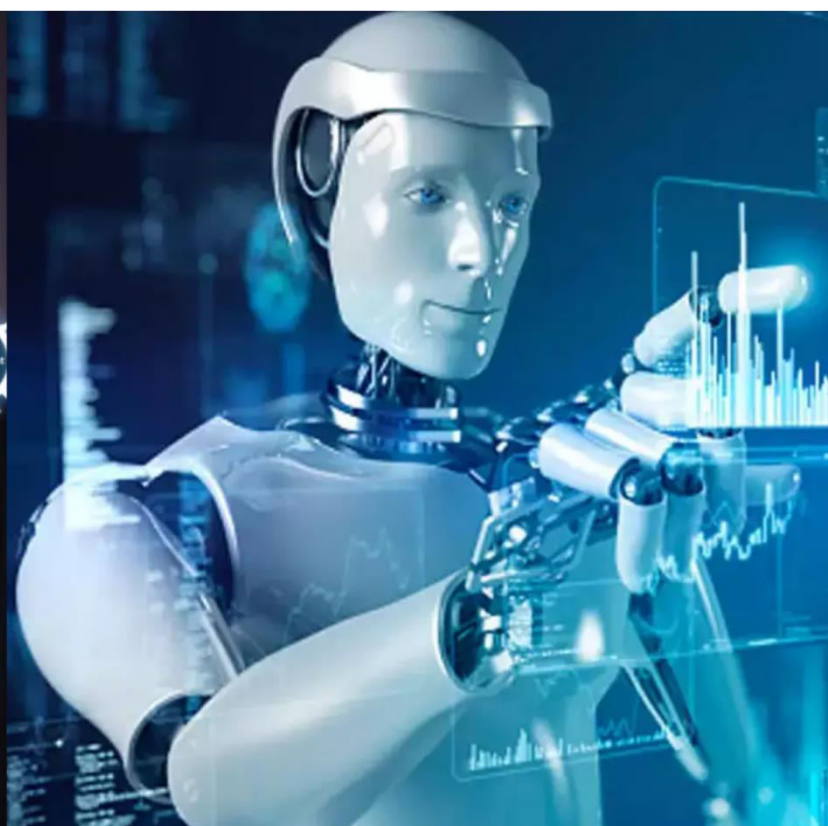




International Journal of Innovative Research in Science Engineering and Technology (IJIRSET)

(A Monthly, Peer Reviewed, Refereed, Scholarly Indexed, Open Access Journal)



Impact Factor: 8.699

Volume 14, Issue 5, May 2025

Machine Learning Model based Solution to Refine CAPTCHA

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ABSTRACT: Since most of the people in the world are facing problems in the field of authentication and security. We are able to provide a real time eye tracing for password authentication for people who authenticate themselves using Morse code. Gaze-based authentication refers to finding the eye location across sequential image frames, and tracking eye center over time. Password authentication will do using Morse code, where numbers will be represented in dots and dashes. This model presents a real-time application for gaze-based PIN entry, and eye detection and tracking for PIN identification using a smart camera. By taking into account past correlations and trends, various mathematical models help In Researchers, data scientists, engineers, and analysts "create dependable, judgements and findings" in addition to disclosing "hidden insights." Effective security measures consider how security data should be handled within the system at both the front end and in the backend procedure without disregarding resources and expenses. The idea of the application of psychological acceptability establishes security and usability in balance in order for comprehend the best outcome

KEYWORDS: Captcha Refinement ,CNN, Multistep Authentication, Machine Learning, Bot detection.

I. 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 . The practical applications range from predicting stock movement to predicting cancer; used in image processing to identity recognition, audio processing for speech to text prediction. Since most of the people in the world are facing problems in the field of authentication and security. We are able to provide a real time eye tracing for password authentication for people who authenticate themselves using Morse code Advancement in the technology of authentication and authorization has be 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 crack able 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.

II. LITERATURE SURVEY

- [1] Aniwat Juhong, Michigan State University, T Treebupachatsakul, C Pintavirooj, "Smart Eye-tracking system", Conference: International Workshop on Advanced Image Technology 2018 (IWAIT 2018), January 2018.
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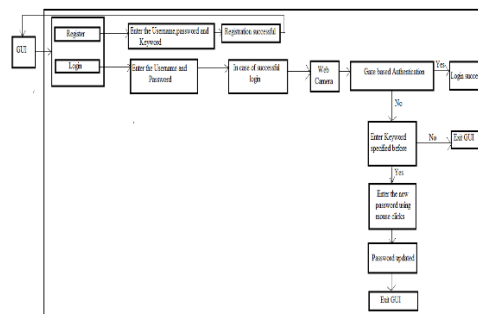
2018.

[3] Veena N, Anitha N, "Converting Intent of Physically Impaired into Text using Eye Blink Detection", IJRTE, July 2019.

[4] V Kovendan, "Eye Blinking Detection Based Emergency Alert and Automated Smart Environment for Patients with Severe Disorder", IJCSE, May 2019.

[5] Vijay Jumb, Charles Nalka, Hasan Hussain, Ricky Mathews, " Morse Code Detection Using Eye Blinks", IJTRET, February 2021. The work in this paper is divided in two stages. 1) Text- Detection 2) Inpainting. Text detection is done To provide a platform for the users and also for disabled people by which they can create a secure confidential data security for every user to which only they can access using almost contactless authentication method. Our solution would allow persons with the own credentials as the data to get access by interact with devices and in this authentication is bit more increased by instead of giving some authentication code by keyboard. This project gives catchphrase and less using of hardware sensors which is using in nowadays..

III. METHODOLOGY



In the above fig , represents the architecture or the basic design that is required for the implementation of the model. The model consists of a user interface and back end database. GUI is created such that the user can interact with the system. Pygame or OpenCV is used in to create it .In the frontend firstly the user need 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 help of a web camera the PIN is taken as input in the form of Morse code.

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 is not 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 existing password with a new one.

IV. EXPERIMENTAL RESULTS

Real time Eye Tracking for Password Authentication[1]proposes a authentication process where a real time application for gaze-based PIN entry, eye detection and tracking for PIN identification using a smart camera. This process leaves no traces of physical footprints behind, therefore offering one of the most secure way to authenticate the password.

1	2	3
4	5	6
7	8	9

(a) Fig1. Digital keypad for gaze based authentication

Quantitative Analysis of Tennis Experts Eye Movement Skill[2] proposes measurement the eye movements of an actual expert tennis player and a beginner tennis player. The measured eye movements of the players are compared and analyzed. The eye movements are recorded using an eye-tracker. Main observation made in this paper is that beginners have a tendency to follow the tennis ball unconsciously for a moment

Smart-Eye Tracking System [3] proposes a Smart Eye tracking system which is designed for people with disabilities and elder people. The concept of this research is to apply eye movement to control appliances, wheelchair and communicate with caretaker. This system comprises four components, imaging processing module, wheelchair-controlled module, appliances-controlled module and SMS manager module. The image processing module consists of webcam and C++ customized image processing, the eye movement image is captured and transmitted to Raspberry Pi microcontroller for processing with OpenCV to derive the coordinate of eye ball. The coordinate of eye ball is utilized for cursor control on the Raspberry Pi screen to control the system

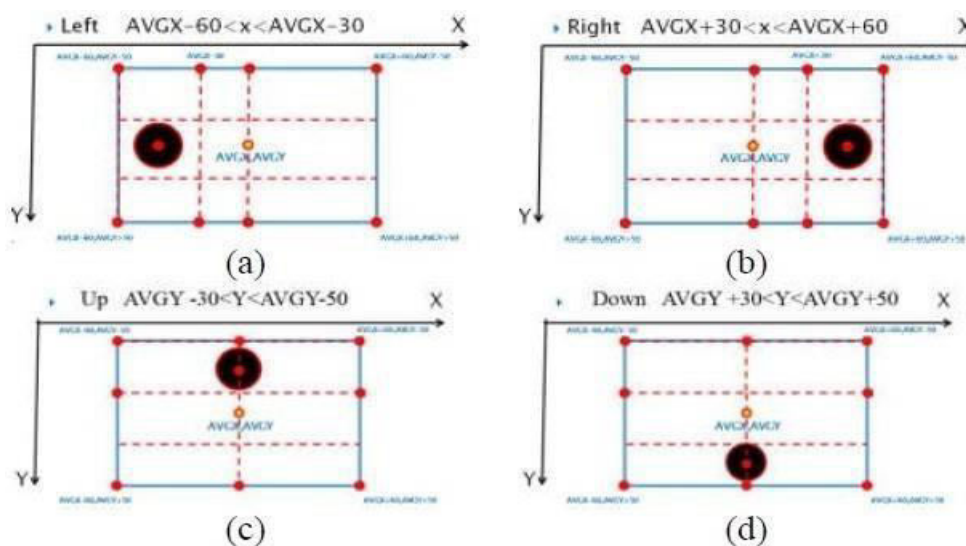


Fig 2: Eyeball Motion Detection

Besides the eye movement, the eye blink is applied in this system for entering a command as when you press, Enter button on keyboard. The wheelchair-controlled module is a cradle with two servos that can be moved to two dimensions and also adaptable to other wheelchair joysticks. This system also remotely controls some appliances and communicate with caretaker via send message to smartphone

Extension of Desktop Control To Robot Control By Eye Blinks using SVM [4] proposes to issues related issues related to Accessibility, which should eliminate, or at least reduce, the distance between disabled people and technology. For severely-impaired persons, there are still many challenges that must 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 enhance the user-machine interaction process in “traditional” activities based on keyboard and mouse. Through the description of some of the projects we have recently developed a robot which can move according to the movements of the eye balls and can be triggered with some actions based on the eye blinks

Eye Movement Related EEG Potential Pattern Recognition For Real-Time BMI [5] proposes study which aims at rapid BMI (Brain Machine Interface) pattern recognition for the eye-ball movement, which is considered to be removed factor from EEG (Electroencephalogram) as artefact. We investigated the repeatability of eyeball movement ERP (Event related Potential) and the characteristics, which possess steady, high voltage and 50ms rapid reaction. As ERP pattern discriminator, this paper proposes 3 methods to extract and distinguish characteristic patterns induced by several directional ocular movements

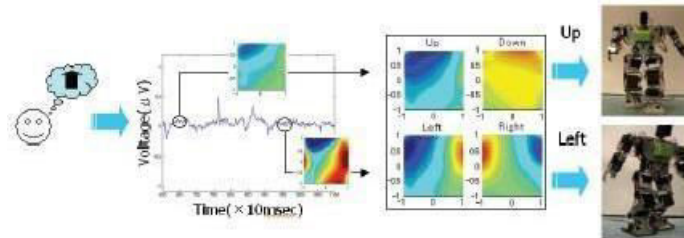


Fig3:Eye-movement Induced EEG interface Application

Besides the eye movement, the eye blink is applied in this system for entering a command as when you press Enter button on keyboard. The wheelchair-controlled module is a cradle with two servos that can be moved to two dimensions and also adaptable to other wheelchair joysticks. This system also remotely controls some appliances and communicate with caretaker via send message to smartphone.

V. CONCLUSION

Machine learning presents a powerful approach to enhance CAPTCHA systems by creating more robust and user-friendly challenges. Deep learning models can generate complex yet accessible tasks, improving bot detection while minimizing user friction. Furthermore, adaptive CAPTCHAs, powered by machine learning, offer a dynamic security layer. This intelligent evolution promises a more secure and seamless online experience for humans

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