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Automated Bank Cheque Verification System

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ABSTRACT: Fraudulent cheques are commonly distinguished using manual identification. Manual identification, unquestionably, is the least successful activity to battle against cheque frauds. This requires staff's ability to distinguish fake cheques dependent on the security highlights and other visual attributes. Furthermore, if the paper cheque is damaged, OCR will not be able to detect the cheque. Hence, its need to be cleared manually by a person. Then the automation process will not be successful. Moreover, current CITS based paper cheque clearance requires at least one day to clear a cheque which could extend up to three working days. Additionally, the user needs to go to the bank to deposit cheque with consuming both time and cost. Proposed system will be implemented as a python web application using Django framework. To verify the authenticity of the cheque, account holder's signature on the cheque will be analyzed using deep learning techniques. Account holders' signatures are collected, and system builds a deep learning model. Model is trained using account holder's signature dataset by extracting the features from every signature image and labeling it. System uses CNN for training and classification.

KEYWORDS: Check truncation system, online banking, remote check deposit, digital check forgery, forgery detection, image forensics, expert system, JPEG artifacts.

I. INTRODUCTION

In the ever-evolving landscape of financial technology, the traditional process of cheque clearance and verification is undergoing a profound transformation. The advent of smart digital cheque clearance and verification, powered by cutting-edge deep learning techniques, represents a significant leap forward in ensuring the security and authenticity of financial transactions. This innovative solution will be implemented as a Python web application, leveraging the robust Django framework to create a user-friendly and efficient platform. At the core of this technology lies the ability to verify the authenticity of a cheque by analyzing the account holder's signature. Traditionally, this process relied heavily on manual inspection, which could be time-consuming and prone to human error.

However, with the application of deep learning, the system can not only expedite the verification process but also enhance its accuracy and reliability. The system begins by collecting signatures from account holders, creating a diverse dataset that will serve as the foundation for building a deep learning model. This model is carefully crafted by extracting essential features from each signature image and associating them with the account holder's identity, effectively labeling each dataset entry. The choice of Convolutional Neural Networks (CNN) for training and classification ensures that the model can effectively learn and distinguish the intricate nuances of each individual's signature. This innovative solution not only streamlines the cheque clearance process but also adds an additional layer of security by making it significantly more difficult With the integration of deep learning techniques and the Python web application using Django, the financial industry is poised to enter a new era of efficiency, accuracy, and trust in cheque verification.

II. LITERATURE SURVEY

In[1] " Cheque Image Security Enhancement in Online Banking"discusses the implementation of the Cheque Truncation System (CTS) to expedite cheque clearance while eliminating the risks associated with physical cheque movement. It emphasizes the use of software-based solutions and robust security measures, including SVD digital watermarking and 256-bit AES encryption, to protect cheque images from unauthorized access and fraud. Furthermore, automated techniques such as pantograph region extraction and MICR region extraction are employed to enhance fraud detection and operational efficiency in the banking system, ultimately resulting in improved customer service, liquidity, and security.

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In [2] "Remote Check Truncation Systems: Vulnerability Analysis and Countermeasure" in This paper it identifies vulnerabilities in remote check deposit systems and introduces a digital check forgery attack model. These attack vectors exploit weaknesses in client check truncation systems by delegating critical operations to untrusted entities. Countermeasures include an expert system-based forgery detector and performance evaluations against digital check forgery. Ongoing research explores the impact of advanced machine learning, particularly deep learning, on enhancing security in remote check-deposit systems.

In [11] Mobile Banking Transaction Using Fingerprint Authentication,in this paper the present Mobile-banking application is using the username and password security mechanism which can easily reached by mere guess work and password can be hacked. To reduce the potential vulnerabilities regarding to the security, a combination of user id & password and fingerprint recognition system seem to be one of the most reliable means of authentication in a, mobile banking application environment. In order for mobile banking to continue to grow, the security and the privacy aspects need to be improved. With the security and privacy issues resolved, the future of mobile banking can be very prosperous. The future of mobile banking will be a system where users are able to interact with their banks "worry-free" and banks are operated under one common standard.

III. SCOPE AND METHODOLOGY

Background Research

The background research for this project is focused on the inefficiencies of manual cheque fraud identification, emphasizing the drawbacks of OCR in handling damaged cheques. The prolonged clearance time of up to three days and the inconvenience of physical bank visits for cheque deposits were identified as critical issues. The project aims to leverage these insights in developing a web application to expedite cheque clearance, enhance security through signature analysis and improve the overall efficiency of banking transactions.

Existing system

The current cheque processing system involves a combination of manual identification and Optical Character Recognition (OCR) technology. Along with it, the Clearing and Imaging Technology System (CITS) is utilized in the current cheque processing system for cheque clearance.

Limitations Of Existing system

The limitation of the existing system is evident in it's heavy reliance on manual identification, which is prone to errors and lacks efficiency in combating cheque fraud. The inability of the OCR to detect damaged cheques further complicates the process, hindering the automation of cheque clearance. Delays in CITS-based paper cheque clearance system, spanning up to three working days, pose a significant inconvenience for users. The necessity for physical bank visits for cheque deposits not only consumes time but also incurs additional costs for the users. These limitations collectively highlight the need for a more robust and automated solution, prompting the proposed system's integration of deep learning techniques to address these shortcomings and enhance the security and efficiency of the cheque transaction process.

Proposed system

The proposed system offers a comprehensive solution to the limitations of the current cheque processing system. Implementing a Python web application harnesses the power of deep learning, particularly Convolutional Neural Networks (CNN), to authenticate account holders' signatures. By automating the cheque clearance process, the system significantly reduces the dependence on manual identification and addresses the shortcomings of OCR in detecting damaged cheques. This not only expedites the cheque clearing timeline but also eliminates the need for users to physically visit the bank for deposits, enhancing overall efficiency and security in cheque transactions.

System Architecture

System architecture of this system is as shown below. Main objective of the proposed solution is to speed up the cheque clearing process and increase the security of cheque transactions by verifying customer signature through machine learning approach. The proposed solution can provide a 24 hour service for customers. Further the web based technology help users to easily issue and clear digital cheques using a simple web application. The system verifies user signature (cheque holder) to validate the cheques and also detects amount written in words using machine learning approach. Furthermore, the approach also provides with a productive, versatile technique for distinguishing bank cheque frauds by analyzing customer's signature. System will display confirmation message once the cheque is verified either as "Cheque Authenticated" or "Cheque Not Authenticated.

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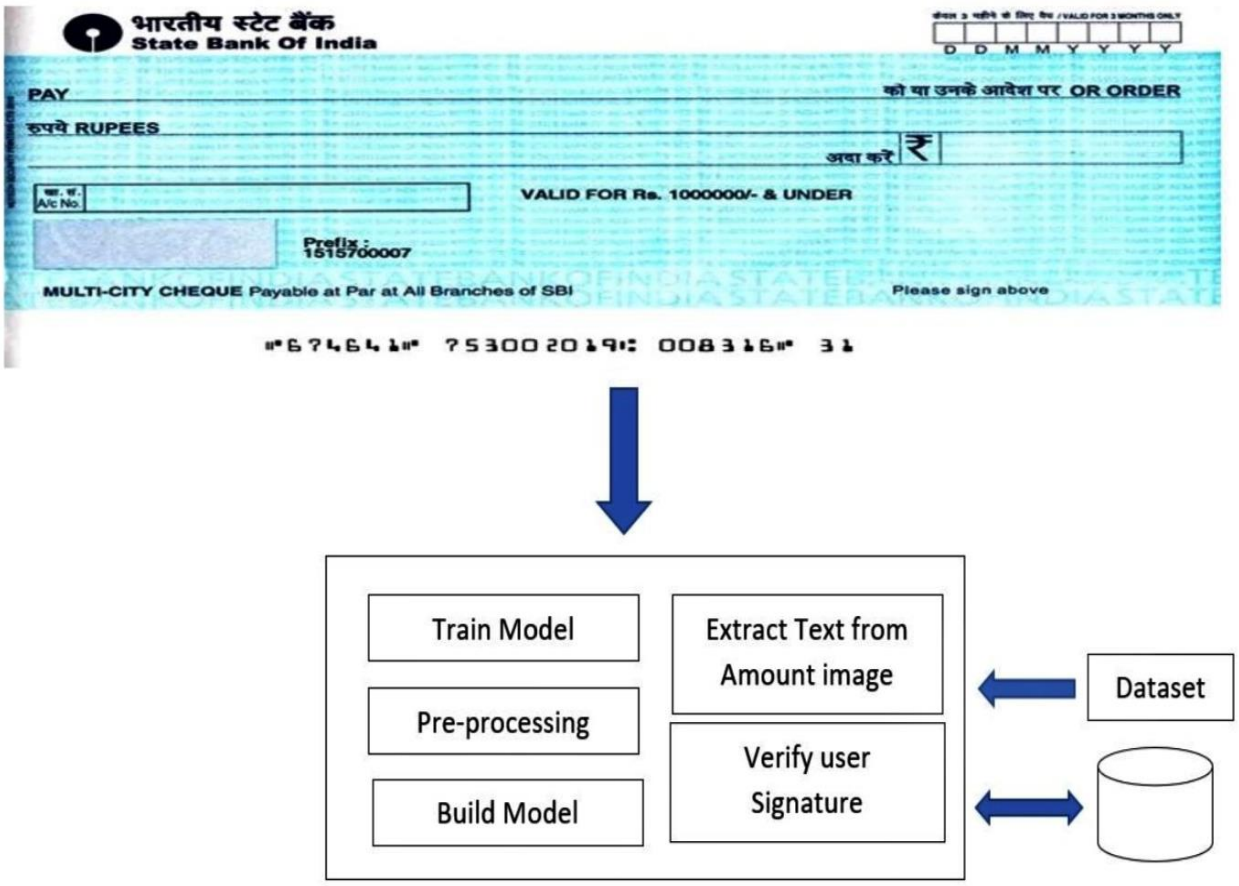

Fig 1 System Architecture

The architecture diagram depicts a streamlined process for automated musical notes generation. It begins with inputting audio file, followed by pre-processing to standardize them. Features such as pitch and duration are extracted.

A machine learning model analyzes these features to predict the note for each frequency. Final step is to use this model to predict the musical notes in an audio file.

IV. CONCLUSIONS

In conclusion, the automated bank cheque verification system presented in this study aims to achieve several key objectives crucial for enhancing the efficiency and security of cheque transactions. By leveraging advanced technologies such as deep learning, the system seeks to expedite the cheque clearing process while simultaneously bolstering security measures.

Through the application of deep learning algorithms, the system can effectively authenticate account holder signatures, providing a reliable method for verifying the authenticity of cheques. Additionally, the system's ability to accurately detect and convert written amounts into numerical format further streamlines the verification process, minimizing errors and enhancing overall operational efficiency within the banking sector.

Overall, by harnessing the advantages of deep learning techniques, this automated system represents a significant advancement in cheque verification methodologies, offering a promising solution for modernizing and securing cheque transactions.

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