

Detection of Fake Currency using Deep Learning

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ABSTRACT

Gigantic automation expansion in publish and inspect manufactory build inauthentic complication to promote dynamically as a outcome inauthentic legal tender affects tied in husbandry along with diminish the profit of aboriginal money ergo it is and essential concerning ascertain the artificial legal tender most of the erstwhile methods are established as for accouterments and resemblance computing approach observation inauthentic legal tender with these methods is inferior efficacious also time ingest to conquer the raised complication we have bounce the discernment of inauthentic legal tender applying abound less complexity nervous chain our work recognize the artificial legal tender by inspect the legal tender appearance the communicate educated complexity nervous chain is competent with two thousand five hundred two hundred and fifty Indian currency note data sets to learn the feature map of the currencies once the feature map is learnt the network is ready for identifying the fake currency in real time the proposed approach efficiently identifies the forgery currencies of 2000500200 and 50 with less time consumption keywords convolutional neural network currency detection deep learning feature extraction image processing.

Keywords : CNN, Features, Extraction, Deep Learning, Image Processing.

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I. INTRODUCTION

Counterfeiting refers to an illegal copy of the currency of origin. Therefore, counterfeit currency is not approved by the government. RBI is the only body responsible for printing banknotes in India. Every year, the RBI has to deal with the problem of counterfeit banknotes once filtered and placed on the

market. Currently with the development of better imageprocessing methods, new methods for identification of currency is designed by analysing specific safety information present in the currency. The safety features are watermarks, hidden images, security threads, and optically variable inks. Therefore, to determine the currency using image processing, extract the specific statistics from the

currency image and select the correct recognition approach. The main methods for currency recognition is by characteristic geometric size [1] and by characteristic texture [2]. The general steps followed by image processing approach is to acquire image, to detect edge, to convert image to gray scale, feature extraction, image segmentation and decision making [3-4]. The drawback of these approaches are detection efficiency is less since feature extraction is a challenging task. To overcome this problem now the trend is towards deep learning, since it is a multilayer neural network. The deep neural network is effective for different application in real time.

In general, to form a deep neural network, we need a large set of image data for the activity to be done. But thanks to transfer learning technique, we only need a small amount of data sets. What we do is take a model already trained in a large data set and use our weights to reconstruct the small data set we have. In this way, a large data set is not necessary and the model is also designed correctly. Hence in this paper transferred learned Alex net is used by fine tuning the last layer of this model to get the desired accuracy.

II. RELATED WORK

In every proposed system developed using various algorithms has their own disadvantages one of the most effective methods of counteracting counterfeiting can be to use easily accessible and effective software to detect counterfeit currency database under training set is trained using these algorithms a method for determining the currency in real time for classifying the currency is proposed the currency of image acquisition is based on currency discovery when the size of various denominations is obtained and the features are extracted it gives the information to kohonens training network this scheme is good with high speed and recognition accuracy in support vector machine based currency recognition is presented it segments our currency into various regions with our own core linear weighing through various forms of basic training matrices and is studied using semi-defined programming are used to obtain ideal weights use of rgb and hsv shade astral model in the image processing helps in legal tender detection with new 500 and 2000 notes it can be

detected faster by making samples of these banknotes this system used for automatic legal tender recognition based on resemblance processing the legal tender resemblance is speak for in the space of differences therefore is a angle astral composed by contrast the resemblance and a series of prototypes each measurement measures the dissimilarity in the middle of the resemblance in question with the prototype to distinguish between two images the local key points of each resemblance are identified and described based on legal tender characteristics it is possible to effectively identify the relevant key points between two resemblance due to the limited number of real-life counterfeit currencies svm is used to detect counterfeit currencies so only authentic currencies are required for authentication and to train classifier 10 in recent years counterfeiting using neural network is good at detection in 11 it was found that the functions were passed through direct feed forward neural network fnn and is therefore Aused for legal tender recognition as well as verification to detect it uses the color information mined from currency but it leads to high risk of error and also makes the empirical consequence to be less accurate an approach additionally back propagation network and principal component analysis when used for feature extraction the approach is successful with an additional investigation 12 in convolutional based neural network when the number of layers are more then complexity is also more 13 but convolution neural network is robust and detection speed is faster 14 in 15 the problem of stochastic gradient slope sgd is been explored and points out due to sgd tilt the previous set of random parameters drops sharply then it may affect the overall performance of the detection process hence in our presented method we have used convolutional neural network with adam optimization to detect fake legal tender note.

III. PROPOSED SYSTEM

In a proposed system, we are proposing experiment on genuine or real fake currency with limited set of supervised data. We are proposing a Convolutional neural network based multimodal classes risk prediction model for limited notes with higher

accuracy. We are going to solve accuracy issue in diagnosis of genuine or fake with accurate stage predictions.

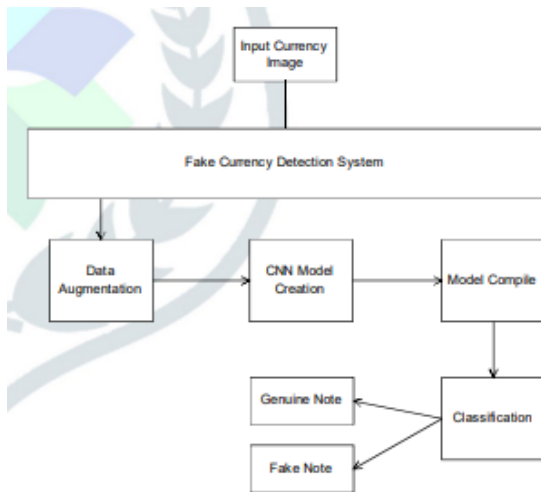


Fig1. System Architecture

IV. IMPLEMENTATION

The implementation steps are depicted in figure 1

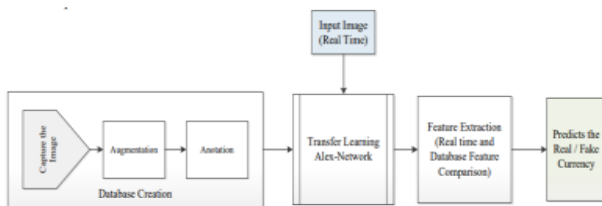


Figure 2. Implementation steps

- 1step : DataBase Creation
- 2step : Image Input
- 3step : Feature Extraction
- 4step : Predicts Output

Database creation includes capturing of the image to train the network, the images of currency note data base is generated. For each note 100 images are generated using augmentation. The augmentation process like resizing and rotating is carried out to increase the data base count. After augmentation annotation of all currency images is done and then the images are stored in a separate folder with labelling. Now the network and images are ready to be trained. Once the training process is over the network learns the features of real currency note of 2000,500,200 and 50. Image Input includes uploading the real time images and running it through the Alex Network. Feature Extraction includes extracting features from the real time images and comparing it

with the database and providing the predictable output .

V. CONCLUSION

We are going to invent currency detection system over machine learning and CNN techniques which solves existing accuracy problem as well as reduce crime rates by genuine or fake notes. For future work, we can implement this technique on some more currency with rich dataset. Increasing the number of currency and dataset used for the process can improve the accuracy.

VI. REFERENCES

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