FAKE CURRENCY DETECTION WITH MACHINE LEARNING ALGORITHM AND IMAGE PROCESSING

Mrs..T. Sai Kumari*,Debabandya Chaini**, Harsh Jaiswal***, Mohd Altaf****, Mohammad Asif*****
*(Information Technology, Malla Reddy Institute of Technology and Science, maisammaguda, Dhullapally, Via Hakimpet Post, Secunderabad-500100 Telangana India.
Email:saikumari.thakur@mrits.co.in)
** (Information Technology, Malla Reddy Institute of Technology and Science, maisammaguda, Dhullapally, Via Hakimpet Post, Secunderabad-500100 Telangana India.
Email:adya.chaini11@gmail.com)
***(Information Technology, Malla Reddy Institute of Technology and Science, maisammaguda, Dhullapally, Via Hakimpet Post, Secunderabad-500100 Telangana India.
Email :harsh4816gmail.com)
****(Information Technology, Malla Reddy Institute of Technology and Science, maisammaguda, Dhullapally, Via Hakimpet Post, Secunderabad-500100 Telangana India.
Email : mohdaltaf495495@gmail.com)
*****(Information Technology, Malla Reddy Institute of Technology and Science, maisammaguda, Dhullapally, Via Hakimpet Post, Secunderabad-500100 Telangana India.
Email:aisfasidemd@gmail.com)

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 colours, 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.
Note: This paper proposes a method for fake currency recognition using K-Nearest Neighbours followed by image processing

I. INTRODUCTION

Fake currency detection using machine learning and image processing involves leveraging advanced algorithms to identify counterfeit currency notes. This technology combines the capabilities of machine learning and image processing techniques to analyse various features present in currency images and distinguish between genuine and fake banknotes.

The process typically begins with the collection of a dataset containing images of both authentic and counterfeit currency notes. Features such as texture, colour , watermark, security threads, and other intricate details are extracted from these images. Machine learning algorithms, especially classification models, are then trained on this dataset to learn the patterns and characteristics that differentiate genuine currency from counterfeits.

II. LITERATURE SURVEY

Detection of fake currency aims at utilizing machine learning techniques using large sets of data as inputs. KNN The entire document should be in Times New Roman or 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

Once the model is trained, it can be used to automatically analyse new currency images and determine their authenticity.

Ying Li Tian in paper [1], 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.

Li Liu et al In paper [2],detection of fake note is possible using deep learning using SVM and FNN(Feed Forward Neural Network),FNN also uses for verification. It uses max pool operation ,suppose ,the image it extracted ,then that

image would go through augmentation process and then annotation, these enable database creation ,then we input image through real time through transfer learning by alex-network, after that it will go for feature extraction where there the comparison is done between real time and database features. At last on the basis of that it predicts whether the currency is fake or real.

Mrs Monali Patil and Prof Jayant Adhikari[3], duplicacy of currency is a vulnerable threat on economy and it is now a common phenomenon due to advanced technology and laser printer, to get rid of this, some methods are processed. Detection of currency is possible through register, watermarking.

Author Bo tang, StevanKay in paper [4] describe a novel shape feature using angle distance method. Automated feature selection and automated feature reduction approach for input size detection and text categorization.

Mirza and Ninda in paper [5],uses digital image processing technique, for this sobel operator is used with magnitude to make comparison between input image and genuine image and this going to help in identification and also helps many commercial sector.

Nayana Susane Jose in this paper [6] made an android based application for blind people for detection of fake currency, he also proposed denominations for impaired people.

Mohammad H Alyshayeji in paper[7],uses bit –plane slicing technique with the help of edge detector algorithm for identification of currency.

In paper [8],for roman coins, spatially local coding method is used. Along with that it also uses traditional rigid spatial structure model such as spatial pyramid.

SYSTEM ARCHITECTURE:

Fig.no-1

III. UML DIAGRAM

A. Use Case Diagram:

A use case diagram shows various use cases and different types of users the system has and will often be accompanied by other types of diagrams as well.

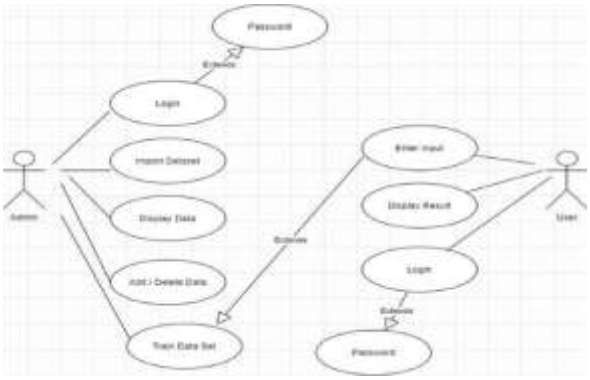
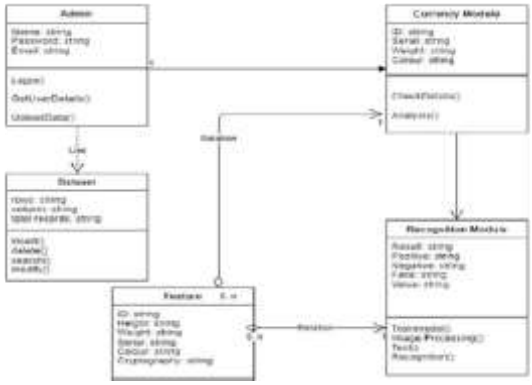


Fig.no-2

B. CLASS DIAGRAM:

The class diagram is the main building block of object-oriented modelling. It is used for general conceptual modelling of the structure of the application.



C. ACIVITY DIAGRAM:

An activity diagram visually presents a series of actions or flow of control in a system like a flowchart or a data flow diagram.

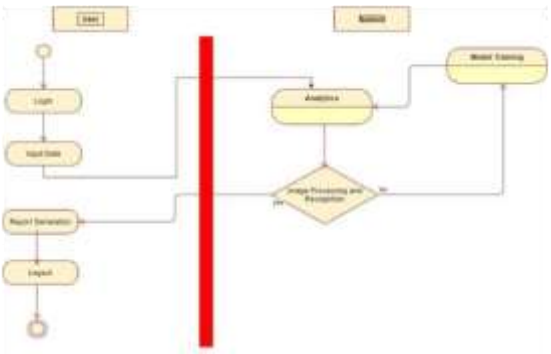


Fig.no-3

D. DEPLOYMENT DIAGRAM:

Deployment diagrams are used to visualize the hardware processors/ nodes/ devices of a system, the links of

communication between them and the placement of software files on that hardware.

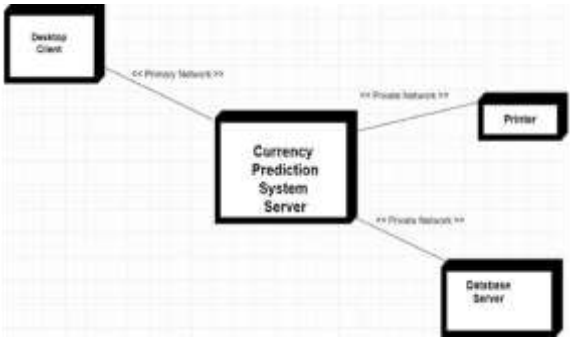


Fig.no-4

IV.SYSTEM TESTING

The purpose of testing is to discover errors. Testing is the process of trying to discover every conceivable fault or weakness in a work product. It provides a way to check the functionality of components, sub-assemblies, assemblies and/or a finished product it is the process of exercising software with the intent of ensuring that the software system meets its requirements and user expectations and does not fail in an unacceptable manner. There are various types of tests. Each test type addresses a specific testing requirement

TYPES OF TESTS

A.Unit testing

Unit testing involves the design of test cases that validate that the internal program logic is functioning properly, and that program inputs produce valid outputs. All decision branches and internal code flow should be validated. It is the testing of individual software units of the application .it is done after the completion of an individual unit before integration. This is a structural testing, that relies on knowledge of its construction and is invasive. Unit tests perform basic tests at component level and test a specific business process, application, and/or system configuration. Unit tests ensure that each unique path of a business process performs accurately to the documented specifications and contains clearly defined inputs and expected.

B. System Test

System testing ensures that the entire integrated software system meets requirements. It tests a configuration to ensure known and predictable results. An example of system testing is the configuration-oriented system integration test. System testing is based on process descriptions and flows, emphasizing pre-driven process links and integration points.

C. Integration testing

Integration tests are designed to test integrated software components to determine if they run as one program. Testing is event driven and is more concerned with the basic outcome of screens or fields. Integration tests demonstrate that although the components were individually satisfaction, as shown by successfully unit testing, the combination of components is correct and consistent. Integration testing is specifically aimed at exposing the problems that arise from the combination of components. Functional test Functional tests provide systematic demonstrations that functions tested are available as specified by the business and technical requirements.

D. White Box Testing

White Box Testing is a testing in which in which the software tester has knowledge of the inner workings, structure, and language of the software, or at least its purpose. It is used to test areas that cannot be reached from a black box level.

E. Black Box Testing

Black Box Testing is testing the software without any knowledge of the inner workings, structure or language of the module being tested. Black box tests, as most other kinds of tests, must be written from a definitive source document, such as specification or requirements document, such as specification or requirements document. It is a testing in which the software under test is treated, as a black box.

V. CONCLUSION & FUTURE ENHANCEMENT

A.Conclusion:

After implementing and analysing the results gathered, we can deduce that all the three algorithms used were exceptionally accurate at classifying notes as genuine and counterfeit based on the used data set. However, KNN outperformed the other two as discussed in the above section. It had an accuracy of 99.9% with classifying incorrectly classifying only 2 counterfeit notes. However, this result is limited as the data set used was quite small. It had a total of 1372 samples which when considered in the real-world scenario might not perform as well as it has currently.

B.Future Enhancement:

Unfortunately, merely removing unique identifiers of users cannot protect their privacy, as databases can be linked to each other based on their quasi-identifiers. Doing so, adversaries can reveal sensitive information about the users and compromise their privacy. In this section, we review the existing approaches for the anonymization of spatiotemporal datasets

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