

## EVALUATION OF MACHINE LEARNING ALGORITHMS FOR THE DETECTION OF FAKE BANK CURRENCY

Mrs. K. Malar<sup>1</sup>, dommata sai teja reddy<sup>2</sup>, karri dilip kumar<sup>3</sup>, chilukoori akhil<sup>4</sup>, varshini<sup>5</sup>, pairala satish<sup>6</sup>

<sup>1</sup>assistant professor, department of information technology, malla reddy institute of engineering and technology (autonomous), dhulapally, secundrabad

<sup>2,3,4,5,6</sup>ug students, department of information technology, malla reddy institute of engineering and technology (autonomous), dhulapally, secundrabad

### ABSTRACT:

The one important asset of our country is Bank currency and to create discrepancies of money miscreants introduce the fake notes which resembles to original note in the financial market. During demonetization time it is seen that so much of fake currency is floating in market. In general, by a human being, it is very difficult to identify forged note from the genuine not instead of various parameters designed for identification as many features of forged note are similar to original one. To discriminate between fake bank currency and original note is a challenging task. So, there must be an automated system that will be available in banks or in ATM machines. To design such an automated system there is need to design an efficient algorithm which is able to predict weather the banknote is genuine or forged bank currency as fake notes are designed with high precision. In this project six supervised machine learning algorithms are applied on dataset available on UCI machine learning repository for detection of Bank currency authentication.

**Keywords:** *UCI, ATM, fake, weather, original.*

### I.INTRODUCTION

Financial activities are carrying out in every second by many persons in which one most important asset of our country is Banknotes [3]. Fake notes are introduced in the market to create discrepancies in the financial market, even they resemble to the

original note. Basically they are illegally created to complete various task [12]. In 1990 forgery issue is not much of concern but as in late 19th century forgery has been increasing drastically [13]. In 20th century technology is increasing very vastly that will help the frauds to generate fake note whose

resemblance is like genuine not and it is very difficult to discriminate them [1]. This will lead to financial market to its lowest level. To stop this and to conduct smooth transaction circulation forged bank currency must be conserved [16]. As a human being it is very difficult to identify between genuine and forged bank currency. Government have designed banknote with some features by which we can identify genuine [9]. But frauds are creating fake note with almost same features with nice accuracy that make it very difficult to identify genuine note [5]. So, now a days it is required that bank or ATM machines must have some system that can identify the forged note from the genuine note [12]. To determine the legitimacy of the banknote artificial intelligence and Machine learning(ML) can play a vital role to design such a system that can identify forged note from the genuine bank currency[6,7,12]. Now a days, supervised machine learning (SML) approaches for classification problem is widely used. For medical disease its shows even promising results [2]. Few authors have only applied SML algorithms on bank currency authentication [6-9, 12]. To identify whether a note is genuine or fake we have to develop an automation system. Initially, the input is an image of note and from different image processing techniques we can extract the features of note. Further these images are given as an input to the SML algorithms to predict whether note is original or fake. In

review we can see that not much of work is done on this side.

## **II.SURVEY OF RESEARCH**

### **1.Tushar Agasti, Gajanan Burand, Pratik Wade and P Chitra, —Fake currency detection using image processing|| 14th ICSET-2017,**

Fake Currency has always been an issue which has created a lot of problems in the market. The increasing technological advancements have made the possibility for creating more counterfeit currency which are circulated in the market which reduces the overall economy of the country. There are machines present at banks and other commercial areas to check the authenticity of the currencies. But a common man does not have access to such systems and hence a need for a software to detect fake currency arises, which can be used by common people. This proposed system uses Image Processing to detect whether the currency is genuine or counterfeit. The system is designed completely using Python programming language. It consists of the steps such as gray scale conversion, edge detection, segmentation, etc. which are performed using suitable methods

### **2.Eshita Pilonia, Bhavika Arora, —Recognition of Fake Currency Based on Security Thread Feature of Currency|| International Journal Of Engineering And Computer Science, ISSN: 2319-7242,**

In the last few years a great technological advances in color printing, duplicating and scanning,

counterfeiting problems have become more serious. In past only authorized printing house has the ability to make currency paper, but now a days it is possible for anyone to print fake bank note with the help of modern technology such as computer, laser printer. Fake notes are burning questions in almost every country. Counterfeit notes are a problem of almost every country but India has been hit really hard and has become a very acute problem. Fake Indian currency of 100, 500 and 1000 rupees seems to have flooded the whole system and there is no proper way to deal with them for a common person. There is a need to design a system that is helpful in recognition of paper currency notes with fast speed and in less time. Our system describes an approach for verification of Indian and other countries currency banknotes. The currency will be verified by using image processing techniques

**3. Nayana Susan Jose, Shermin Siby, Juby Mathew, Mrudula Das, Android Based Currency Recognition System for Blind, International Journal of Engineering Research in Computer Science and Engineering (IJERCSE) Vol 2, Issue 4, April 2015,** in recent years, a lot of illegal counterfeiting rings manufacture and sell fake coins and at the same time fake note currency is printed as well which have caused great loss and damage to the society. Thus it

is imperative to be able to detect fake currency. We propose a new approach to detect fake Indian notes using their images. Currency image is represented in the dissimilarity space, which is a vector space constructed by comparing the image with a set of prototypes. Each dimension measures the dissimilarity between the image under consideration and a prototype. In order to obtain the dissimilarity between two images, the local key points on each image are detected and described. Based on the characteristics of the currency, the matched key points between the two images can be identified in an efficient manner. A post processing procedure is further proposed to remove mismatched key points. Due to the limited number of fake currency in real life, SVM is conducted for fake currency detection, so only genuine currency are needed to train the classifier

**4. Komal Vora, Ami Shah, Jay Mehta, A Review Paper on Currency Recognition System, International Journal of Computer Applications (0975 –8887) Volume 115 – No. 20, April 2015,** In this paper, an algorithm based on the frequency domain feature extraction method is discussed for the detection of currency. This method efficiently utilizes the local spatial features in a currency image to recognize it. The entire system is pre-processed for the optimal and efficient implementation of two dimensional discrete wavelet transform (2D

DWT) which is used to develop a currency recognition system. A set of coefficient statistical moments are then extracted from the approximate efficient matrix. The extracted features can be used for recognition, classification and retrieval of currency notes. The classification result will facilitate the recognition of fake currency mainly using serial number extraction by implementing OCR. It is found that the proposed method gives superior results.

### III.EXISTING SYSYEM:

In existing project, review of those applied machine learning approaches to classify whether not is original or not. Yeh et. al. implemented SVM based on multiple kernels to reduce false rate and compared with SVM (single kernel). To classify real and forged network. Author's Hassanpour et. al. used texture-based feature extraction method for the recognition and to model texture Markov chain concept is used. This method is able to recognize different countries' currencies. To classify whether the note is forged or not global optimization algorithms are applied in Artificial Neural Network (ANN) training phase, and they have observed good success in classification of note.

#### Disadvantages:

- Accuracy is Low.

- The technology is increasing very vastly that will help the frauds to generate fake note whose resemblance is like genuine not and it is very difficult to discriminate them.

### IV.PROPOSED SYSTEM:

To identify whether a note is genuine or fake we have to develop an automation system. Initially, the input is an image of note and from different image processing techniques we can extract the features of note. Further these images are given as an input to the algorithms to predict whether note is original or fake. In review we can see that not much of work is done on this side.

#### Advantages:

- Accuracy is Very high.
- Classification of fake and original notes are very easy.

### V.METHODOLOGY

In this project, the primary objective is to assess the effectiveness of various machine learning algorithms in the detection of counterfeit bank currency. The project begins with the acquisition of a diverse dataset containing images or features of both genuine and fake banknotes, ensuring representation of various denominations, conditions, and real-world scenarios. Subsequently, the dataset undergoes thorough preprocessing to handle missing values, noise, and

inconsistencies, followed by feature extraction, particularly if image data is involved. The selection of machine learning algorithms is a crucial step, considering classifiers such as Support Vector Machines, Random Forest, Decision Trees, and Neural Networks. To ensure robustness and avoid overfitting, the dataset is split into training and testing sets, typically with an 80-20 ratio. Each selected algorithm is then trained on the training dataset, with hyperparameter tuning to optimize their performance. The implementation of k-fold cross-validation further assesses the algorithms' generalization capability. Evaluation metrics, including accuracy, precision, recall, F1 score, and ROC-AUC, provide a comprehensive understanding of each algorithm's ability to distinguish genuine and counterfeit banknotes. Comparative analysis is conducted to identify the best-performing models. Ethical considerations are addressed to ensure responsible data usage, and the final models are evaluated on an unseen testing set to realistically gauge their generalization to new banknotes. Findings and recommendations are documented in comprehensive reports, detailing the strengths and limitations of each algorithm. Continuous improvement is considered, allowing for future updates and exploration of advanced algorithms to enhance the efficacy of fake bank currency detection in the financial sector.

## VI.CONCLUSION

Hand Gesture recognition and voice conversion for dumb and deaf person was successfully executed using image processing. The method takes image as input and gives text and speech as an output. Implementation of this system gives up to 90% accuracy and works successfully in most of the test cases.

## VII.REFERENCES

- [1] M. Aoba, T. Kikuchi, and Y. Takefuji, "Euro Banknote Recognition System Using a Three-layered Perceptron and RBF Networks", *IPSJ Transactions on Mathematical Modeling and its Applications*, May 2003.
- [2] S. Desai, S. Kabade, A. Bakshi, A. Gunjal, M. Yeole, "Implementation of Multiple Kernel Support Vector Machine for Automatic Recognition and Classification of Counterfeit Notes", *International Journal of Scientific & Engineering Research*, October-2014.
- [3] C. Gigliarano, S. Figini, P. Muliere, "Making classifier performance comparisons when ROC curves intersect", *Computational Statistics and Data Analysis* 77 (2014) 300–312.
- [4] E. Gillich and V. Lohweg, "Banknote Authentication", 2014.

[5] H. Hassanpour and E. Hallajian, "Using Hidden Markov Models for Feature Extraction in Paper Currency Recognition.

[6] Z. Huang, H. Chen, C. J. Hsu, W. H. Chen and S. Wuc, "Credit rating analysis with support vector machines and neural network: a market comparative study", 2004.

[7] C. Kumar and A. K. Dudyala, "Banknote Authentication using Decision Tree rules and Machine Learning Techniques", International Conference on Advances in Computer Engineering and Applications(ICACEA), 2015.

[8] M. Lee and T. Chang, "Comparison of Support Vector Machine and Back Propagation Neural Network in Evaluating the Enterprise Financial Distress", International Journal of Artificial Intelligence & Applications 1.3 (2010) 31-43.

[9] C. Nastoulis, A. Leros, and N. Bardis, "Banknote Recognition Based On Probabilistic Neural Network Models", Proceedings of the 10th WSEAS International Conference on SYSTEMS, Vouliagmeni, Athens, Greece, July 10-12, 2006.

[10] S. Omatu, M. Yoshioka and Y. Kosaka, "Bankcurrency Classification Using Neural Networks", IEEE, 2007.