Coin Recognition by Neural Network and Image Subtraction

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Abstract— Coins are utilized as a part of our day by day life . Coin Identification is a fundamental need that coin will be sorted and numbered consequently . In this paper we are going to executing the Neural Network based coin Recognition framework and we are likewise utilizing iamge subtraction system for identification of coin .

Index Terms— Neural Network , Coin Recognition , Image Subtraction

I.INTRODUCTION

We are utilizing the coin as a part of our day by day routine very nearly all over much the same as in banks, markets and so on. Coin is a vital piece of our day life. Today planets oblige a more precise and productive programmed coin recognition framework. This paper proposes a coin recognition by neural network[8] and utilizing image subtractions with turn invariance technique[9]. The coin can tried utilizing its size, shape, weight, materials.

The image subtraction system takes two images as data and gives a third image as yield, whose pixel qualities are essentially the pixel estimations of the first image short the comparing pixel estimations of the second image. Fake neural systems, which are models imitating an organic neuron system, are effectively used to perform design recognition.

Fig 1. Some Indian coin

In 1997 Minoru Fukumi et al. [1] exhibited a rotational invariant neural example recognition framework for coin recognition.

Paul Davidsson [2] in 1996 exhibited a methodology for coin characterization utilizing learning trademark choice trees by controlling the level of speculation.

P. Thumwarin et al. [3] at the Bend Seibersdorf examination focus in 2006 built up a coin recognition. This framework was intended for quick characterization of substantial number of cutting edge coins from 30 separate nations. Coin order was fulfilled by relating the edge image of the coin with a preselected subset of expert coins and discovering the expert coin with most reduced separation. Preselection of expert coins was carried out focused around three pivot invariant peculiarities (edge point circulation, edge separation conveyance, events of distinctive turn invariant examples on circles focused at edge pixels), coin width and thickness.

In 2011 [9] Vaibhav Gupta et al. exhibited a methodology focused around image subtraction strategy for recognition of Indian coins. In this methodology framework performs 3 checks (range, coarse and fine) on the

info coin image. As a matter of first importance sweep is ascertained of the information image. At that point focused around the range a test image (pivoted at certain altered edge) from database is chosen. At that point coarse image subtraction in the middle of article and test image is carried out. At that point, minima of the resultant image is checked in the event that it is short of what a determined edge then fine image subtraction in the middle of article and test image is carried out generally new test image is chosen. At that point focused around fine image subtraction, recognition happens.

II. PROPOSED SYSTEM

A) Rotation-Invariant Image Subtraction Technique

In the proposed system of image subtraction technique the following blocks are

1)Image processing
2)Radius Calculation
3) Course subtraction and fine subtraction
4)Comparison and coin identifications

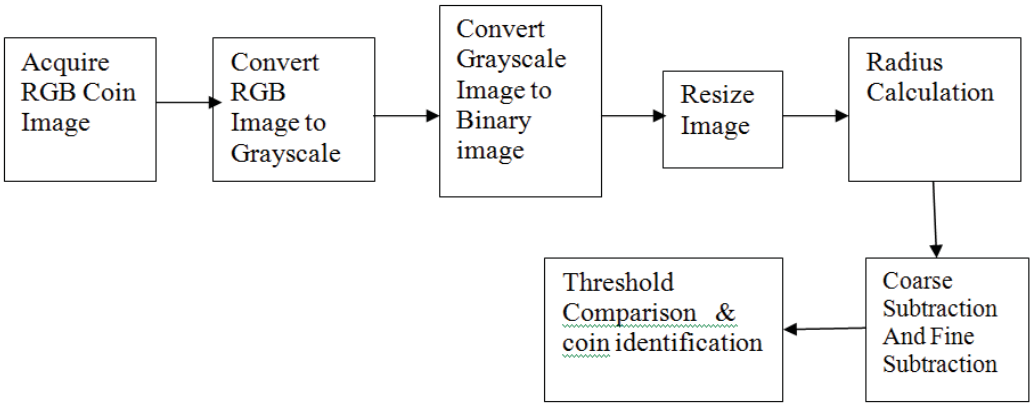


Fig 2.Image Subtraction Method Block Diagram

1) Image Processing

In image handling the image acquisition and the image segmentation methodology are ruined the coin recognition. A camera with having a good resolution is utilized for catching the images . After the camera taken the image that image is given to segmentation this implies that the dividing the coin images from the background image.

Methodology of image segmentation is firstly change over the image into the grayscale image using equation

Gray= (0.333*r+ 0.333*g +0.333*b) (1)

In image handling after the grayscale of image the binary image is made.

2) Radius Calculation:

The distance across is found by taking the contrast in the middle of greatest and least position of the white pixels of the binary image . All Indian coin having the different radius .

3) *Coarse Subtraction*

The test image is given with one full revolution in steps of fixed angular distance. The image subtraction is completed between the pivoted test image and the input object image .

Subtracted (r,c) = object (r,c) – test (r,c) (2)

4) Fine subtraction

This is same like as that coarse subtraction with a little difference of the of rotation of image angle is (1^0) is small.

From the coarse or fine subtraction the output images are compared with the grayscale images and after finding the minima we will do the threshold comparison

5) Threshold Comparison

After gating the minima of gray scale value sum is compared with the standard value of threshold and perditions is made that the coin matches or not.

III. NEURAL NETWORK WITH ML-CPNN METHOD

The Network (ANN) is an information processing paradigm that is inspired by the way biological nervous systems, such as the brain, process information.

In the neural network with ML-CPNN algorithm the following steps occurs as shown in fig 2

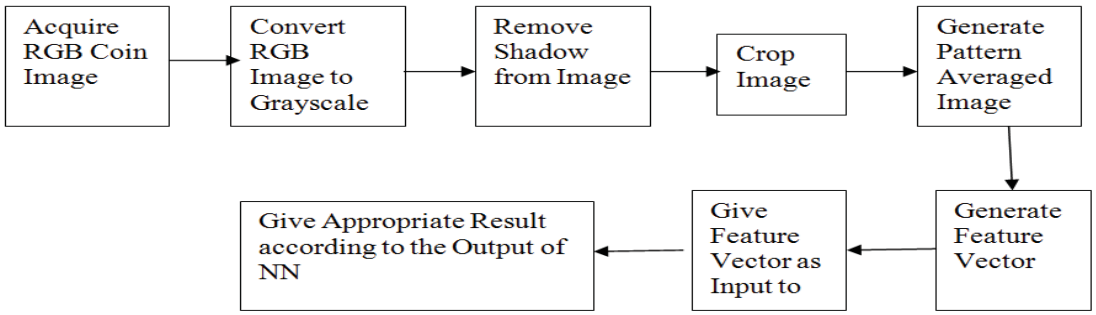


Fig3.Neural Network with ML-CPNN Method Block Diagram

1) Acquire RGB Image

It is the first step of the coin recognition method .In this coin from both side are firstly scanned and that image is given to the for further grayscale conversion .

2) Convert RGB coin to Grayscale Image

Firstly the 24 bit image is capture from the camera and that input RGB image is converted into the 8 bit grayscale image.

3) Remove shadow of coin from Image

In this step, shadow of the coin from the Grayscale image is removed. As all the coins have circular boundary. So, for removing shadow Hough Transform[6] for Circle Detection is used. For this first of all edge of the coin is detected using Sobel Edge Detection[6].

4) Crop The Image

After shadow removal the image is cropped so that we just have the coin in the image. Then after cropping, coin image is trimmed to make it of equal dimension of 100 × 100 or 50 × 50.

5) Generate the pattern Averaged Image

The 100×100 or 50×50 trimmed coin images become the input for the trained neural network. But to reduce the computation and complexity in the neural network these images are further reduced to size 20×20 or 10×10 by segmenting the image using segments of size 5×5 pixels, and then taking the average of pixel values within the segment.

6) Generate feature vector

The feature vector as I/P to trained Neural Network. The feature vector from the pattern averaged step is then passed as input trained neural network. This trained neural network classifies the coin into appropriate class based on which the output will be generated. MATLAB provides a Neural Network Toolbox with the help of which Neural Network for pattern recognition can be easily created.

Implementation Details of *ML-CPNN Algorithms*

In This Paper We are going to used the following steps

1) Acquire RGB Coin Image using good camera
2) Convert that image into grayscale image
3) Sharpened the image
4) Crop the image using 100x100 resolution
5) Find the feature vector of input image and compared with pre stored image.
6) Give result according to matching

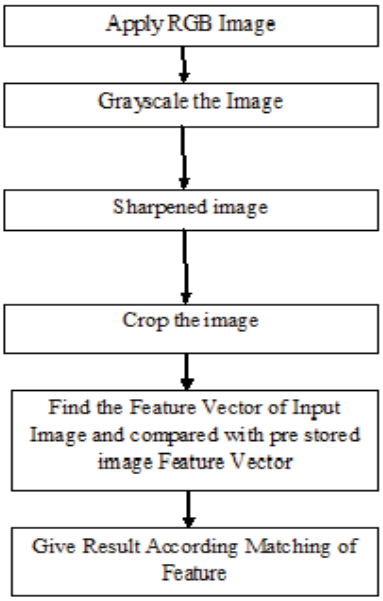


Fig 4 . Flowchart For the ML-CPNN

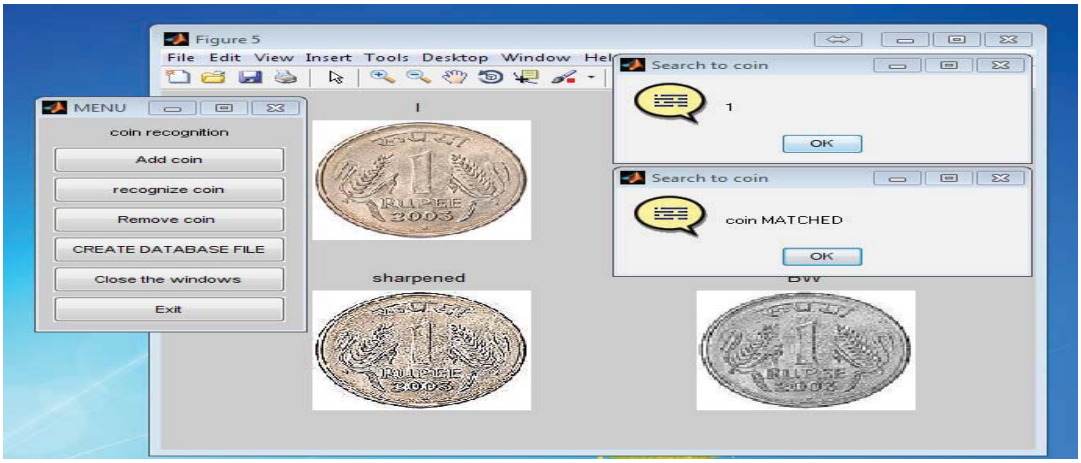
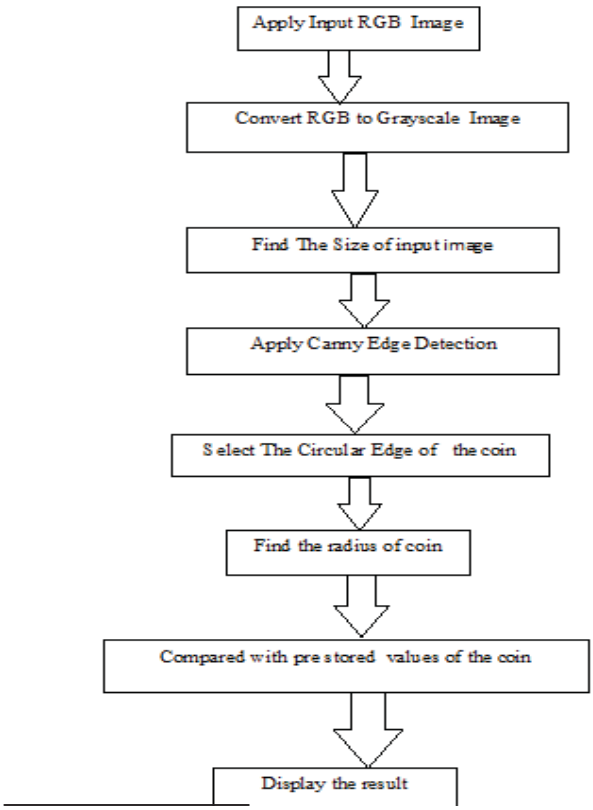


Fig 5 Results Of ML-CPNN Algorithm

IV. Implementation Details of Image Subtraction Algorithms



For Image Subtraction Algorithm apply the following steps

1) Apply RGB image as a input image
2) Convert RGB image to grayscale Image
3) Find the size of input image
4) Apply canny edge detection to detect the edges of coin
5) To select the circular boundaries of coin use the disk function
6) Find the radius of the coin
7) Compared that radius with standard radius and display the result.

Fig 6 Image Subtraction Algorithm

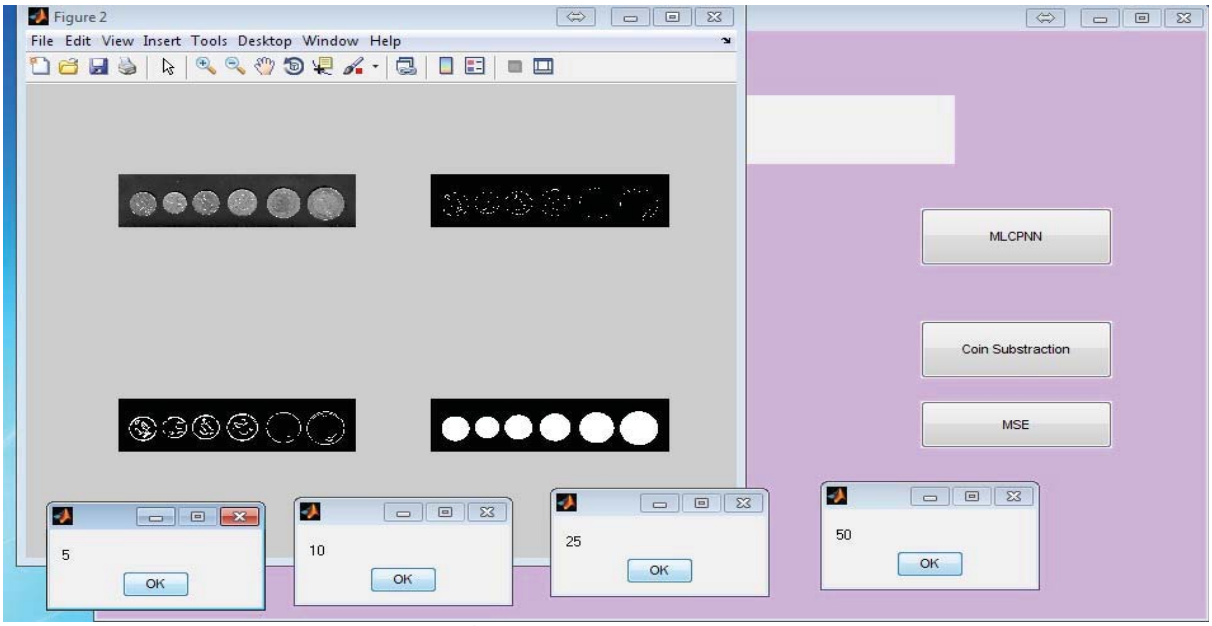


Fig . Results Of Image Subtraction Algorithm

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