



e-ISSN: 2319-8753 | p-ISSN: 2347-6710

IJIRSET

International Journal of Innovative Research in
SCIENCE | ENGINEERING | TECHNOLOGY



INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH

IN SCIENCE | ENGINEERING | TECHNOLOGY

Volume 10, Special Issue 2, December 2021

ISSN INTERNATIONAL
STANDARD
SERIAL
NUMBER
INDIA

Impact Factor: 7.569

Detection of Fake Indian Currency using Machine Learning

Mr. A. Kumara Vadivelan², Dr.M.Deepamalar¹, G.Gokilavani³

Assistant Professor, Paravathy's Arts and Science College, Dindigul, TamilNadu, India¹

Associate Professor, Paravathy's Arts and Science College, Dindigul, TamilNadu, India²

PG Scholar, Paravathy's Arts and Science College, Dindigul, TamilNadu, India³

ABSTRACT: Fake currency detection affects the economy and real currency notes. The use of counterfeit currency is one of the major issues nowadays. The counterfeiters are becoming harder to watch. The software will recognize Indian currency notes using a webcam on image processing technology and applying it to verify valid currency notes. The software will extract features from images for fake currency detection and measure in terms of accuracy and speed. So it is work on which will be impossible to implement on counterfeit notes so we started working on minutiae parameters. It will be enough to differentiate between fake and original notes.

KEYWORDS:-Image processing, Pre-processing, Convolutional Neural Network, Feature extraction, Currency detection.

I. INTRODUCTION

Fake currency is the illegal replication of the original note. Counterfeit currency has not been authorized by the RBI (Reserve Bank of India) and the Government. The methodology of image processing is used for the extraction of the features on currency notes. The images are analyzed using different image processing techniques. The proposed work, the Keras deep learning library in python to build our CNN (Convolutional Neural Network). We should install the Tensor Flow and Theano which works on the back end of Keras.

IMAGESPROCESSING: A collection of picture elements (pixel) is called an image. An image is represented by two-dimensional structure. Analog images converted into a digitized image are called image processing. It is considering three types of levels there are low-level, mid-level, and high-level. The low-level process is reducing noise, contrast enhancement, and image sharpening. These operations are called primitive operations. The mid-level process includes tasks such as segmentation and classification. High-level process is image analysis. Key stages of image processing of image restoration, image acquisition, image enhancement, morphological processing, segmentation, object recognition, representation and description, color image processing, image compression.

PATTERN RECOGNITION: Pattern recognition is used to scan the input images pixel-by-pixel to find the exact matches. This recognition process can identify the features from the images. The pattern recognition process is collecting the data from the source images, removing a noise, observing some features otherwise elements from images. Some Pattern recognition software is LIBSVM (support vector machine), SVM light (support vectormachine software), PR tools (Implemented to math lab), MATLAB (Implementing and testing pattern recognition algorithms).

WHAT IS CNN?: Convolution Neural network is mostly used to analyze visual imagery. It is one of the neural network types. It is also called space invariant artificial neural networks (SIANN), and it is based on shared-weights architecture and translation invariance characteristics. The architecture of neural networks contains three types of layers. There is the input layer, mid-layer, output layer. Input layer and output layer is an activation function. The mid-layer is a feed-forward network and is also called the hidden layer.

15th & 16th September 2021

Organized by

Department of Computer Science, Parvathy's Arts and Science College, Dindigul, Tamilnadu, India

II. ARCHITECTURE OF CNN

There are certain Layers of CNN Architecture.

- a. Input
- b. Padding
- c. Convolution
- d. Pooling
- e. Flatten/Dense
- f. FullyConnected

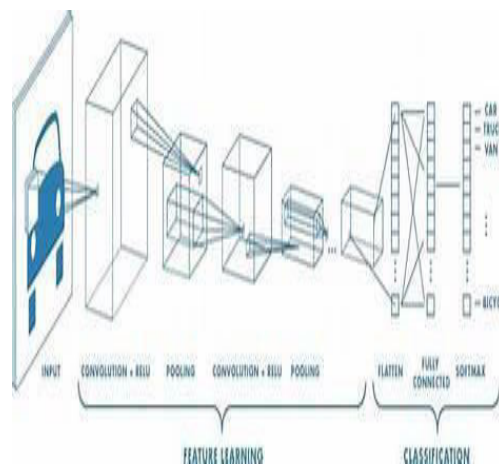
Padding Layer:

It refers to the amount of pixels added to an image.

Convolution Layer:

A convolution layer should have the following attributes:

- Convolution filters defined by width, height, input channels, and output channels.
- The depth of the convolution filter (the input channels) is equal to the input feature map.
- Convolution operation-specific hyper parameters like padding size.
- Convolution layers convolve the input and pass its result to the next layer.



Pooling Layer:

Pooling layers reduce the dimensions of the values. *Max pooling* layer filters the maximum value of each cluster of neurons at the prior layer.

Flatten Layer:

The flattening layer takes pooling layer output. It converts its matrix format into vector format (Single Column or Single row).

Fully Connected Layer:

Fully connected layers connect in one layer to another layer. Fully connected layer for classifying the images. The fully connected layer is the final step of the classifier and decides the output.



15th & 16th September 2021

Organized by

Department of Computer Science, Parvathy's Arts and Science College, Dindigul, Tamilnadu, India

II. METHODOLOGYS

Method 1: Read the currency image Method 2: Accept an image

Method 3: Calculate histogram

```
Display an image
Display the histogram using CNN If (Histogram < 13000)
{
Print ("The given image is Original")
}
Else
{
Print ("The given image isFake")
}
```

Method 4: Calculate EdgeDetection

```
Check an input image
{
Print ("Edges detection is not clear in fake note")
}
Else
{
Print ("Original")
}
```

Method 5: Check Serial Number

```
Open the image Import CNNalgorithm
Image Crop (left, top, right, bottom) Print the serialNumber
Save and View the image
Read the serial number using CNN
{
Print ("On the number panel, numerals growing small to big on top left and bottom right ")
}
```

Method 6: Mahatma Gandhi

```
Open the image Import CNNalgorithm
Image Crop (left, top, right, bottom) Save and View the image
Read the Mahatma Gandhi image using CNN
Calculate Edges Detection
{
Print ("Raised printing of Mahatma Gandhi portrait")
}
```

Method 7: Ashok Pillar emblem Image

```
Import and open the image Import the image
Image Crop (left, top, right, bottom) Display the image
Read the image using CNN
{
Print ("Original Ashok pillar emblem image is clear but duplicate is blur")
}
```

15th & 16th September 2021

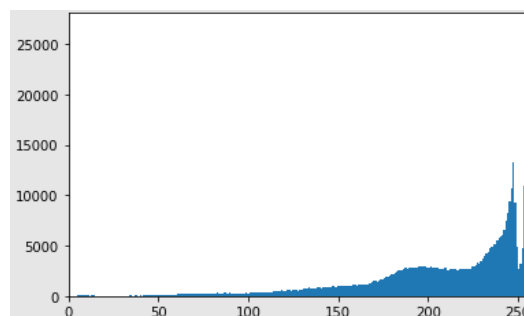
Organized by

Department of Computer Science, Parvathy's Arts and Science College, Dindigul, Tamilnadu, India

III. EXPERIMENTAL RESULTS

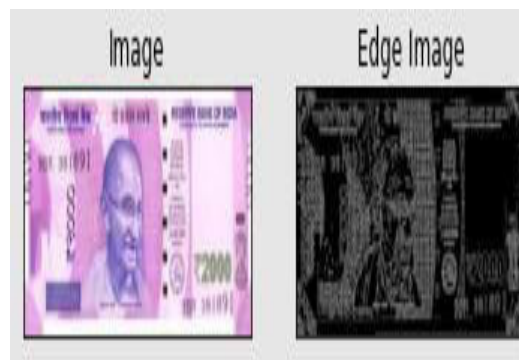
Histogram: A histogram is representation of the distribution of numerical data, where the data are binned and the count for each bin is represented. More generally, in plotly a histogram is an aggregated bar chart, with several possible aggregation functions (e.g. sum, average, count...). The currency image is accepted to check whether it is original or fake currency. Calculate the given image histogram.

The given image Histogram grater then 13000 are original other fake

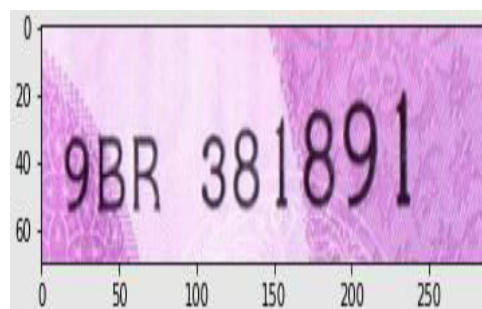


EdgeDeduction: Edge detection is an image processing technique for finding the boundaries of objects within images. It works by detecting discontinuities in brightness. Edge detection is used for image segmentation and data extraction in areas such as image processing, computer vision, and machinevision.

Edge Deduction is clear the given image is original otherwise fake.



SerialNumber: On the number panel, numerals growing small to big on top left and bottom right.

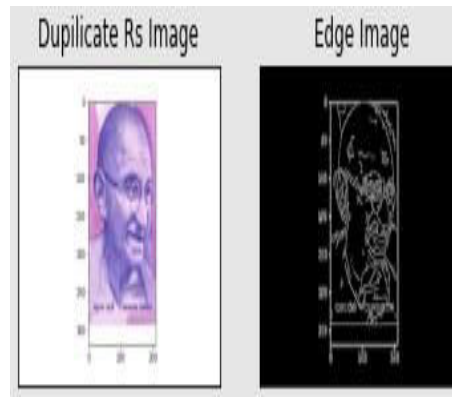


15th & 16th September 2021

Organized by

Department of Computer Science, Parvathy's Arts and Science College, Dindigul, Tamilnadu, India

MahatmaGandhi: Original Mahatma Gandhi Image is clear. But duplicate is blurring.



Ashok Pillar emblemimage: Original Ashok Pillar emblem Image is clear. But duplicate is blurring.



III. CONCLUSION

By using digital image processing, analysis of Currency image is more accurate as well as this method is efficient in terms of cost and time consuming compared to existing techniques. Python Software is used for this analysis. Day by day research work is increasing in this field and various image processing techniques are implemented in order to get more accurate results. The proposed system is worked effectively for extracting features of Indian currency images. Extracted features of currency image will be using for currency value recognition as well as for its verification. The process of detection of fake note is quick and easy under the trained model. By this we can also assure that under the real and large data set, the model can be well- trained and also provides accurate results, which can help the people in recognizing the currency note whether it is fake or original.

REFERENCES

1. Z-X My, Z-B Qian and J-G Li. "Currency recognition using mathematical morphology and neural networks", Journal of Shanghai Jiaotong University, Vol. 33, No. 9, pp. 1142-1145, 1999.
2. R Mirza, and V Nanda, "Design and implementation of Indian paper currency authentication system based on feature extraction by edge based segmentation using Sobel operator", International Journal of Engineering Research and Development, Vol. 3, No. 2, pp. 41-46, 2012.
3. J Guo, Y Zhao, and A Cai, "A reliable method for paper currency recognition based on LBP", IEEE International Conference on Network Infrastructure and Digital Content, pp. 359-363, 2010.
4. PJ Grace, and A Sheema, "A survey on fake Indian paper currency identification system", International Journal of Advanced Research in Computer Science and Software Engineering, Vol. 6, No. 7, July 2016.

15th & 16th September 2021

Organized by

Department of Computer Science, Parvathy's Arts and Science College, Dindigul, Tamilnadu, India

5. ST Gouri, PK Akshay, M Sneha, and S Bharat, "Detection of fake Indian currency", International Journal of Advance Research, Ideas and Innovations in Technology, Vol. 4, No. 2, pp. 170-176, 2018.
6. EH Zhang, B Jiang, JH Duan, and ZZ Bian, "Research on paper currency Recognition by neural networks. In: International conference on machine learning and cybernetics, Vol. 4, pp. 2193–2197, 2003
7. CY Yeh, WP Su, and SJ Lee, "Employing multiple-kernel support vector machines for counterfeit banknote recognition", Applied Soft Computing (Elsevier), Vol. 11, No. 1, pp. 1439–1447, 2011.
8. N. Akamatsu, M. Fukumi, A method to design a neural pattern recognition system by using a genetic algorithm with partial fitness and a deterministic mutation(1996).
9. Chowdhury, N. Jahangir, Bangladeshi banknote recognition by neural network with axis symmetrical masks in masks, in: 10th international conference on computer and information technology.
10. Da-costa, Multiview banknote recognition with component and shape analysis(2014).
11. S.Das, CNN Architectures: LeNet, AlexNet, VGG, GoogLeNet, ResNet and more, 2017.
12. P.P.A. Frosini, A neural network based model for paper currency recognition and verification, IEEE Transactions on Neural Networks 7 (1996).1482–1490
13. P. Gidveer, S.R. Darade, Automatic Recognition of Fake Indian Currency Note, International Conference on Electrical Power and Energy Systems (ICEPES), Bhopal, India, pp.290–294.
14. D.A.K.S. Gunaratna, N.D. Kodikara, Premaratne, ANN Based Currency Recognition System using Compressed Gray Scale and Application for Sri Lankan Currency Notes - SLCRec, World Academy of Science, Engineering and Technology International Journal of Computer and Information Engineering 2 (2008)2957–2962.
15. Li Liu, Yue Lu —An Image-Based Approach to Detection of Fake Coins in IEEE TRANSACTIONS ON INFORMATION FORENSICS AND SECURITY June 2017.
16. A Roy —Machine-assisted authentication of paper currency: an experiment on Indian bank notes International Journal on Document Analysis and Recognition, 18(3): 271-285, 2015.
17. D-F Wang, and S-W Lian, "Automatic selling tickets machine on railway station and cash recognition technology", Computer System Applications, Vol. 7, pp. 12- 14, 1999.
18. 2. Z-X Ymg, Z-B Qian and J-G Li. "Currency recognition using mathematical morphology and neural networks", Journal of Shanghai Jiaotong University, Vol. 33, No. 9, pp. 1142-1145, 1999.
19. 3. R Mirza, and V Nanda, "Design and implementation of Indian paper currency authentication system based on feature extraction by edge based segmentation using Sobel operator", International Journal of Engineering Research and Development, Vol. 3, No. 2, pp. 41-46, 2004.
20. D-F Wang, and S-W Lian, "Automatic selling tickets machine on railway station and cash recognition technology", Computer System Applications, Vol. 7, pp. 12-14, 1999.
21. Z-X Ymg, Z-B Qian and J-G Li. "Currency recognition using mathematical morphology and neural networks", Journal of Shanghai Jiaotong University, Vol. 33, No. 9, pp. 1142-1145, 1999.
22. R Mirza, and V Nanda, "Design and implementation of Indian paper currency authentication system based on feature extraction by edge based segmentation using Sobel operator", International Journal of Engineering Research and Development, Vol. 3, No. 2, pp. 41-46, 2012.
23. J Guo, Y Zhao, and A Cai, "A reliable method for paper currency recognition based on LBP", IEEE International Conference on Network Infrastructure and Digital Content, pp. 359-363, 2010.
24. PJ Grace, and A Sheema, "A survey on fake Indian paper currency identification system", International Journal of Advanced Research in Computer Science and Software Engineering, Vol. 6, No. 7, July 2016.
25. ST Gouri, PK Akshay, M Sneha, and S Bharat, "Detection of fake Indian currency", International Journal of Advance Research, Ideas and Innovations in Technology, Vol. 4, No. 2, pp. 170-176, 2018.



**Impact Factor:
7.569**



INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH

IN SCIENCE | ENGINEERING | TECHNOLOGY

 **9940 572 462**  **6381 907 438**  **ijirset@gmail.com**



www.ijirset.com

Scan to save the contact details