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VISUAL CRYPTOGRAPHY: STRENGTHENING BANKING AUTHENTICATION WITH IMAGE PROCESSING

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Abstract *- In today's digital era, we present a multi-factor authentication system that combines Visual Cryptography, Face Authentication, and OTP Verification to fortify banking security. Visual Cryptography splits images into secure shares, Face Authentication verifies unique facial features, and OTP Verification adds an extra layer. The synergy of these factors forms a robust, secure, and user-friendly system, reducing unauthorized access and fraud. This project contributes to cyber-security advancements and improves the banking user experience. In an ever-growing digital banking landscape, this innovative approach ensures data confidentiality and addresses evolving threats.*

Keywords: Visual Cryptography, Image Processing, Face Recognition, Encryption, Multi-factor Authentication

1. INTRODUCTION

In the age of digital transformation, online banking has become an integral part of our daily lives. It has redefined the way we manage our finances, providing unparalleled convenience and accessibility. However, the very convenience that online banking offers is accompanied by significant security concerns. The reliance on traditional authentication methods, primarily based on passwords and PINs, poses inherent vulnerabilities that cybercriminals often exploit to gain unauthorized access to financial data.

Our project addresses these vulnerabilities by introducing a multifaceted authentication system that combines Visual Cryptography, Face Authentication, and OTP (One-Time Password) verification. This advanced system offers a comprehensive approach to bolster the security of online banking transactions and protect sensitive financial data from unauthorized access.

Visual Cryptography, a relatively new and exciting field that intersects computer science and cryptography, plays a pivotal role in our approach. It employs the concept of sharing an image into multiple shares in such a way that the original image is revealed only when a predefined number of shares are combined. This technique provides a unique and secure way to store and retrieve authentication information.

Face Authentication, on the other hand, leverages the biometric attributes of an individual's face to confirm their identity. The utilization of biometrics in the authentication process enhances security by making it significantly more difficult for unauthorized users to gain access.

Lastly, OTP verification is a dynamic component of our system that adds an additional layer of security. Each OTP is generated for a single-use transaction and is valid for a brief period, minimizing the risk of unauthorized transactions even if an attacker gains access to other authentication factors.

This project aims to revolutionize the security landscape of online banking by integrating these three authentication methods. By doing so, we not only enhance the security of financial transactions but also provide a more user-friendly and robust system that is adaptable to the evolving threats in the digital realm. The ensuing sections of this report will delveop deeper into the technical aspects and implementation of Visual Cryptography, Face Authentication, and OTP verification, showcasing the innovative potential of these technologies in the context of banking security.

2. LITERATURE SURVEY

[1]. Paper Name : Visual Cryptography and Image Processing Approaches for Enhanced E-Banking Transactions
Author : Kamlesh Kumar Rajput, Mrs. Madhu Lata Nirmal.

Publish Date: Sept 2022.

Information : A relatively new field of study that is gaining traction is image cryptography. Numerous strategies have been developed for cryptography over time. Images

containing text or other visual information can be hidden using a variety of encryption algorithms. The term "visual cryptography" refers to the idea that the main idea behind encryption is that it may be decrypted by human vision if the right key image is used. Security has become the most important component of today's banking transaction system, notwithstanding banks' commitment to providing secure core banking services to their customers. Participation in the transaction is contingent upon the legitimacy of the users and is only permitted for those users. Banks utilise passwords, biometric,, password, and OTP-based authentication systems for this reason, but the database of the banking system is no longer secure owing to avoidable criminal activities like phishing attacks and identity theft. Intelligent hackers can retrieve biometric information about consumers from the bank's database and utilize it later to make fraudulent transactions. To prevent all of these terrible occurrences, the RSA algorithm is utilized coupled with visual cryptography and steganography approaches.

[2]. Paper Name : Haar Cascade Face detection and local binary pattern histogram face recognition based drone.

Author : K. G. Shanthi, S. Sesha Vidhya, K. Vishakha, S. Subiksha, K. K. Srija.

Publish Date: March 2022.

A common method for identifying people's faces via image processing is face recognition. Face recognition is becoming important because of the increasing population, which calls for strict security and surveillance systems. It's also important because of the modern demand for self-confirmation, fighting in rural areas, disaster aid, and other reasons. This study suggests using a face recognition-based drone for surveillance and to help the task force track illegal immigrants who go missing. An technique called Haar Cascade is used to identify faces in photos and live recordings. The Local Binary Pattern Histogram (LBPH) is a facial recognition algorithm. The drone identified people with a 98 percent accuracy rate, which has important applications.

[3].Paper Name : E-Authentication for Secure Net Banking
Author : Mitul Chauhan, Gayatri Barapatre, Amruta Ghatge, Rajashri Sabale, Pooja Sakunde
Publish Date : February 2022.
Information : Recent technological breakthroughs have led to the spread of personal computing devices, such as watches, tablets, smartphones, and eyewear. This has helped them imagine a digital future in which they may use the Internet to perform basic everyday tasks from anywhere at any time and on any device. Concurrently, developments in ubiquitous computing have spawned the idea of "smart spaces," which aim to deliver customised services to inhabitants automatically. User authentication, or confirming one's identity, is crucial in the digital era to safeguard private data kept on laptops and smartphones as well as to enable personalised services in digital spaces (such changing the temperature of the room, etc.). Recent research has shown that traditional methods of authentication, such as passwords or fingerprints, are vulnerable to hacking. As a result, scientists have created a wide range of cutting-edge techniques for user authentication in the above specified situations. In order to help direct future research in these areas, this paper offers an overview of these distinctive systems.

[4]. Paper Name :Prevention of phishing website attacks in online banking systems using visual cryptography.
Author : M. A. Snober, A. Dros, Q. A. Al-Haija.
Publish Date : December 2022.
Information : Account numbers and private passwords are two pieces of sensitive data that are frequently taken by attackers and pirate operations. They attempt to fool victims into disclosing these details. One is the counterfeiting of websites, especially those related to online banking, electronic payment services, and other websites. Those websites' users typically have lower awareness of security risks. In order to create an authentication-level protection method that restricts these phenomena, this study makes use of Visual Cryptography (VC) technology. Our suggested method would make it easier for users to discern between a legitimate website and a phishing one, especially for those who are not familiar with the cyber security industry. Considered straightforward, visual cryptography eliminates the need for convoluted encryption and decryption procedures.

[5]. Paper Name : Design and Implementation of a visual cryptography application
Author : Petre Anghelescu, Ionela-Mariana Ionescu, Marian Bogdan Bodea.
Publish Date : June 2020.
Information: An application for visual cryptography is designed and implemented in this work. After processing the original data in the form of a picture, this image will be subjected to a visual encryption technique. It will produce two to four papers that show the encryption's outcome. By aligning them correctly and allowing the human eye to visually recognise the information, the encryption process is completed. Every encryption will provide a distinct set of results, and each encryption repetition will produce a new set.

3. SYSTEM ARCHITECTURE

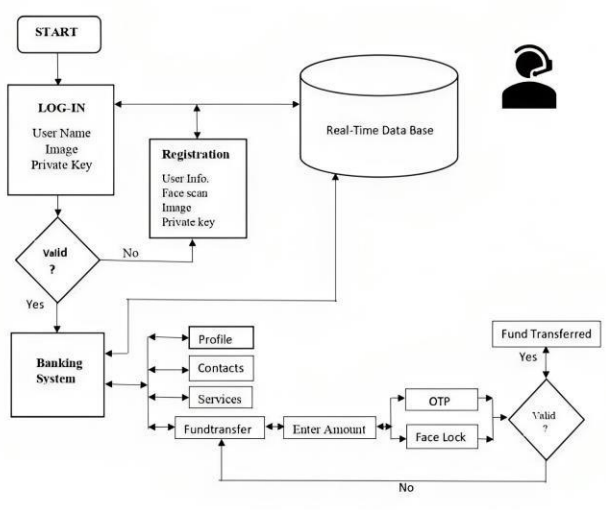

Fig. system architecture

This flowchart shows a real-time database and face lock feature in a banking system. The black-and-white flowchart has a total of 16 boxes and 17 arrows. The flowchart is indicated by a "START" box at the start and a "Fund Transferred" box at the end. The flowchart uses a cylinder form to symbolize a real-time database and a Libra symbol for the banking system. The flowchart's face icon denotes the existence of the face lock feature. The flowchart illustrates the rational progression of data in the banking system, encompassing financial transfers, contacts, services, profile management, loan requests, transaction requests, OTP verification, and face lock verification. Please be advised that the OCR result I received from the system was the foundation for description

4. CONCLUSION

To sum up, the team has done a fantastic job of utilizing visual cryptography to provide financial authentication. The amalgamation of facial identification, OTP verification, and image processing has yielded a strong solution that prioritizes user-friendliness while simultaneously raising security standards. Steganography and watermarking are two image processing techniques that improve data secrecy. Face authentication and OTP verification, on the other hand, act as strong barriers to unauthorized access and guarantee the integrity of banking transactions. Though significant work remains, this accomplishment lays a solid basis for financial security going forward. The project has a bright future ahead of it, full with opportunities for growth and development.

5. FUTURE SCOPE

To further enhance the system, we recommend exploring biometric enhancements, machine learning integration, multi-channel authentication, block-chain technology, and continuous cyber threat monitoring. Collaboration with banks, usability studies, and regulatory compliance will be crucial for real-world implementation, ensuring scalability and adaptability in the evolving banking security landscape.

6. REFERENCES

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