series data and Fourier power spectra are used. In both cases, they are directly used as inputs to the neural network. They also refer a new evaluation method of recognition ability.
Mirza and Nanda[5] has a technique to extract paper currency denomination. The extracted region of interest (ROI) can be used with Pattern Recognition and Neural Networks matching technique. First they acquire the image by simple at scanner on _x dpi with a particular size, the pixels level is set to obtain image. Few filters are applied to extract denomination value of note. They use different pixel levels in different denomination notes. The Pattern Recognition and Neural Networks matcher technique is used to match or find currency value/denomination
Pathrabe and Bawane [6] gives the algorithm with low computational complexity, which can meet the high speed requirement in practical applications. It needs to be noted that the proposed technique may not be able to distinguish counterfeit notes from genuine notes. Indeed, techniques use infrared or ultraviolet spectra may be used for discriminating between genuine and counterfeits notes.

3. EFFICIENT COMMUNICATION

Is one thing to be sure, that something happens to the original works. It means that our average method works.

But the results were not as expected. We wanted to convert the image into a grayscale, but this turned out to be a rather black image. This problem arise due to the fact, that we take average of the three colors. Since the three different colors have three different wavelength and have their own contribution in the formation of image, so we have to take average according to their contribution, not done it averagely using average method. Right now what we are doing is this, 33% of Red, 33% of Green, 33% of Blue
We are taking 33% of each, that means, each of the portion has same contribution in the image. But in reality thats not the case. The solution to this has been given by luminosity method.

You have seen the problem that occur in the average method. Weighted method has a solution to that problem. Since red color has more wavelength of all the three colors, and green is the color that has not only lesswavelength then red color but also green is the color that gives more soothing effect to the eyes. It means that we have to decrease the contribution of red color, and increase the contribution of the green color, and put blue color contribution in between these two.
So the new equation that form is:
New grayscale image = ((0.3 * R) + (0.59 * G) + (0.11 * B)).
According to this equation, Red has contribute 30%, Green has contributed 59% which is greater in all three colors and Blue has contributed 11%.
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4. SECURITY

The design flow of fake currency detection system consists of eight stages. This system works on two images one is original currency image and other is image of currency used for authentication purpose.

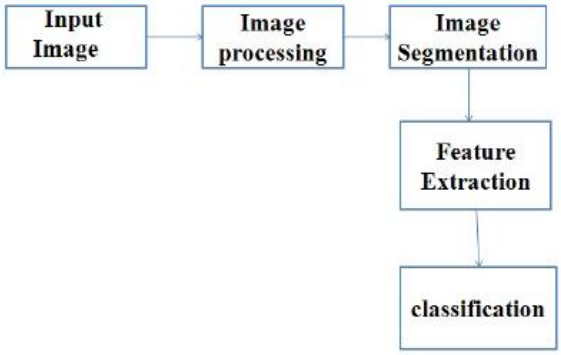
1. Image acquisition

The camera or scanner is used for image acquisition. The acquired image should consist of all the features. The image acquisition is to acquire a digital image. It requires camera. It may be a webcam.

2. Pre-processing

In pre-processing the operations normally initial to main data analysis and extraction of information. In this unwanted distortion are suppressed and enhance some image features that are important to further processing. It includes image adjusting and image smoothening. In image adjusting, when the image obtained from scanner the size of image is large therefore to reduce the size of image, image adjusting is used. In this for image adjusting interpolation is used. In image smoothening, while using camera or scanner and perform image transfer, some noise will appear on the image. The important step of removing noise is done by image smoothening. For image smoothening median filter is used.

The median filter is normally used to reduce noise in an image, somewhat like the mean filter. However, it often does a better job than the mean filter of preserving useful detail in the image.
Like the mean filter, the median filter considers each pixel in the image in turn and looks at its nearby neighbors to decide whether or not it is representative of its surroundings. Instead of simply replacing the pixel value with the mean of neighboring pixel values, it replaces it with the median of those values. The median is calculated by first sorting all the pixel values from the surrounding neighborhood into numerical order and then replacing the pixel being considered with the middle pixel value. (If the neighborhood under consideration contains an even number of pixels, the average of the two middle pixel values is used.) Figure 1 illustrates an example calculation.



5. CONCLUSION AND FUTURE ENHANCEMENT

In this project, detection of fake Indian currency note will be done by using image processing principle. This will be the low cost system. The system will works for denomination of 100,500,and 2000 for Indian currency. The system also provides accurate and valid results. The process of detection of fake note will be quick and easy. In this system input will taken by CCD camera and output will be displayed on PC.
So far in all the previous research papers the images were scanned horizontally. We will trying to scan the images with different angles and different methods could be used for recognizing foreign currencies like US dollar, EURO etc., in order to produce better accuracy rate in finding counterfeiting notes. This technique will be very adaptive to implement in real time world. Not only in banks, can also be used in shops or some other places.

6. REFERENCES

[1] Bender, K. (2006). Moneymakers. Berlin: John Wiley and Sons.

[2] KomalVora, Ami Shah, Jay Mehta, "A Review Paper on Currency Recognition System", International Journal of Computer Applications , vol. 115, no.20, pp.125-130 , 2015.

[3] Prof. RenukaNagpure, Shreya Sheety,TruptiGhotkar, "Currency Recognition and Fake Note Detection", IJIRCCE, vol-4,2016

[4] G. TruptiPathrabe, Mrs.SwapniliKarmore, "A Novel Approach of Embedded System for Indian Paper Currency Recognition", International Journal of Computer Trends and Technology, pp.2231-2803,2010

[5] Rubeena Mirza, Vinti Nanda, "Characteristic Extraction Parameters for Genuine Paper Currency Verification Based on Image Processing", IFRSA International Journal of Computing, vol. 2, no. 2, 2012.

[6] Pathrabe T, Bawane N.G, \Feature Extraction Parameters for Genuine Paper Currency Recognition Veri_cation", International Journal of Advanced Engineering Sciences and Technologies, vol 2, pp.85-89, 2011

[7] B. Sai Prasanthi, D. Rajesh Setty , Indian Paper Currency Authentication System using Image processing", International Journal of Scientific Research Engineering Technology (IJSRET), pp.2278 0882.

[8] 8280Binod Prasad Yadav, C. S. Patil, R. R. Karhe, P.H Patil, "An automatic recognition of fake Indian paper currency note using MATLAB" in Proceedings of International Journal of Engineering Science and Innovative Technology (IJESIT) Volume 3, Issue 4, July 2014

[9] B.SaiPrasanthi , D.RajeshSetty, "Indian Paper Currency Authentication System- A Quick Authentication System" International Journal of Scientific & Engineering Research, Volume 6, Issue 9, September-2015 1249 ISSN 2229-5518

[10] Kavya B R, Devendran B, "INDIAN CURRENCY DETECTION AND DENOMINATION USING SIFT" International Journal of Science, Engineering and Technology Research (IJSETR), Volume 4, Issue 6, June 2015

[11] W. K. ElSaid, "Fake Egyptian Currency Detection System using Texture and Shape Characteristics" International Journal of Computer Applications (0975 – 8887) Volume 143 – No.2, June 2016