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Morse code Based Security Authentication System Using AI

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ABSTRACT: This paper introduces an advanced security authentication system that combines Morse code with artificial intelligence (AI) and employs the Haar Cascade algorithm for face detection. The proposed system enhances authentication security by integrating Morse code sequences, which users create as passwords, with AI-driven verification methods. During the authentication process, the system first utilizes the Haar Cascade algorithm to detect and verify the user's face in real-time, ensuring that the person attempting to authenticate is the registered user. Subsequently, AI algorithms decode the Morse code input to match it with the stored password, adding an additional layer of security. The approach aims to provide a robust and multifactor authentication system by combining biometric face detection with traditional Morse code-based authentication. The paper details the design, implementation, and evaluation of this integrated system, demonstrating its effectiveness in improving security and accuracy.

KEYWORDS: Morse Code Integration; Haar Cascade Algorithm; Real-Time Verification; Multifactor Authentication; System Design; Security

I. INTRODUCTION

In the current digital environment, PINs have some benefits, but they also have certain drawbacks. Traditional PINs, particularly those that are short, are vulnerable to automated software's brute-force attacks, which attempt every conceivable combination. Since PINs like "1234" and "0000" are easy to figure out, customers are at greater risk. Lack of Intricacy: PINs are usually 30 numbers long and have a defined length, in contrast to passwords, which can contain any combination of letters, numbers, and special characters. Compared to more complicated password combinations, they are simpler to crack due to their low complexity. Possibility of Shoulder Surfing: If PINs are not entered discreetly, antagonistic users may be able to watch them being typed on touchscreen devices.

"Morse Code Based Secure Authentication System Using AI" project aims to enhance traditional Morse code authentication methods through the application of AI technology. Because it is dependable and easy to understand, Morse code is employed as a secure communication technique. By incorporating artificial intelligence, the system can ensure accuracy and reliability while automating the authentication process. This innovative approach combines the reliable Morse code with modern AI algorithms to provide a secure and efficient identification system suitable for a variety of applications, from digital security to telecommunications. By using AI's speedy decoding and validation of Morse code communications, the research aims to improve authentication processes.

II. OBJECTIVE

The system aims to provide an accessible authentication method to users who might find it difficult to use traditional authentication processes, such as inputting a PIN and having the system. In order to provide accurate authentication, the system analyzes the aspect Ratio with the entered PIN, which is the Morse code.The system is built to be scalable, which enables everyone to access the project while handling a large number of users and authentication requests. The system is made to be easy to use and intuitive, allowing users to authenticate themselves without any difficulties. Showing that a high volume of users and authentication requests can be handled by it. The method aims to mitigate the limitations of traditional PIN-based authentication systems by utilizing the unique characteristics of gaze-based authentication, which increases the difficulty for attackers to gain unauthorized access. The primary aim of this system is to provide an extremely secure authentication method. It increases security above and beyond traditional PIN-based systems by employing eye pupil movement as the foundation for authentication. The primary aim of this system is to provide an extremely secure authentication method.

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III. LITERATURE SURVEY

[1] "Real time Eye Tracking for Password Authentication"
[2] "Morse Code Based Secure Authentication System Through Artificial Intelligence"
[3] "Eye-Contact Game Using Mixed Reality for the Treatment of Children with Attention Deficit Hyperactivity Disorder"
[4] "Morse Code Based Authentication System"
[5] "A Novel Authentication Technique using Face Detection and Gaze-based Morse Code Entry"

IV. METHODOLOGY

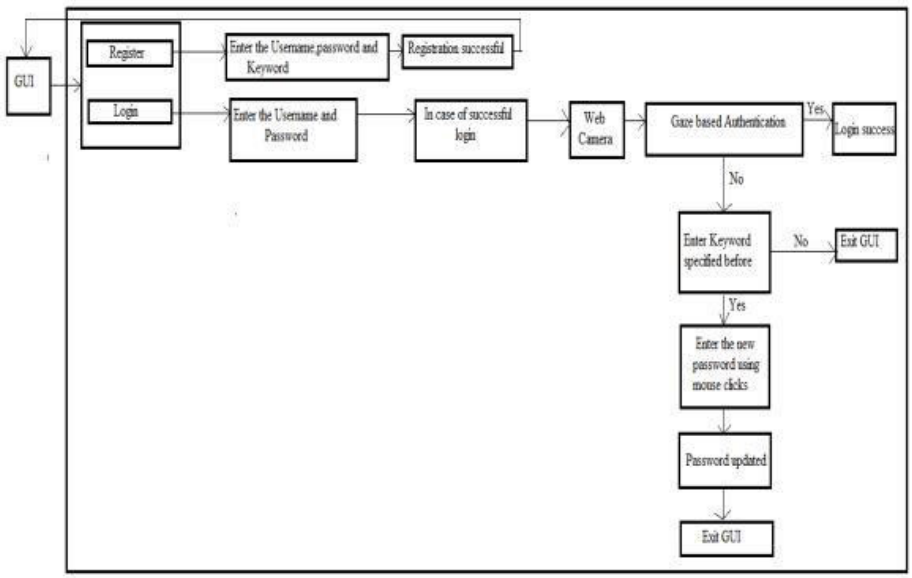
Morse code is a technique used in telecommunications to encode text characters as standardized sequences of two differing signal durations known as dots and dashes or dits and dahs. It is named after one of the telegraph's inventors, Samuel Morse.Signal Representation:Dot (·) indicates a brief signal.Dash (-) indicates a longer signal.Representation of characters. Each character (letter, number, or symbol) is represented by a distinct pattern of dots and dashes. A dash normally lasts three times as long as a dot. People with severe motion difficulties can send Morse as long as they have some motor control. An electronic typewriter with the codes inscribed on the keys has been proposed as an innovative solution to the problem of caregivers learning to decode. In our project, the password is entered in the form of morse code using eye blinks

The Haar Cascade algorithm is a ML Based approach for identifying objects in pictures or video streams. Paul Viola and Michael Jones proposed the Haar Cascade algorithm in their landmark 2001 paper, "Rapid Object Detection Using a Boosted Cascade of Simple Features." This method offered a framework for real-time object detection that employs a sequence of classifiers.It interferes with the process of locating specific important points on a person's face while shooting a photograph. For example, emotion recognition through facial gestures, assessment of the angle of regard, face altering, the application of graphics to faces, and puppet control of other characters.

Feature Selection, The Haar Cascade detects objects by using a series of rectangular features, known as Haar features. These features function like filters, applied to various parts of the image to yield a single value that characterizes a particular aspect of each image region Integral Image, An integral image (also known as summed area table) is used to quickly compute the image's characteristics. This enables the rapid calculation of the sum of pixel intensities over any arbitrary rectangular region in constant time. Adaboost Training, The Adaboost learning method is used to choose a small subset of significant features from a big set. Each feature is taught to determine if it contains the object of interest. Adaboost combines weak classifiers, which are basic classifiers.

The Haar Cascade classifier operates in a cascaded fashion.Cascade Structure, A series of classifier stages, known as cascade stages, are applied sequentially. Each stage progressively removes sections of the image that are less likely to contain the object.Classifier Efficiency, Each step uses the preceding stage's output to determine whether to continue analyzing the current region or discard it early.

V. SYSTEM ARCHITECTURE



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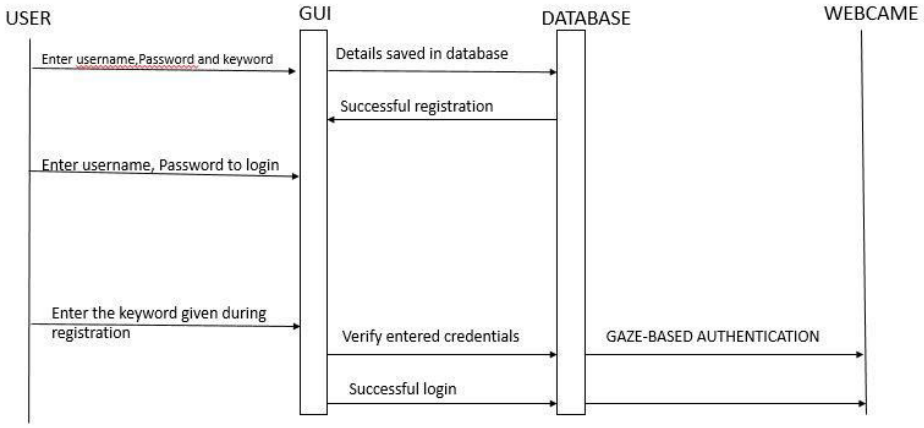
SEQUENCE DIAGRAM



VI. CONCLUSION

Our project primarily supports three-factor authentication. Three factor authentication adds additional layers of security. We employ gaze-based authentication to transform digits into morse, boosting security. To detect faces, we use a set of templates to extract Haar-like features and geometric ratios, as well as extract the eye region. An otp is then sent to an email for verification. This project helps disabled individuals. Implementing for each user would eliminate the need for further enhancements. Regarding the long-term enhancement which will eliminate the need to input the password inside the least. We have implemented this model in the defense sector. The integration of Morse code-based authentication with artificial intelligence (AI) and the Haar Cascade algorithm for face detection presents a significant advancement in security systems. By combining Morse code sequences with AI-driven verification, the proposed system enhances traditional authentication methods, offering a multi-layered approach that strengthens security. The Haar Cascade algorithm effectively provides robust face detection, ensuring that only authorized users can access the system. This combination not only improves the accuracy and reliability of user authentication but also minimizes the risk of unauthorized access and false positives.

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