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DETECTION OF FAKE CURRENCY USING MACHINE LEARNING

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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 identificationas 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 suchan 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 paper we are using CNN algorithm on dataset available on UCI machine learning repository for detection of Bank currency authentication. To implement this we have applied machine learning algorithms are measured their performance on the basis various quantitative analysis parameter. keywords: Pre-processing, Segmentation, Feature Extraction, Image Classification, Machine Learning Algoritham.

I. INTRODUCTION

Counterfeiting of currency has been a persistent problem plaguing financial systems worldwide, posing significant threatsto economic stability, trust in financial institutions, and even national security.

Manual detection methods, although effective to some extent, are time- consuming, labor-intensive, and often prone to errors. With the rapid advancements in technology, there has been a growing interestin leveraging machine learning techniques to develop automated systems capable of detecting counterfeit currency with higher efficiency and accuracy. Machine learning, a subset of artificial intelligence, provides powerful tools for pattern recognition and classification tasks, making it well-suited for tackling the complex problem of counterfeit detection. By analyzing various visual features extracted from banknote images, machine learning algorithms can learn to differentiate between genuine and counterfeitdelve into the rationale behind employing machine learning for this task, emphasizing its potential to revolutionize the way counterfeit currency is identified and mitigated. The primary objective of this research is to develop a robust and scalable system capable of accurately discerning between genuine and counterfeit banknotes in real-time scenarios. To achieve this goal, we propose a methodology.

That involves the extraction of discriminative features from banknote images, followed by the training of machine learning models on a diverse dataset encompassing bothgenuine and counterfeit samples.

Through empirical evaluations and comparative analyses, we aim to demonstrate the effectiveness and reliability of our proposed approach in detecting counterfeit currency. Furthermore, we discuss the practical implications of deploying such systems in various financial environments, including banks, automated teller machines (ATMs), and cash processingcenters, to enhance security measures and safeguard against counterfeit attempts.

Overall, this research contributes to the ongoing efforts aimed at combating counterfeit currency by leveraging the capabilities of machine. currency notes, thereby facilitating rapid and reliable detection. In this paper, we present a comprehensive study on the detection of fake currency using machine learning techniques. We explore the challenges associated with counterfeit detection and highlight the limitations of existing manual inspection methods. Subsequently, we learning. By advancing automated detection technologies, we aim to bolster the integrity of financial transactions and instill greater confidence in the global financial system.

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II. DESIGN AND IMPLEMENTATION

A. Design

1) Data Flow Diagram

It is a simple graphical formalism that can beused to represent a system in terms of input data to the system, various processing carriedout on this data, and the output data is generated by this system. DFD shows howthe information moves through the systemand how it is modified by a series of transformations. It is a graphical techniquethat depicts information flow and the transformations that are applied as data moves from input to output As shown in figure 2.1

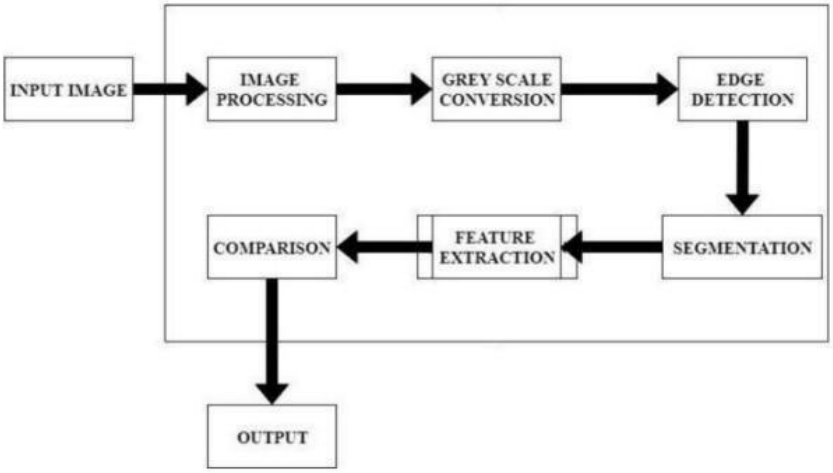

Figure 2.1: Data Flow Diagram

2) Use Case Diagram:

A use case diagram in the Unified Modeling Language (UML) is a type of behavioral diagram defined by and created from a Use- case analysis. Its purpose is to present a graphical overview of the functionality provided by a system in terms of actors, theirgoals (represented as use cases), and any dependencies between those use cases. The main purpose of a use case diagram is to show what system functions are performed for which actor. Roles of the actors in the system can be depicted. As shown in figure 2.2.

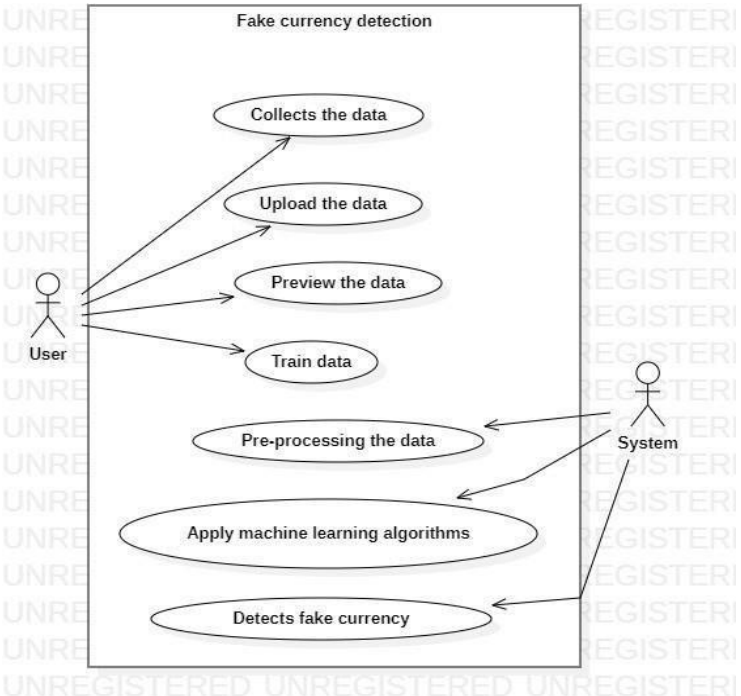

Figure 2.2: Use Case Diagram

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3) Sequence Diagram:

A sequence diagram in Unified Modeling Language (UML) is a kind of interaction diagram that shows how processes operatewith one another and in what order. It is a construct of a Message Sequence Chart.

Sequence diagrams are sometimes called event diagrams, event scenarios, and timing diagrams. As shown in figure 2.3.

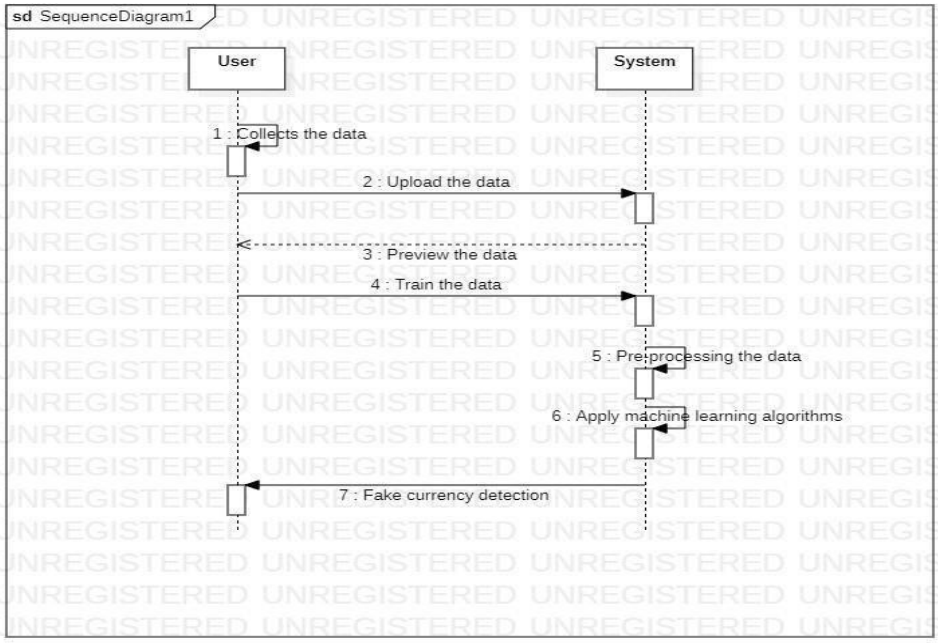

Figure 2.3: Sequence Diagram4)Activity Diagram

Activity diagrams are graphical representations of workflows of stepwise activities and actions with support for choice,iteration and concurrency. In the Unified Modeling Language, activity diagrams can be used to describe the business and operational step-by-step workflows of components in a system. An activity diagramshows the overall flow of control. As shown in figure 2.4.

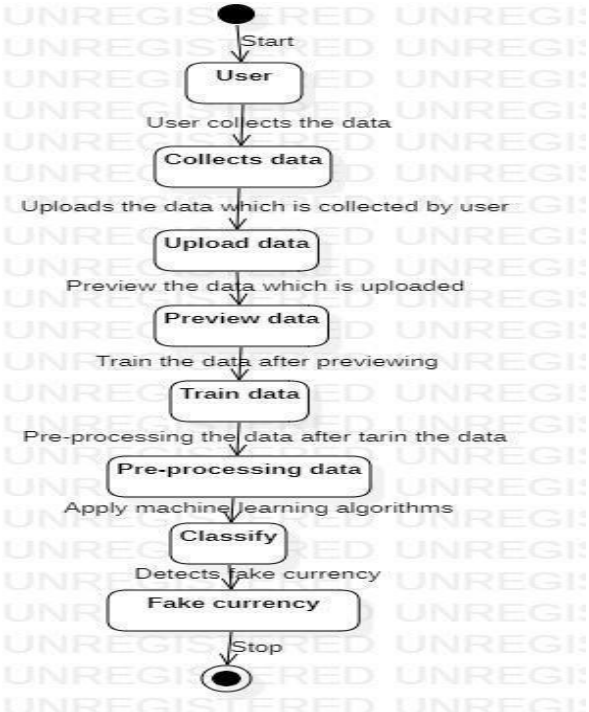

Figure 2.4: Activity Diagram

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B. System Requirement

Table 1: System Requirement

Category			
Hardware		Software	
Programming with GPU	RAM	Programming Environment	Dataset
Intel i5	8GB	Python	Kaggle

III. MODULE

A. Data Collection :

The different categories of Indian currencies differs in value estimation and color usage, separated from the quality of printing, material used for printing and other which makes for simple visual distinguishing proof. In any case, for the visually disabled person, the content and color will not give the assistance at all and measure can lead to disarray since of the comparable measurements of the different coins.

B. Pre-processing :

In pre-processing the operations normally initial to main data analysis and extraction of information. In this unwanted distortion are suppressed and enhance some image featuresthat are important to further processing. It includes image adjusting and image smoothening. After these two pre-processing steps, the images of the currency were applied for feature.

C. Feature extraction :

Feature extraction employs the selection and extraction of some of the Effective and important features, among the largest data set of the featureswhich are extremely important for the recognition of fake currency. Some Features of an image are Latent image and Identification Mark. We first create a database of a number of authentic Indian notes and then extract their features. The extracted features are used for detection of fake currency.

D. Detect Fake Currency :

In this work machine learning algorithms are applied on dataset available on UCI machine learning repository for detection of Bank currency authentication. To implement this we have applied machine learning algorithms are measured their performance on the basis various quantitative analysis parameter. And some of ML algorithm are giving better accuracy for particular train test ratio

CNN (Convolutional Neural Network): The CNN approach is predicated on the thought that the model function properly supported an area understanding of the image. It uses few parameters as compared tototally connected network by reusing an equivalent parameter numerous times. While a totally connected network generates weights from each pixel on the image,

a convolutional neural network generates only enough weights to scan a little area of the image at any given time. This approach is useful for the training process-the fewer parameters within the network, the higher it performs. Additionally, since the model requires less amount of knowledge, it's also ready to train faster. For classifying an image using a trained CNN Model, the features are searched at base level.

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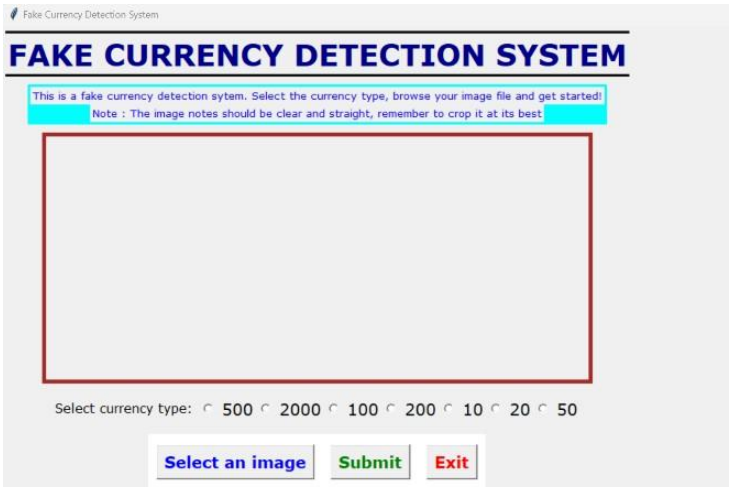
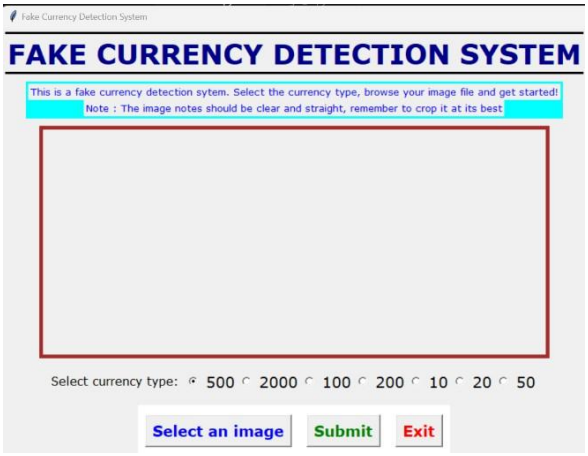
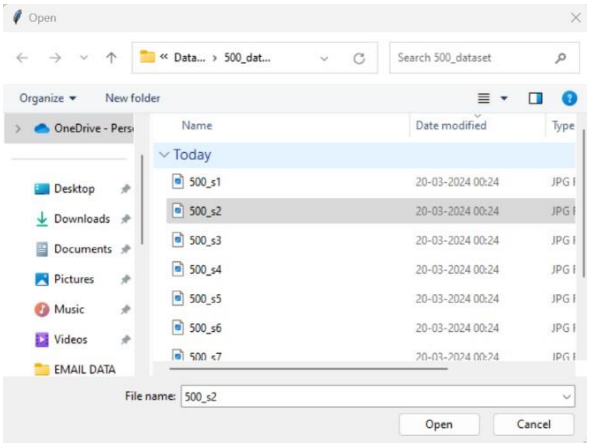
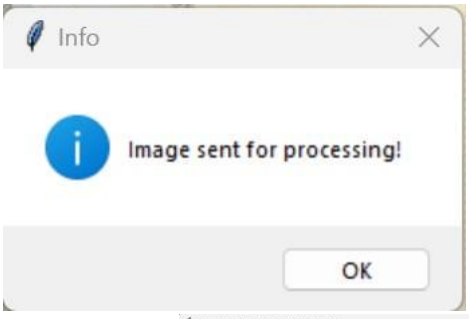
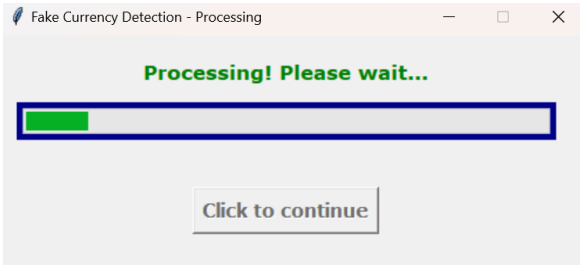
IV. RESULT

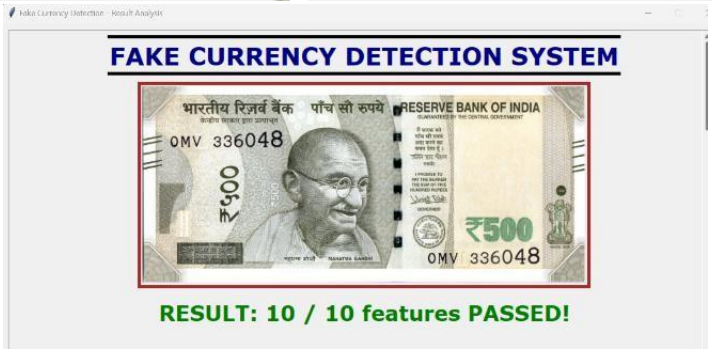












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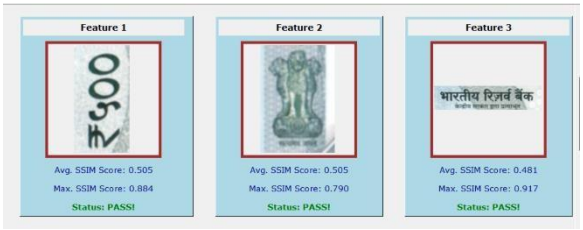

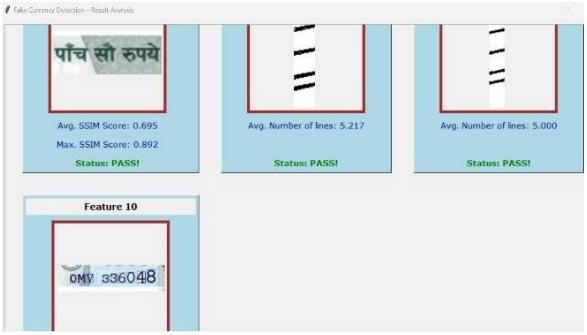

V. CONCLUSION

In this work, we have discussed that how our proposed system detects the fake bank currency using machine learning algorithms. The proposed system is also scalable for detecting the whether the currency is fake or not by image processing. The system is not having complex process to detect the whether the data contains fake bank currency like the existing system. Proposed system gives genuine and fast result than existing system. Here in this system we use cnn algorithm to detect whether currency is fake or not.

VI. FUTURE SCOPE

Advanced Security Features Machine Learning and Al Blockchain and Digital Currency Public Awareness and Education.

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VII. REFERENCES

[1] Vidhate, Y. Shah, R. Biyani, H. Keshri, R. Nikhare, Fake currency detection application. Int. Res. J. Eng. Technol. (IRJET) 08(05) (2021), e-ISSN: 2395- 0056.

[2] A.A. Mandankandy, K.E. Kannammal, Fake currency detection: a survey. Gedrag enOrganisatie 33(4), 622-638 (2020).

[3] A.A. Mandankandy, K.E. Kannammal, Fake currency detection: a survey. Gedrag enOrganisatie 33(4), 622-638 (2020).

[4] A.Singh, K. Bhoyar, A. Pandey, P. Mankani, A. Tekriwal, Detection of fake currency using image processing. Int. J. Eng.Res. Technol. (IJERT) 8(12) (2019).

[5] Navya Krishna, G. Sai Pooja, B. Naga Sri Ram, V. Yamini Radha, P. Rajarajeswari, Recognition of fake currency note using convolutional neural networks. Int. J. Innov. Technol. Exploring Eng 8(5), 58-63 (2019).

[6] K.D. Sudha, P. Kilaru, M.S.R. Chetty, Currency note verification and denomination recognition on Indian currency system. Int. J.Recent Technol. Eng. 7(6S) (2019). ISSN: 2277-3878

[7] M. Laavanya, V. Vijayaraghavan, Real time fake currency note detection using deeplearning. Int. J. Eng. Adv. Technol. (UEAT)9(155) (2019), ISSN: 2249-8958.

[8] T. Kumar, T. Subhash, D. Regan, Fake currency recognition system for Indian notes using image processing techniques (2019).

[9] A. Upadhyaya, V. Shokeen, G. Srivastava, Analysis of counterfeit currency detection techniques for classification model (2018).

[10] S. Gothe, K. Naik, V. Joshi, Fake currency detection using image processingand machine learning (2018).

[11] S. Shaker, M.G. Alawan, Paper currency detection based image processing techniques: a review paper (2018),

[12] V. Lalithendra Nadh, G. Syam Prasad, Support vector machine in the anticipation of currency markets. Int. J. Eng. Technol. (UAE) 7(2), 66-68 (2018).