

A Literature Survey on Indian Currency Detection

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Abstract- This paper provides an outline of currency detection using Internet of Things (IOT) with emphasis on empowering innovations, protocols and application issues. Programmed identification and affirmation of Indian money has picked up a huge amount of research consideration as of late especially because of its inconceivable potential applications. Since, India is a growing country, Production and printing of counterfeited notes of Rs.100, 500 and 2000 are humiliating the economic development of our country. From past few years due to technological advancement in shading printing, scanning, and copying, counterfeiting issues are coming into picture. The fundamental aim of this paper is to provide an overview of currency detection.

Keywords- IOT, Edge detection, counterfeited notes, image processing algorithm, weight sensing.

I. INTRODUCTION

This system is developed to perceive the currency by applying different approach and methods on currency notes. The currency identification system should be free to categorize the paper currency to its proper class. The currency recognition system should be able to detect the note rapidly and properly. The currency recognition system should be capable of identifying the currency notes from all ways. There are various types of currencies, some are ancient and some are new. So, it is not easy to detect such notes. Detection system is developed to overwhelm this problem and this can used in temples, shops, marts, wherever there is a need of money detection system. It is not that is easy to check the money whether it is fake or damaged, manually. Adopting this system can also reduce human effort. The easiest way is to make use of the features of the currency detection, for example, as shown in the figures. It represents marks which are printed in the 500 rupee note. These layouts can be scanned and captured by an acquisition machine and proceed for recognition. It gives good accuracy.

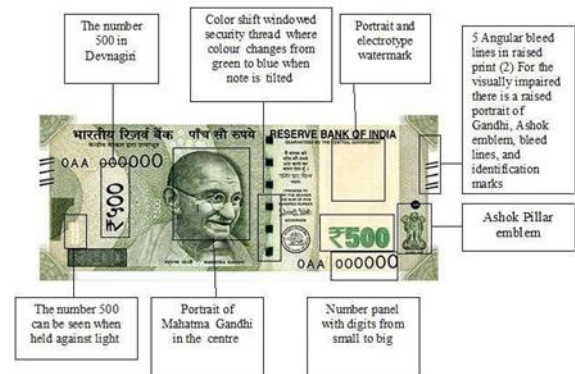
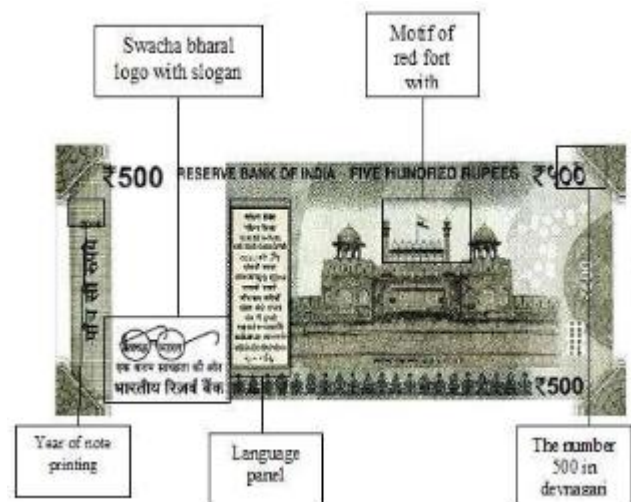


Figure [1]



II. LITERATUREREVIEW

[1] The author has developed a Currency identifying system using image processing technique for users to recognize the currency to which country it belongs to, efficiently and accurately. The system recognizes mostly all the currencies available in the world. Various image processing and pre-processing techniques or algorithms are used for better results. Svm is carried out for counterfeited currency detection and perform template matching to check the currency. [2] The main aim of this paper was to design a low-cost counter machine with fake detection that utilized MCU based ARM Cortex-M4 32 bit.

The mechanical parts include the roller, which has rods in a continual pattern, and the roller move these rods with a fixed speed. Laser transmitters and receivers are used to detect notes and to start and stop the counting in addition to each note. The UV sensor is used as a fake note detector. The counting result is displayed on the LCD screen and the system stops counting if detect any fake note. The results appear a relatively high-speed counting with high accuracy (100%) in counting and fake detection. [3] This undertaking empowers an outwardly tested individual know in defending the cash to identify whether the money is unique or phony.

The MATLAB procedure when conveyed in Raspberry Pi with scanner or a camera with the goal that it will catch the money note and perform the picture handling systems forced in the venture by separating whether the money is unique or phony dependent on the parameters of HSV estimations of the cash note which in front enables to an impeded individual in recognizing it. The all-encompassing variant can likewise incorporate fulfillment of the discourse combination ability from the raspberry pi gadget that can be gone about as a compact gadget did by the outwardly hindered people with most extreme adaptable way.[4] This paper introduces another affirmation method for Indian cash using PC vision.

It is exhibited that Indian money related norms could be gathered considering a game plan of standout non-isolating parts, for instance, concealing, estimation or more all the Identification Mark indicated in RBI rules. Immediately, the overall concealing and the point of view extent of the note are isolated. After this, the division of the section of the note containing the extraordinary I.D. Check is done. From these separated picture, incorporate extraction is finished using Fourier Descriptors. As each note has an exceptional shape as the I.D. Check, the game plan of these shapes is done with the help of Artificial Neural Network. After segment extraction, the divisions are seen considering the made estimation. [5] Programmed paper checking machine proposes quick and proficient tallying of paper without human exertion. The proposed paper checking machine utilizes the implanted framework Arduino for the working of the machine. It utilizes a detecting innovation to detect the tally entered and sends the relating sign to the information terminals of the IC in the arduino board. The utilization of arduino board makes the machine progressively precise in working. The arduino board on accepting the sign sends sign to information pins of a presentation which shows the quantity of the papers checked. The necessary tally of papers can be tallied out from a group by contributing the number. The programmed paper tallying machine finds a various applications in numerous fields.[6] The reason for the venture is to successfully recognize

counterfeit cash and check dark cash by utilizing bleeding edge advances like NFC(Near field correspondence), IOT(Internet of things) and Android. In first case once the individuals are given a money note to the machine.

This machine is associated with the server. At that point, the machine is to check the sequential number, sum and lapsed date. At last, it hint the first note or phony note. In second case, the individuals utilize brilliant cards, and this framework is to store the exchange among individuals and sum subtleties by utilizing server. In third case the individuals utilize a QR codes, this framework likewise stores the exchange among individuals and sum subtleties by utilizing server. This whole framework is utilized to control the flow of fake cash notes as the cash which seem to be "lapsed" must be taken back to the bank thus the cash is consistently available for use and not gathered to a solitary individual. Through the server we can even follow the way of how the cash is moved.[7] Target of the venture is to perceive distinctive BDT coins and sort them. .Our mint piece arranging machine has a computerized module to gather a coin from the coin line, a heap cell to quantify coins' weights, a slider to slide through the coin in the correct container and a coin brush to clear the coin onto the slider.

The machine takes a solitary mint piece by the currency gathering module and arranges it on a stage that is associated with a heap cell. At that point the heap cell estimates the heaviness of the coin and chooses which coin it is and the slider changes its situation to the comparing basin. Later on, a coin brush clears the coin onto the slider and the coin folds into the basin it has a place with. [8] This paper plans to take care of the issue of recognizing a paper cash and yield the outcome as discourse. The created model acknowledges a picture from a webcam. The Raspberry Pi's picture preparing calculation at that point removes certain highlights from this picture and matches them against a lot of preparing information. At the point when a fitting match of the worthy edge is found. At last, the upsides and downsides of both the strategies are assessed and the best calculation is learned. [9] Clever frameworks on Paper money acknowledgment and verification are inescapable for current financial administrations. These frameworks are utilized in Auto-dealer machines, candy machines and so on. Removing adequate and dependable money related attributes are fundamental for precision and execution of such frameworks. This paper proposes another smart framework for paper cash acknowledgment.

This paper identifies, presents, and concentrates strong highlights from banknotes. In the wake of removing these highlights - forward Back proliferation Neural Network

(BPN) for canny classification. The outcomes show that framework has 100% acknowledgment capacity on appropriately caught pictures. [10] In this paper, the creator structures a framework that is useful in acknowledgment of paper cash notes with quick speed and in less time. This framework depicts a methodology for confirmation of Indian cash banknotes. The money will be checked by utilizing picture handling strategies. In this article, six trademark highlights are separated. The methodology comprises of various parts including picture handling, edge recognition, picture division, trademark extraction, looking at pictures. The attributes extraction is performed on the picture of the cash and it is contrasted and the qualities of the veritable money.

The outcome will be whether cash is real or fake. [11] The creator proposes another way to deal with distinguishing counterfeit Indian notes utilizing their pictures. A cash picture is spoken to in the disparity space, which is a vector space developed by contrasting the picture and a lot of models. So as to get the difference between two pictures, the nearby key focuses on each picture are distinguished and depicted. In light of the qualities of the money, the coordinated key focuses between the two pictures can be distinguished in a proficient way. A post handling method is additionally proposed to evacuate confused key focuses. Because of the set number of phony money, in actuality, SVM is directed for counterfeit cash recognition, so just certified cash are expected to prepare the classifier. [12] This work shows the improvement of ongoing paper money recognizable proof framework for outwardly tested. It permits distinguishing the demonetization new Indian banknotes for outwardly tested people, to independently manage new Indian banknotes, especially while tolerating their cash back when searching for their step by step needs. The advancement of this gadget depends on a Raspberry Pi implanted board, included with pi camera. The continuous monetary certificates are caught and prepared through various picture handling procedures like edge identification, division include extraction and characterization. In this proposed work the order calculations, for example, k-Nearest Neighbors (k-NN) for perceiving every class of banknote are utilized. These calculations are executed in Python language with Open CV on raspberry pi equipment stage.[13] 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. MATLAB Software use for this analysis. The proposed system is worked effectively for extracting feature of Indian currency images.

Extracted features of currency image will be using for currency value recognition as well as for its verification.

[14] The cash tallying machine or CCM is one of the supernatural occurrence of the science. The CCM chips away at the standard on the broadness of the heap of money and there in a roller which has bars in a consistent example and the roller moves these bars with a specific speed. The speed stays steady as like in the ATM machine checking machine and these rollers proceeds onward the heap of the money and simply move out the single cash individually at a consistent and fast and there is a transducer which distinguish that what number of single money has gone out before it. [15] Frameworks, devices, and related techniques for checking and arranging coins are depicted in this. In one exemplification, a coin handling machine can incorporate a coin input area, a coin tallying segment, and a coin-arranging segment. The coin tallying segment can incorporate a first container that gets coins from the coin input area, and a coin discriminator that gets the coins from the primary container and segregates the coins to decide their worth. The coin-sorting segment can incorporate a second coin container that gets the coins from the coin discriminator, and a coin Sorter that gets the coins from the subsequent container and sorts the coins into singular divisions.

III. TABLE: SUMMARY OF TECHNIQUES USED FOR CURRENCY DETECTION

AUTHORS	YEAR	TECHNIQUE	ADVANTAGES
Ms. Monali Patil, Prof. Jayant Adhikari	April- 2018	Svm algorithm, k means algorithm	The system gives better accuracy and precision.
Osama Saadi, Ergun Ercelebi	May-2018	Money counting theory, counterfeited money detection theory, counter algorithm.	This system works at high speed with 100% accuracy in counting and fake detection.
VenkataSai Teja .D1, A Krishnamoorthy, P Boominathan	2018	Assistive technology, segmentation, features extraction, template matching, text to speech, edge detection.	The system will recognize the currency and return the value in the form of speech .
M.Sravan Kumar, B.Jyothi Priya	Jan-2018	Picture securing, picture limitation, picture pre-handling, highlight extraction, layout coordinating, examination with limit values.	It can be implemented for real time applications such as vending machines, automatic ticket counters.
Anju S, Haritha H, Chippy Susan Rajan, Nijo Varghese Chacko	April-2016	Separating, Counting.	It is implemented in small size which enables it to be portable and the ability to handle very easily at any kind of places.
S Bharathi, S VaishnaviDevi, T Sruthi Priya	Nov-2017	FLASH TECHNOLOGY: Low power but with high-speed improved Flash technology, completely static design, Broad operating voltage choice, Industry and comprehensive temperature ranges.	This system helps to strongly eradicate black money sector.
Raquib Bin Yousuf	Jul-2016	Weight measurement	Reduces manual workload.
Gokul Ramasamy, Sakthi Subramanian	April-2019	Image processing, Feature extraction, FAST key points, BRIEF descriptors.	Developing an assistive technology for visually impaired so that they can lead their life independently both socially and financially.
Allah Bux Sargano, Muhammad Sarfraz, NuhmanUI Haq	April-2015	Image processing, feature extraction, classification using backpropagation NN.	It is used for real time applications.
B.Sai.Prasanthi, D.Rajesh Shetty	Sep-2015	Edge detection, image segmentation, feature extraction, comparison of features.	The system is able to extract the features even if the note has scribbles on it, Cost effective and easy to implement.
Naina Shende, Prof.Pragati Patil	April-2018	Currency pre-processing, segmentation, recognition and classification, K-means and SVM algorithm	Accurate, Efficient in terms of cost and time consuming.
Anilkumar B, KRJ Srikanth	Mar-2018	Image acquisition, Edge detection, Pre-processing, segmentation, feature extraction, k-NN.	identifying the demonetization new Indian banknotes for visually challenged persons
Venkata Sai Teja. D, A Krishnamoorthy	2018	Image acquisition, feature extraction	Easily gives the power for visually impaired persons to detect currency
Unknown	2012	Counterfeiting techniques, color analysis	Used at hospitals, banks etc..
Martin	Mar-2015	Optical coin discrimination technique Auto calibration technique	Easy to detect coins.

IV. CONCLUSION

This paper discusses about several types of Indian currency identification & detection by analyzing various techniques. We conclude that the works which are done so far has less accuracy, so these techniques which we have given has a better way to approach for good accuracy. Edge detection, image processing, weights measurement, UV detection are some of the major techniques which can be used for high accuracy and precision. Though India is becoming digitalized day-by-day, research for this field is gaining more importance. This survey has gone through different types of literature which includes various techniques for determining counterfeit and genuine currencies. Verification and recognition of Indian currency can be done through Extracted feature. Through this survey, we can culminate that pre-processing and feature extraction techniques are used for better results.

V. FUTURESCOPE

With the help of above discussed techniques, a system for detecting the denomination of Indian currency and checking the originality of Indian currency using basic image processing algorithm can be easily developed. This system can be implemented for real time applications. This can be achieved with the help of low cost processor like Raspberry pi.

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