

# MORSE CODE BASED SECURED AUTHENTICATION SYSTEM THROUGH ARTIFICIAL INTELLIGENCE

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## ABSTRACT

Automatic Morse detection and recognition have been researched for several years, but some thorny problems in actual communication always restrict the performance of methods. In this article, by introducing deep learning technology, we propose a network named Morse Net that can simultaneously locate and decode Morse signals in the spectrogram. Morse Net uses shared convolutions to extract shared features for both the detection and recognition branches. The detection branch regresses bounding boxes based on signal centerlines, and the recognition branch decodes Morse fragments cropped from feature maps by a convolutional recurrent neural network (CRNN). The losses of two branches are combined to implement the end-to-end training. Morse code, also known as dots and dashes or dits and dahs, is a telecommunications device that encodes text characters as standardized sequences of two different signal durations. Samuel Morse, the inventor of the telegraph, is the name of the Morse code. Morse code is normally conveyed using an information-carrying medium like electric current, radio signals, visible light, or sound waves.

**Keyword:-** Morse Code, Signal Processing, Pattern recognition, Biometrics, Multifactor authentication, Gaze based authentication, Data encryption.

## 1. INTRODUCTION

Data science is a multidisciplinary blend of data inference, algorithm development and technology in order to solve analytically complex problems. Data science is used by almost all the industries like educational institutions, finance, healthcare, business to handle large volume of data. Advancement in the technology of authentication and authorization has been supported in the 21st century a lot as we know. Personal identification numbers (PIN) are widely used for user authentication and security since the late 90's. Since PIN numbers can be easily crackable these days, we prefer to follow different approach. PIN authentication with hands-off gaze-based PIN entry techniques, on the other hand, leaves no physical footprints behind and therefore offer a more secure password entry option. Gaze-based authentication refers to finding the eye location across sequential image frames, and tracking eye center over time. Password authentication will be done using Morse code, where numbers will be represented in dots and dashes. Balancing usability and security to understand optimal result has been defined by the principle of psychological acceptability, consistent with this principle, a security mechanism shouldn't make accessing a resource, or taking the another action, harder than it's be if the security mechanism weren't present. This suggests that a security mechanism

should add as little as possible to the matter of the user's performing some action. Currently there aren't plenty of amenities for disabled people within the planet which helps them to be incorporated within the traditional society. Our system hopes to scale back that burden on them and makes sure that they are more integrated with the society

## 2. PROBLEM STATEMENT

To provide a platform for the physically challenged and disabled people by which they will create a secure private account to which only they will access. Our solution would allow persons with motor disabilities to interact with devices and during this authentication is bit more increased by rather than giving some authentication code by keyboard. This project gives catchphrase and fewer using of hardware sensors which is using in nowadays.

## 3. BACKGROUND WORK

Morse code was developed by Samuel Morse and Alfred Vail in the early 1830s as a means of long-distance communication using telegraph systems. Samuel Morse, an American inventor and painter, conceived the idea of a telegraph system that could transmit messages over long distances using electrical signals. Morse collaborated with Alfred Vail, an engineer, to refine and develop the system. Together, Morse and Vail created a system where each letter of the alphabet, along with numbers and some punctuation marks, was represented by a unique combination of dots and dashes, also known as "dits" and "dahs." These combinations formed a code that could be transmitted using electrical signals over telegraph wires. The development of Morse code involved several iterations and refinements to create a practical and efficient means of communication. Once Morse code was standardized and proven effective, it became widely adopted for telegraphy and later for various other communication purposes, including maritime and aviation signaling. Its simplicity and universality made Morse code a vital tool for communication for many decades, even into the era of radio and beyond.

In this project Firstly, the user inputs their PIN by tapping a sequence of dots and dashes, representing the letters or numbers of their code. This input is captured by a sensor or a user interface, which then translates the Morse code into text characters. Next, the AI algorithm receives the inputted Morse code and begins its analysis. Using pattern recognition and machine learning techniques, the AI identifies and interprets the sequence of dots and dashes to reconstruct the user's PIN. During this analysis, the AI may employ various strategies to enhance security, such as detecting anomalies in the input pattern or cross-referencing the input against known user profiles and historical usage data. Once the AI successfully deciphers the Morse code and verifies the authenticity of the user's PIN, access is granted to the secured system or device. If the authentication fails or raises suspicions, the system may prompt the user for additional verification measures or deny access altogether.

## 4. OBJECTIVE

The objective of the Morse code-based secured authentication system through artificial intelligence (AI) is to create a robust and innovative method for verifying the identity of individuals or granting access to secure systems using Morse code signals:

1. To create a secure system to authenticate users who are not completely blind.
2. To create a secure password authentication system which uses Morse code.
3. To make sure that specified parts of the face are recognized accurately by the system.

## 5. LITERATURE SURVEY

A literature survey on Morse code-based secured authentication systems through artificial intelligence (AI) would likely encompass research from various fields, including cryptography, signal processing, machine learning, security and related fields.

“Quantitative Analysis of Tennis Experts Eye Movement Skill”:

This paper proposes measurement the attention movements of an actual expert athlete and a beginner athlete. The measured eye movements of the players are compared and analyzed the attention movements are recorded using an eye tracker. Main observation made during this paper is that beginners have a bent to follow the ball unconsciously for a flash.

### “Smart Eye Tracking System”:

This paper proposes a sensible Eye tracking system which is meant for people with disabilities and elder people. The concept of this research is to use eye movement to regulate appliances, wheelchair and communicate with caretaker. This technique comprises four components, imaging processing module, wheel chair controlled module, appliances controlled module and SMS manager module. The image processing module consists of webcam and C++ customized image processing, the attention movement image is captured and transmitted to Raspberry Pi microcontroller for processing with OpenCV to derive the coordinate of eye ball.

### “Extension of Desktop Control to Robot Control By Eye Blinks using SVM”:

This paper proposes to issues related issues associated with Accessibility, which should eliminate, or a minimum of reduce, the space between disabled people and technology. For severely-impaired persons, there are still many challenges that be overcome. We present eye tracking as a valuable support for disability in the accomplishment of hands-free tasks. Moreover, we stress the potentials of eye-based interfaces to reinforce the user- machine interaction process in “traditional” activities supported keyboard and mouse.

## 6. METHODOLOGY

The methodology for implementing the Morse code involves several steps. Here's a structured approach to the methodology:

Step 1- Image Acquisition: The smart camera automatically acquires a raw image.

Step 2 - Image pre-processing: The acquired raw image is transformed to a grey image, which is also converted automatically by a smart camera.

Step 3 - Eye Detection: The user's eye is first identified using template matching. A template from the S is compared to the given image using a matching metric in template matching. The matching metric is a measure of similarity between the two versions. As the template match ranking, this similarity is translated into a numerical value.

Step 4 - Edge Detection: If the eye is detected, a new Region of Interest (ROI) covering only the eye is removed to minimize the processing area. An edge detection technique is applied to the current ROI to locate points around the ellipse or circle of the eye.

Step 5 - If at least 3 points (for the circle) or 4 points (for the ellipse) are found, the circle or ellipse of the eye will be drawn.

Step 6 - If the eye ellipse/circle is drawn, the camera's processor calculates the center coordinates and saves them for later use in the spreadsheet. The center of the rectangle bounding the observed eye is used to calculate these coordinates.

## 7. ARCHITECTURE

System architecture is that the conceptual model that defines the structure, behavior and views of a system. A system architecture can contains system components which will work together to implement the general system.

In the below figure 1, represents the architecture or the essential design that's required for the implementation of the model. The model consists of a interface and rear database. GUI is made such the user can interact with the system. Pygame or OpenCV is employed in to make it.

In the frontend firstly the user got to register by providing a user id of choice, a password (PIN) and a keyword. After registration the user can log in by using the credentials i.e. user id and password. With the assistance of an internet camera the PIN is taken as input within the sort of Morse .

In the backend, the entered PIN is checked with the stored PIN which was entered into the database by the user while registering. If the entered PIN isn't correct, its exits the screen. If the entered PIN is correct, it displays successful authentication. If the user has forgotten his password then he can use the keyword to authenticate and update the prevailing password with a replacement one.

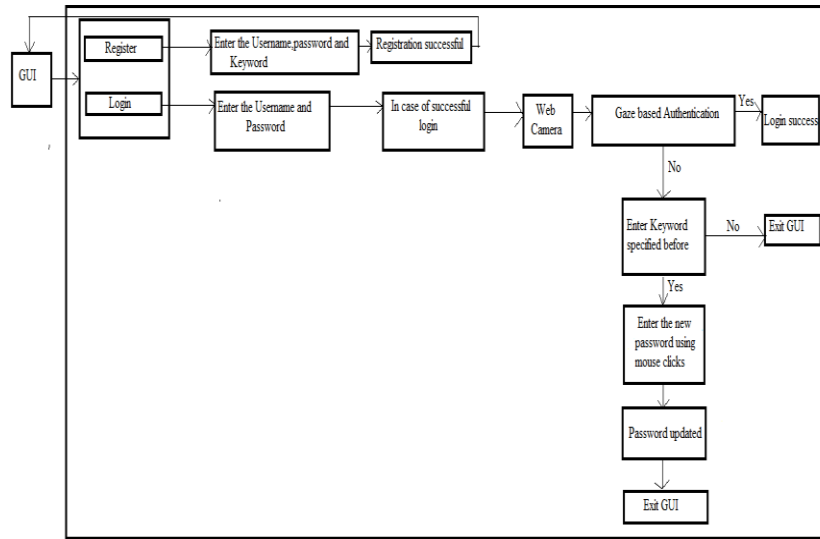


Figure 1. System Architecture Diagram

### 8. RESULTS

The expected results of this project include:

#### Module 1: Registration

Steps	Test Data	Expected Results	Observed Results	Remarks
Step 1	Enter Username	Successful	Successful	Pass
Step 2	Enter Password	Successful	Successful	Pass
Step 3	Enter Keyword	Successful	Successful	Pass

#### Module 2: Login

Steps	Test Data	Expected Results	Observed Results	Remarks
Step 1	Enter Username	Successful	Successful	Pass
Step 2	Enter Password	Successful	Successful	Pass

#### Module 3: Forgot Password

Steps	Test Data	Expected Results	Observed Results	Remarks
Step 1	Enter Keyword	Successful	Successful	Pass
Step 2	Enter New Password	Successful	Successful	Pass

### 9. CONCLUSION

Our project basically provides two factor authentication. Two factor authentication is actually providing two layer of security guard an account or system. Here we are making use of gaze based authentication and click on so on convert numbers or ASCII document thereby increasing the security. This projects is additionally helpful for disabled people so on authenticate. People from kids to old people can make full use of this model who have a basic

knowledge on morse code. For blind people, there are keyboards with braille dots present on each button. Concerning the long run enhancement we attempt to implement face recognition for each user, there will be no need to enter the password within the least. We are also trying to deploy this model in government sectors, with less number of steps required for authentication .

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