Counterfeit Currency Detection Using K- Nearest Neighbors Technique

K. Mounika, K. Jyothi,M. Charan, K. Naga Chaitanya

Under the guidance of Mr. S. Ramesh Babu, Assistant Professor,

Department of ComputerScience and Engineering,

Tirumala Engineering College, Narasaraopet, Andhra Pradesh

ABSTRACT

This paper deals with the matter of identifying the currency that if the given sample of currency is fake. Different traditional strategies and methods are available for fake currency identification based on the colors, width, and serial numbers mentioned. In the advanced age of Computer science and high computational methods, various machine learning algorithms are proposed by image processing that gives 99.9% accuracy for the fake identity of the currency. Detection and recognition methods over the algorithms include entities like color, shape, paper width, image filtering on the note. This paper proposes a method for fake currency recognition using K-Nearest Neighbors followed by image processing. KNN has a high accuracy for small data sets making it desirable to be used for the computer vision task. In this, the banknote authentication dataset has been created with the high computational and mathematical strategies, which give the correct data and information regarding the entities and features related to the currency. Data processing and data Extraction is performed by implementing machine learning algorithms and image processing to acquire the final result and accuracy.

Keywords— Machine Learning, Currency detection, KNN, Indian Currency Note

I. INTRODUCTION

Machine Learning techniques help in building applications that support in detection of currency, through automated system and algorithm. Machine Learning is going to use pattern recognition and image processing for analyzing the real characteristics. The aim of this work is to create a paradigm which can be supervised with the help of related set theory so that it can be further beneficial in detecting feigned datasets with a very few categorizing bugs.Therefore another name referred as categorizing model grouped as data, consisting of attributes and labels for the bills referring as fake or genuine.Moreover, it identifies decision boundaries which separate samples of two classes.

We firstly take out data from images that rooted out from an original and copied banknote. In regard to digitization, we use camera for printing in terms of inspection. The size of all images has 300x 300 pixels, this is because of the distance concerning lens and grayscale pictures having targeted some dots per inch to achieve. Properties and characteristics are explored and taken out from images in support of transformation concerning

wavelet. Some methodologies that came from wavelet transformation are variance, skewness, kurtosis, entropy of pictures and class relevant to currency. Among these some are continuous in showing the features of a banknote and some i.e., the last one actually the real sign of the banknote, indicates 1 as original and 0 for duplicate. The set theory has 1100 samples, 600 samples for feigned notes, remaining 500 copies for original currency.

This work basically aims at observing images taken as input that anonymously based on properties taken out after wavelet transformation and also on the problem based on machine learning. Therefore, the processes are continuing with transformation of images. We check their feasibility by testing the data set in respect of set theory, which will be visible but not mentioned in the model, for achieving accuracy. Set of data is given, by using their properties we able to design supervised learning model and using that we classify whether the currency is fake or real.

For the values that are not mentioned in the data set, we can search them by applying properties and methodologies. As some of the properties are continuous in nature, normalization is applied to make the data set in the scope of 0 to 1. We cannot neglect any properties having outliers or falsify. In case of applying supervised learning, normalization helps in treating the properties equally and consistently. Other thing is, to establish a benchmark model. It acts as a naïve classifier and also helps in detection of notes. Few metrics are introduced focusing on feasibility and overall classification.

II. LITERATURE SURVEY

Detection of fake currency aims at utilizing machine learning techniques using large sets of data as inputs. KNN method is a useful method that is used for analysis. These types of analysis can be very useful for deriving implicit information. In this chapter, we review the recent available literature on classification and clustering of sequential data. This chapter also presents some of the major application areas of detection of currency. We are using three different types of algorithms KNN method, gradient method and support vector along with the concept of machine learning which helps in detection of currency at a large scale and also make India free from such malpractice. Ying Li Tian in paper, identification of fake note is done for blind through image processing using segmentation. it extracts various features of currency notes with the help of MATLAB software. This enhances simplicity and high- performance speed.

III. EXISTING SYSTEM

From the observation of the papers, we can say that there are certain stages which are very important in the existing system architecture. Firstly, we have the step called image acquisition means we have to take input as the image only through the scanner and in this there is no use of any digital camera to capture the image in the real time system. In this existing architecture, only the front part of the note is taken into consideration and not the rear part. After that we have next step called as pre-processing method. In this there are basically 3 to 4 sub stages involved like pre-processing, grayscale conversion, edge detection and segmentation.

IV. PROPOSED SYSTEM

The proposed system contains the advantages of the existing system and eliminates the disadvantages of it. The project centres on the design and implementation of Fake Currency Detection Application. The scope of the project is to provide approaches and strategies, which have proved to be suitable when accessing the image of the desired currency note.

V. ARCHITECTURE DIAGRAM
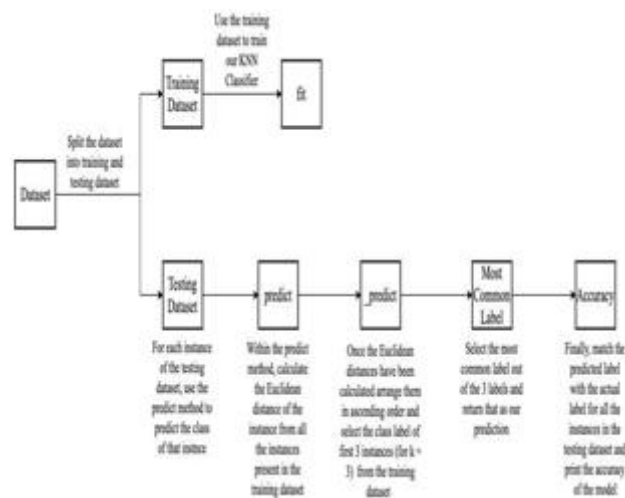
## VI. TRAINING AND TESTING THE DATASET

The K-Nearest Neighbors (KNN) Algorithm is a Simple, easy-to-implement supervised machine learning algorithm that can be used to solve both classification and regression problems. Machine learning models use a set of input values to predict output values.

KNN is one of the simplest forms of machine learning algorithms mostly used for classification. It classifies the data point on how its neighbors is classified. KNN classifies the new data points based on the similarity measure of the earlier stored data points. For example, if we have a dataset of tomatoes and bananas. KNN will store similar measures like shape and colour. When a new object comes it will check its similarity with the colour (red or yellow) and shape.
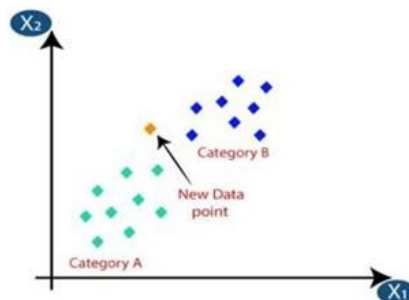
VII. RESULTS

Among all those algorithms, the best performance is selected. For Counterfeit currency detection using KNN is selected since it has high testing accuracy. The fake value is 1 and real one is 0. The currency of real one and fake has different colors.
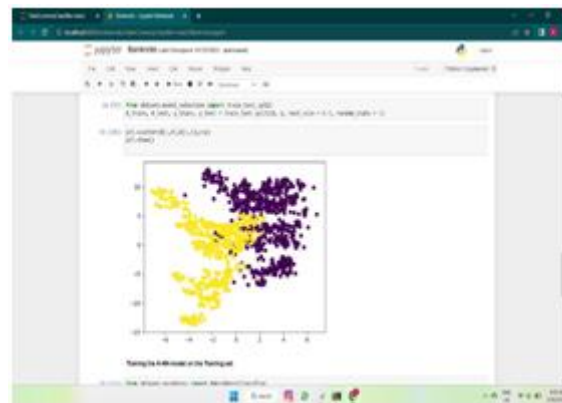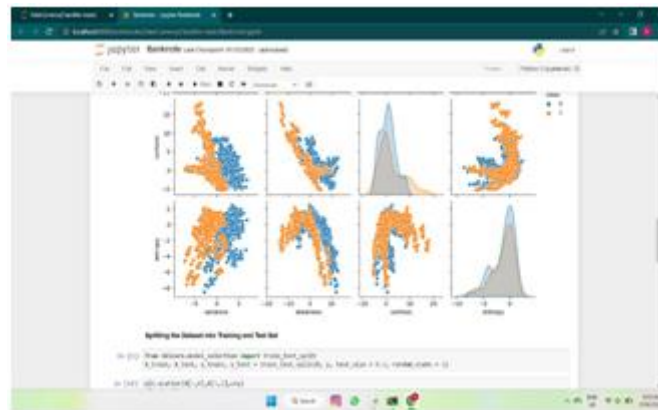
VIII. CONCLUSION

The model enables to discover the fake currency using machine learning. This could help us get rid of the circulate of fake currency to a few extents. It could offer an possibility for the consumer to well discover the authenticity of word definitely without going to the banks. Here we have taken into consideration the entire photo, however in destiny we will attempt to consist of all of the safety capabilities of currency by using appropriate structural layout and with appropriate schooling data. Further, noise can be avoided with inside the captured photo which must be taken into consideration as a pre-processing step in fake currency detection process. The recognition and pretend fake currency detection also can be prolonged by thinking about the styles of fake currency as capabilities for enhancing the detection accuracy.

REFERENCES

[1] 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.

[2] C. Gigliaranoa, S. Figini, P. Muliere, "Making classifier performance comparisons when ROC curves intersect", Computational Statistics and Data Analysis 77 (2014) 300–312.

[3] E. Gillich and V. Lohweg, "Banknote Authentication", 2014.

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

[5] 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.

[6] 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.

[7] 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.

[8] 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.