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Graphical Password Authentication Using Cued Click Points

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Abstract:

In today's world the password security is very important. For password protection various techniques are available. Cued Click Points are a click-based graphical password scheme, a cued-recall graphical password technique. Users Click on one point of an image. The next subsequent points can be chosen by the user as per his wish. The passwords which are easy to memorize are chosen by the users and it becomes easy for attackers to guess it, but the passwords assigned by the strong system are difficult for users to remember. In this paper, we focus on the evaluation of graphical password authentication system using Cued Click Points, including usability and security. In this authentication system, our usability goal is to support the users in selecting better passwords, thus increases the security by expanding the effective password space. The emergence of hotspots is mainly because of poorly chosen passwords. Thus click-based graphical passwords encourage users to select more random, and hence more complex to guess, click points. This adds a layer of security because it taps into your memory for visual cues and spatial relationships. Plus, it's flexible, giving you a way to build trust in your authentication process. Our research dives into exploring and testing these graphical password systems based on cued click points. We're curious about how well they work and how users feel about them. By digging deep into how these systems handle signals and click points, we hope to make online security both safer and more user-friendly for everyone in the digital age.

Impact Statement:

Introducing a groundbreaking paradigm shift in user authentication, the integration of graphical passwords with cued click points has transformative global implications. This innovative approach transcends geographical boundaries, redefining digital security practices on a worldwide scale. By fostering collaboration and innovation, it empowers individuals and organizations to actively contribute to a more secure digital landscape. This initiative not only strengthens online defenses, but also cultivates a culture of proactive digital citizenship. Through its novel methodology, it lays the foundation for a more resilient and interconnected digital future, where users can navigate cyberspace with confidence and trust

***Index Terms*:**

Graphical Passwords, Cued Click Points, Authentication Systems, Security, Usability, User Experience, Digital Authentication, and Password Security.

INTRODUCTION:

Authentication serves as the gatekeeper for system access, determining whether users should be granted entry. Balancing strong password requirements with user memorability is a challenge, as easily remembered passwords often equate to weak security. Our solution, Graphical Password Authentication Using Cued Click Points, revolutionizes traditional authentication methods by integrating graphical elements. Users select points within images, leveraging spatial memory cues for a personalized password experience.

This innovative approach adapts to user behaviour and evolving threats, enhancing security dynamically. Multi-Factor Authentication (MFA) further fortifies defences by combining Cued Click Points with traditional passwords or biometrics. Behavioural biometrics add another layer of security by capturing unique user patterns. Geographic security and self-destructing images mitigate risks associated with unauthorized access and prolonged image use.

The motivation behind this project arises from the shortcomings of traditional password-based authentication, such as weak passwords and usability issues. By exploring Cued Click Points, we aim to enhance both security and usability. Our objectives include system design, usability evaluation, security analysis, and contributing to knowledge advancement. Through these efforts, we seek to propel authentication systems towards greater security and user-friendliness in the digital realm.

LITERATURE SURVEY:

Recent research underscores the effectiveness of graphical password authentication methods, with cued click points emerging as a compelling option for their unique blend of security and usability benefits. Studies by Wiedenbeck et al. (2005) and Li et al. (2012) showcase the memorability and intuitive nature of cued click points, positioning them as a viable alternative to traditional text-based passwords. This innovation allows users to select specific points on an image, leveraging human spatial memory for authentication, thus mitigating the risk of password guessing attacks and addressing the issue of password fatigue.

Moreover, cued click points have demonstrated resilience against various security threats, including shoulder surfing and brute force attacks, as evidenced by research conducted by Biddle et al. (2012) and Yan et al. (2004). Despite their promising attributes, challenges such as usability issues and careful image selection persist. Usability concerns, such as the selection of easily guessable points and the memorability of chosen points, highlight the importance of thoughtful design considerations to ensure both security and user satisfaction.

In conclusion, cued click points offer a visually intuitive authentication method that strikes a balance between security and usability. Continued research into their optimal implementation and resilience against potential attacks is necessary to fully harness their potential in enhancing online security. Through comprehensive literature survey, this review contributes to our understanding of cued click points and guides future advancements in graphical password authentication systems.

METHODOLOGY:

The methodology embraced in this research endeavor revolves around the conception and evaluation of a graphical password authentication system harnessing Cued Click Points. The process commences with an exhaustive examination of extant literature to comprehend the evolution and efficacy of graphical password authentication methods, with particular emphasis on the usability and security facets of cued click points.

The architectural blueprint of the system is meticulously crafted to ensure scalability, maintainability, and security. Specialized attention is directed towards the interlinking of components, encompassing the user interface, authentication service, database management system, and ancillary elements such as the image repository and logging and monitoring mechanisms.

The implementation trajectory entails the phased development of both backend and frontend components. Backend development encompasses database design, authentication service implementation, image repository setup, and integration of logging and monitoring mechanisms. Frontend development is centered on the creation of intuitive user interfaces and the incorporation of client-side validation and session management functionalities.

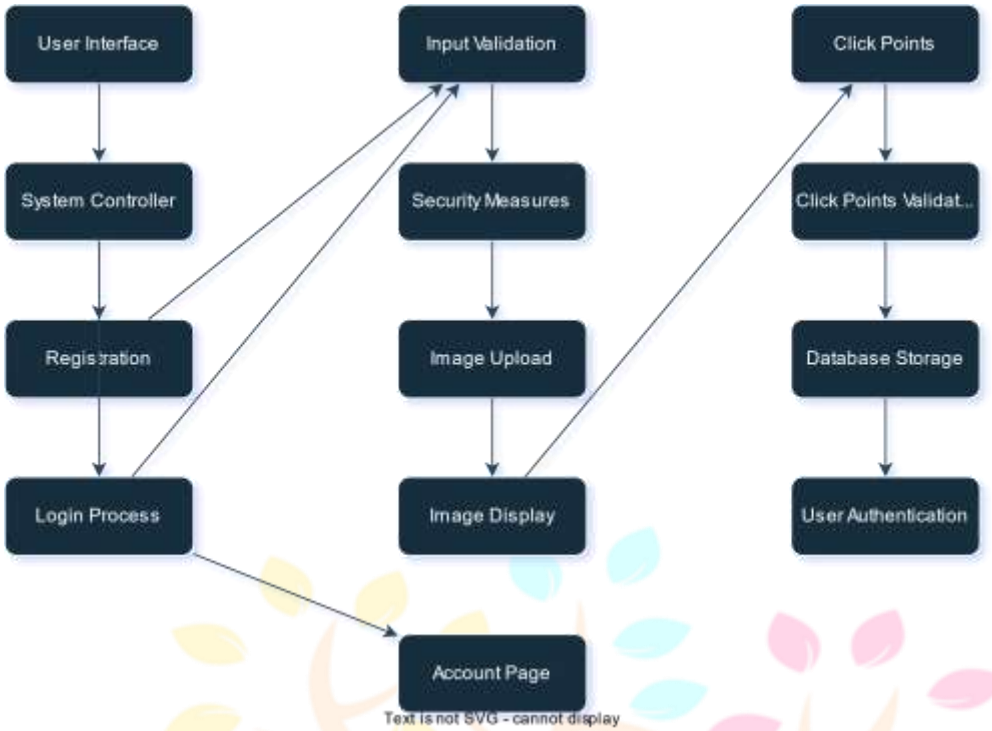

Fig.1. Workflow

Throughout the implementation continuum, stringent security protocols are embedded to safeguard user data and thwart unauthorized access. These encompass input sanitization, HTTPS encryption, and access control mechanisms. Following successful testing, the graphical password authentication system is deployed to a production environment, adhering to best practices for server configuration, network security, and monitoring. Key features of the system include intuitive user interface design, secure password storage, robust authentication mechanisms, and comprehensive logging and monitoring capabilities, thereby ensuring a seamless and secure authentication experience for users.

IMPLEMENTATION:

Technologies Used

The graphical password authentication system leverages a suite of technologies optimized for web development, database management, and security. Key technologies include JavaScript for client-side scripting, Python for server-side logic, and SQL for database interactions. Frameworks such as Flask facilitate web application development, while frontend libraries enhance user interface responsiveness.

Backend Development

Backend development involves several crucial steps. Firstly, database design establishes the schema for storing user data, click point sequences, and audit logs. Authentication service development focuses on validating user credentials, and processing authentication requests securely. Setting up an image repository enables the storage of images used for graphical password authentication. Integration of logging and monitoring mechanisms captures system events, user activities, and authentication attempts for analysis and troubleshooting.

Frontend Development

Frontend development revolves around user interface design, client-side validation, and session management. Designing intuitive interfaces for registration, login, and authentication screens ensures a seamless user experience. Implementing client-side validation enforces input constraints and enhances responsiveness. Session management functionality securely stores session tokens and facilitates interactions with the server, managing session expiration and token renewal.

REGISTRATION:

1. Accessing the Registration Page:

- To get admission to the registration web page, navigate to the graphical password authentication system the use of Cued Click Points. This may be carried out through an internet browser or a devoted application.

2. Creating a New Account:
- Click on the "Register" or "Sign Up" button to begin the registration process.
- You will need to offer the following facts:
- Username: Choose a unique username for logging into the system.
- Email Address: Enter a valid e-mail address for verification and communication purposes.
- Password: Create a strong and memorable password that meets specified standards.

3. Selecting Click Points:
- Follow on-display screen commands to select a chain of click factors at the furnished photo.
- Pay attention to the pointers or clues to help consider your click factor series.

4. Confirmation and Submission:
- Review the entered facts for accuracy and completeness.
- Once happy, put up the registration form to create your account.

LOGIN:

1. Accessing the Login Page:
- Navigate to the login web page of the graphical password authentication device, accessible through a web browser or committed application.

2. Entering Credentials:
- Enter your registered username and password into the respective input fields on the login form.
- Ensure correct credentials are entered to continue with authentication.

3. Click Point Authentication:
- After entering legitimate credentials, you will be offered a photo containing click-on points.
- Click on predefined click on points within the sequence decided on in the course of registration.

4. Authentication Result:
- If the clicking point sequence suits the one associated with your account, you may be successfully authenticated and granted access.

EXPERIMENTAL RESULTS:

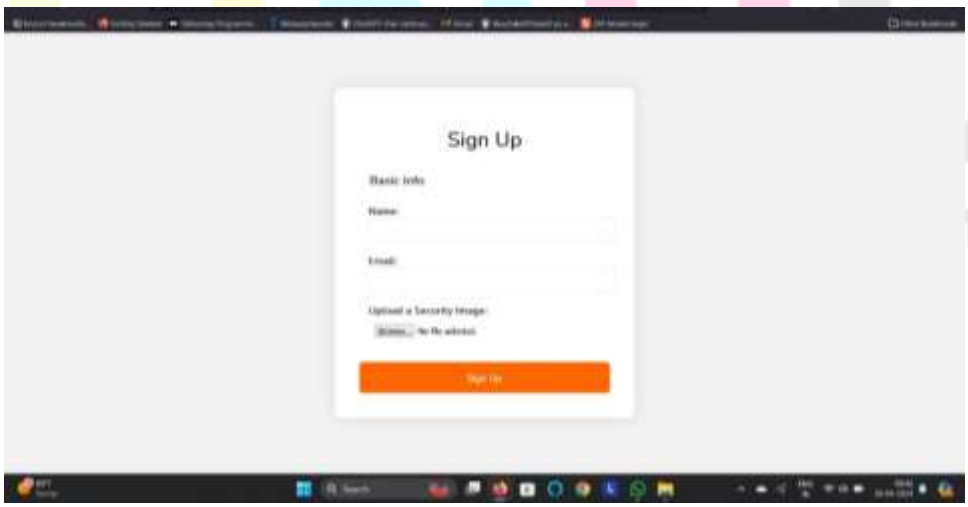

Fig.2. Signup page

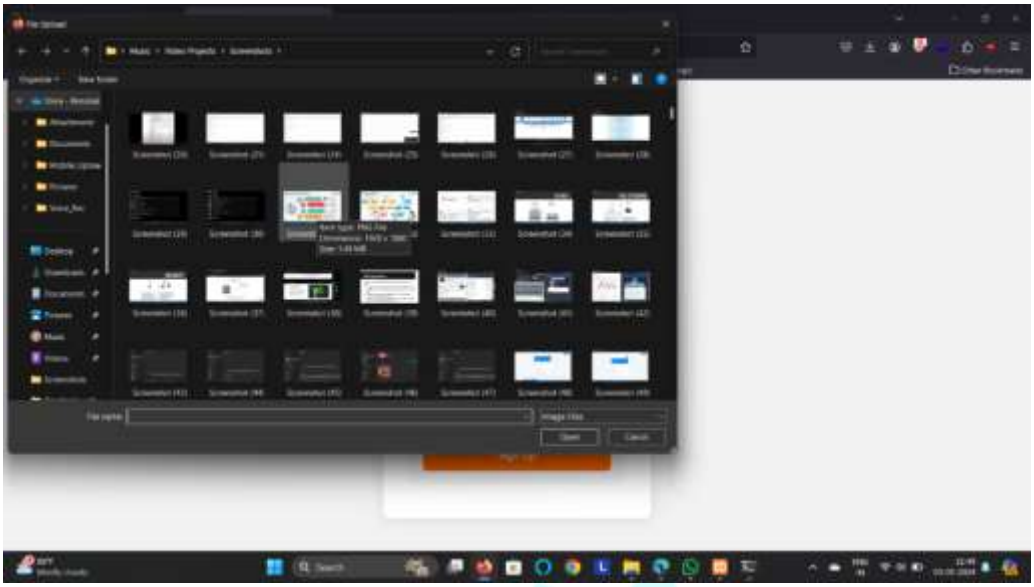

Fig.3. Image Selection

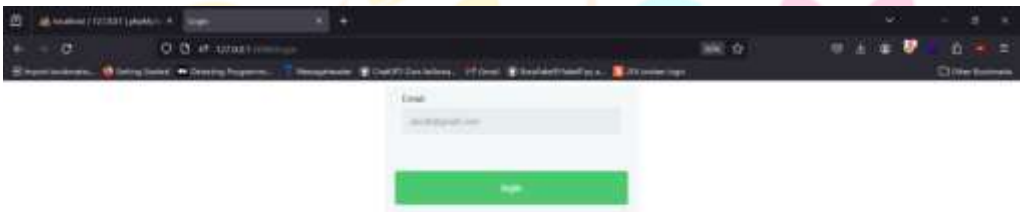

Fig.4. Login page

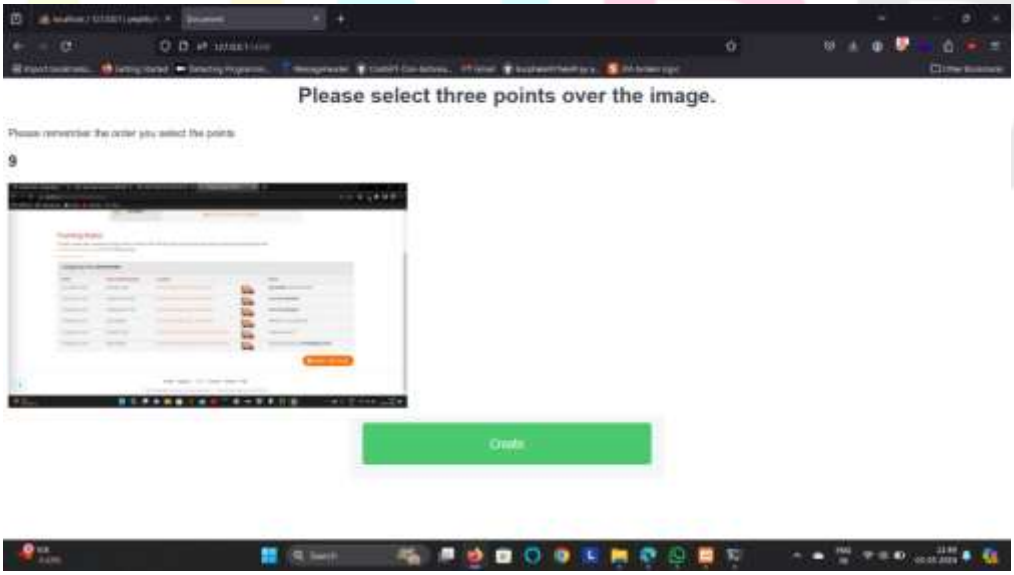

Fig.5. Login Process

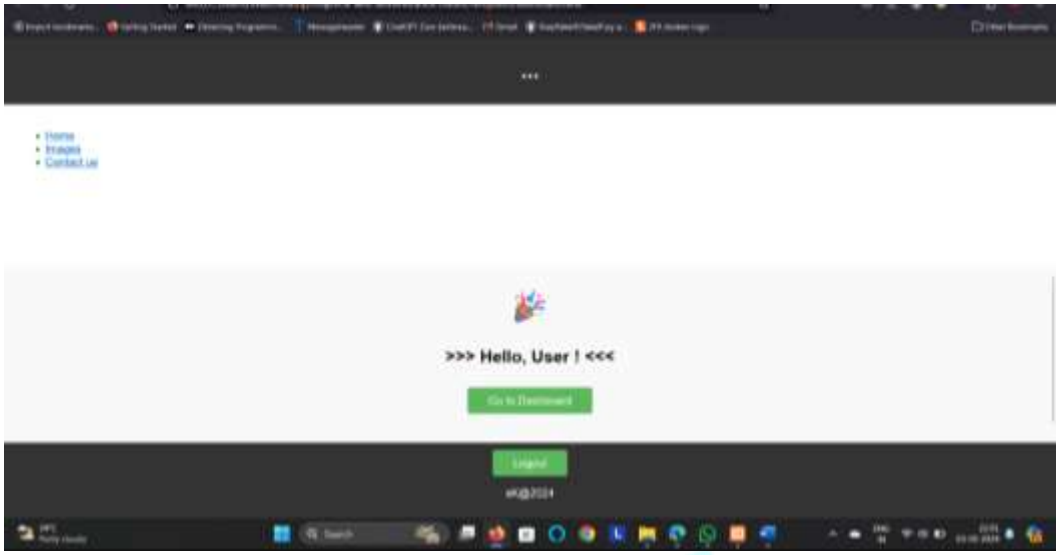

Fig.6. Successful login

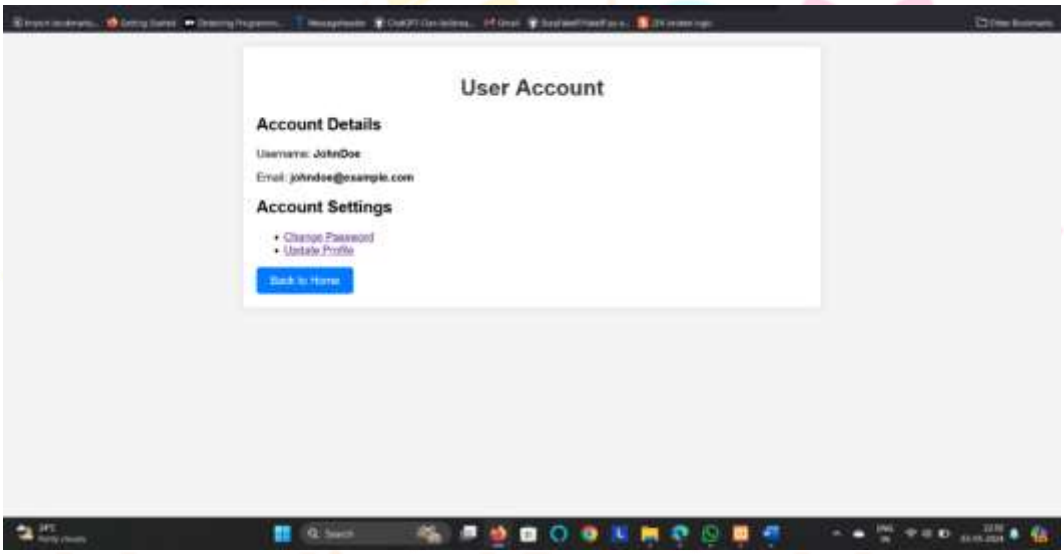

Fig.7. Dashboard

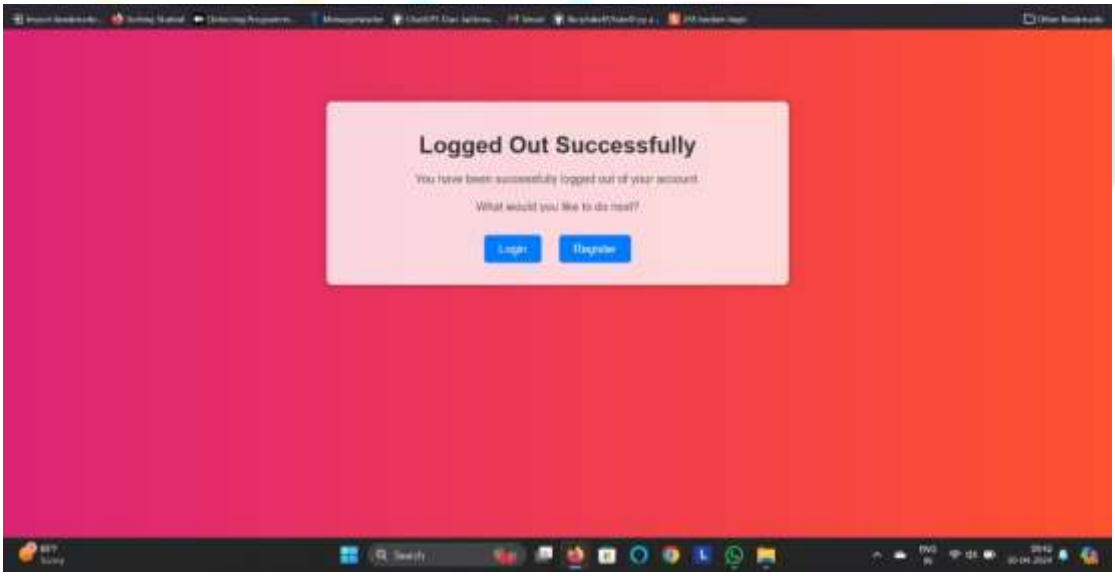

Fig.8. Logout Page

CONCLUSION:

The graphical password authentication system provides a simple and secure solution for digital authentication. Using simple registration methods, users can effortlessly access their accounts ensuring strong protection against unauthorized access The system is designed well enough to meet user expectations and implement stringent safety standards through comprehensive functional testing and safety analysis. Continuous improvements and adaptations to emerging threats ensure that the system remains effective and resilient in the face of evolving cybersecurity challenges. Going forward, the new system approach has the potential to revolutionize digital trust across platforms, delivering a simple and reliable approach to protecting user data and privacy Focused attention controlling user feedback, and iterative improvement.

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