Detection of Fake currency using Image processing techniques

IVP Course project, 5th semester

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Introduction

The growth in the number of fake notes in the system have been tremendous over the past few years. The counterfeiters have kept developing new ways to get as close to the real paper currency as possible.

Here we implemented a program detecting fake currency using image processing techniques. We applied image processing techniques on some features of the currency that is used to differentiate itself from fake currency.

The characteristics of currencies are employed which are used by common people for differentiating for different banknote denominations. The characteristics that can be used to check the authentication of currency note are -

1. RBI symbol
2. Currency Denomination
3. Emblem
4. Security Strips

We used these features to distinguish between real and fake currency Images using image processing techniques.

Project Implementation

- Project was implemented in MATLAB.
- Methodology, Results and conclusion discussed in later slides.
- Project was implemented using common image processing techniques only.

Methodology

1. Convert Input RGB images to HSV color space
2. Segmentation of Images to work on features of our interest
3. Performing closing morphological operation to remove internal noise from image object
4. Performing opening morphological operation to remove external noise from image object
5. Counting connected components in both images and comparing the results.

1. Converting images from RGB color space to HSV color space
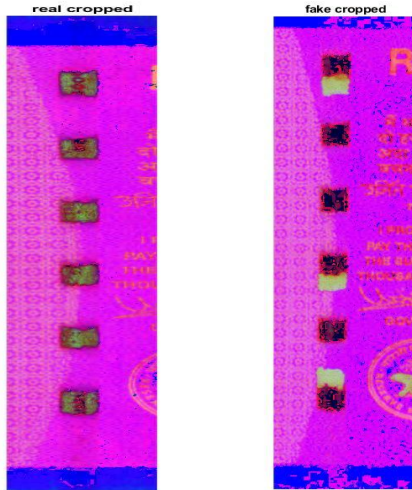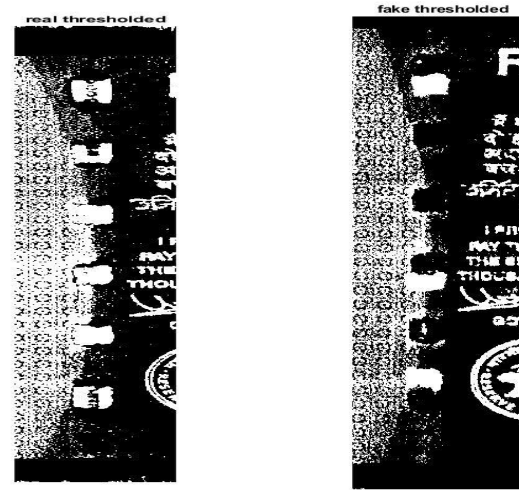

Real

Fake

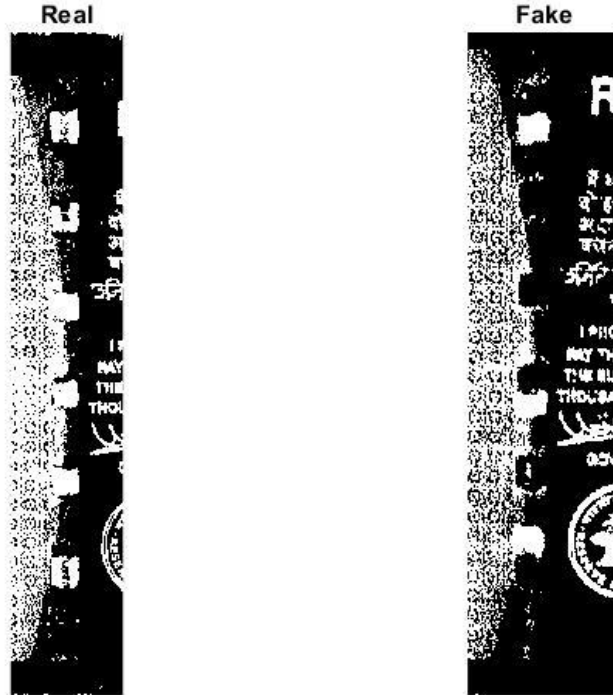# 2. Image Segmentation

After cropping

After thresholding

real cropped

fake cropped

real thresholded

fake thresholded

3. Morphological Closing operation

Morphological Closing operation is dilation followed by erosion used to remove internal cavities from objects of interest.

4. Morphological Opening operation

Real   Fake

Morphological Opening operation is erosion followed by dilation and is used to remove noise around outline of the edges of the objects of interest.

5. Results

Finally, using bwlabel() function, we counted the number of connected components in both the samples and results were obtained.

The total number of black lines for the real note is: 120
The total number of black lines for the fake note is: 132

We performed same procedure on other features of the currency notes like emblem, RBI symbol, etc.

Conclusion

We compared the results of various features of real and fake notes. We observed that the results had high differences in values for real and fake images.
We used various images processing techniques like segmentation and morphological operations to arrive at this result.
The project could have been improved by used specific noise filtering techniques but we kept as simple as possible.