

# Fake Currency Detection Using Matlab

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**Abstract-** Our aim is to provide advancement in the technology used for detection of fake notes. We have included Android phone camera and a PC with MATLAB software. The technology we have used for Fake Note Detection is more efficient and automated than the one which is commercially available in the market. We have used the newly available Histogram of Oriented Gradient (HOG) feature of MATLAB.

**Keywords-** Automation, Security, Fake Note Detector, HOG, Machine learning.

## I. INTRODUCTION

Counterfeit money is imitation currency produced without the legal sanction of the state or government. Producing or using this fake money is a form of fraud or forgery. Counterfeiting is as old as money itself, and is sufficiently prevalent throughout history that it has been called "the world's second oldest profession.. This has led to the increase of corruption in our country hindering country's growth. Common man became a scapegoat for the fake currency circulation, let us suppose that a common man went to a bank to deposit money in bank but only to see that some of the notes are fake, in this case he has to take the blame. Counterfeiting, of whatever kind, may be that has been occurring ever since humans grasped the concept of valuable items, and there has been an ongoing race between certifier like (banks, for example) and counterfeiter ever since. Some of the effects that counterfeit money has on society include a reduction in the value of real money; and inflation due to more money getting circulated in the society or economy which in turn dampen our economy and growth - an unauthorized artificial increase in the money supply; a decrease in the acceptability of paper money; and losses. And this some of the methods to detect fake currency are water marking, optically variable ink, security thread, latent image, techniques like counterfeit detection pen and using MATLAB

## II. BACKGROUND OVERVIEW

### A. Existing System

Different range of counting machines like Basic Note counter, Intelligent Counting cum counterfeit detection machines and Hi Speed Heavy duty cash counting machine are

available to suit different type of customers. Highly dependable and ideal for Banks, Big & small business houses, Traders, retailers, jewellers and almost all types of business establishment can use them according to their suitability. A currency-authentication machine is a machine that authenticates money. These machines may be purely mechanical or use electronic components. The machines also provide a total count of all money, or count off specific batch sizes for wrapping and storage. Currency Authenticators are commonly used in: money deposit machines, currency counter hardware machines In some modern automated teller machines

### B. Drawbacks of Existing System

Many Currency Authenticators machines are available in the market. But, not a single software. These machines occupy a good amount of space. Existing machines are expensive too.

They are Harder to maintain. Common people can't afford to buy currency authenticating machine. Supermarkets need to buy machines for every counter they have, which costs them a lot. These machines also occupy some area of the counter.

## III. PROPOSED MODEL

The main objective of the project is to develop a Counterfeit Currency Authentication System using Matlab to detect fake currency. Project will try to include following key features:

- a) Currency Authentication using a simple camera.
- b) No additional processing unit needed.
- c) Software based Authentication

## IV. HOG ALGORITHM

The Histogram of Oriented Gradients is a special type of histogram analysis of an image. The gradients are generated whenever there is detection of an edge, i.e., abrupt change in pixel intensity. These gradients not only detect edges

but also detect orientation of edges which helps our script to understand the shape of the object. The properties are then extracted in an xml file. This xml file contains information about the Object Of Interest (OOI). This information can be then imported in detector object to scan an image for similar properties.

## V. PROGRAM FLOW

The MATLAB GUI is been used in our project to keep the user isolated from haptic programs and complex algorithms. GUI uses three pushButtons for connecting to device, capturing an image and processing it and one plot function for viewing the image.

Algorithm followed for Image Detection & Recognition:

Step 1: Make the machine learn the mark structure. For this we need to have positive instances(the Object Of Interest, in our case marks) and negative instances(Background).

Step 2: Create positive instances using ImageTrainer App.

Step 3: Export Region Of Interest(ROI) and provide it in trainCascadeObjectDetector function.

Step 4: After generating the xml file from Step 3, Generate a Detector Object for Object Of Interest(OOI).

Step 5: Now read the image file on which you want to test the algorithm.

Step 6: Apply detector Object on the image using step() function. The step() function will return ( x, y, width, height) of the OOI detected in that image.

Step 7: Store this data in BBOX(Bounding Box).

Step 8: Annotate circle or rectangle in the image where OOI is been detected.

Step 9: Display the Image.

NOTE:For better results FalseAlarmRate should be kept low and NumCascadeStages should be high.

## VI. WORKING

Put on the IP webcam app in Android Phone and begin the server streaming. In MATLAB GUI press on connect. Once the streaming is available, place the note in front of camera. Press on capture in MATLAB. If the image is

captured properly then press on process to get the final processed image.



## VII. ADVANTAGES

- Low power consumption as compared to existing systems.
- Easily implementable all scales of business.
- Low implementation cost.

## VIII. DISADVANTAGES

- Processing speed is slow.
- Accuracy and performance will vary from system to system and environmental conditions like lighting.

## IX. APPLICATIONS

- It can be implemented in small scale businesses as well as large scale businesses.
- It can be used in public malls.

## X. FUTURESCOPE

This system forms the basis of Machine Learning. It can be extended using Application Program Interface (API) and can be made more interactive by using voice interactive machines.

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