# Captcha as a Graphical Passwords - A New Security Primitive based on Hard AI Problems

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*Abstract:* This project is the need for the predefined regions to be readily identifiable. A graphical password system with a supportive sound signature to increase the remembrance of the password is discussed. In proposed work a click-based graphical password scheme called Cued Click Points (CCP) is presented. The possibility selecting the password is very less. In this paper, we present an advanced CAPTCHA technique; our technique essentially relies on employing the human recognition ability, which is not available in automated bots or machines, through leveraging the handwriting characteristics in designing CAPTCHA. Moreover, the proposed CAPTCHA technique adopts handwritten characters of four different languages (English, Arabic, Spanish, and French) to generate handwritten multilingual CAPTCHA text using characters from the four adopted languages. Furthermore, the initial experiments' results have shown a promising security level that the proposed CAPTCHA technique can provide.

*Keywords:* Sound, Click point View Port, Image, Database, Register, Click Points, Password, Possibilities, Authentication.

## INTRODUCTION

Users often create memorable passwords that are easy for attackers to guess, but strong system-assigned passwords are difficult for users to remember. A password authentication system should encourage strong passwords while maintaining memo ability.

We propose that authentication schemes allow user choice while influencing users toward stronger passwords. We applied this approach to create the first persuasive click-based graphical password system, Persuasive Cued Click-Points (PCC) and conducted user studies evaluating usability and security.

## SYSTEM DESCRIPTION

### Proposed System Description

In the proposed work we have integrated sound signature to help in recalling the password. No system has been devolved so far which uses sound signature in graphical password authentication. Study says that sound signature or tone can be used to recall facts like images, text etc.

In daily life we see various examples of recalling an object by the sound related to that object enters User ID and select one sound frequency which he want to be played at login time, a tolerance value is also selected with will decide that the user is legitimate or an imposter.

To create detailed vector user has to select sequence of images and clicks on each image at click points of his choice. Profile vector is created. To create detailed vector user has to select sequence of images and clicks on each image at click points of his choice.

Profile vector is created. Users preferred CCP to Pass Points, saying that selecting and remembering only one point per image was easier and sound signature helps considerably in recalling the click points. System showed very good Performance in terms of speed, accuracy, and ease of use.

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**System Architecture**
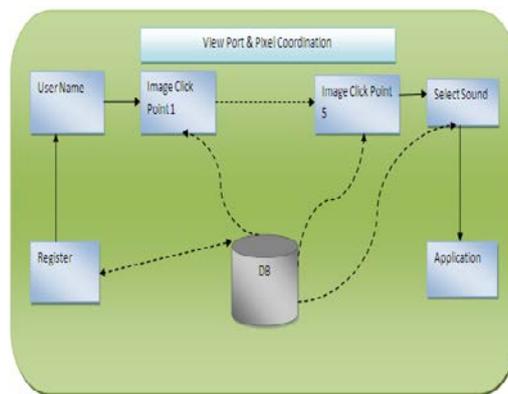


# SYSTEM ANALYSIS

### Requirements and Specification:

### What Is SRS?

Software Requirement Specification (SRS) is the starting point of the software developing activity. As system grows more complex it became evident that the goal of the entire system cannot be easily comprehended. Hence the needs for the requirement phase Specification. The software project is initiated by the client needs. The SRS is the means of translating the ideas of the minds of clients (the input) into a formal document (the output of the requirement phase.). The SRS phase consists of two basic activities:

### Problem/Requirement Analysis

The process is order and more nebulous of the two, deals with understand the problem, the goal and constraints.

### Requirement Specification

Here, the focus is on specifying what has been found giving analysis such as representation, specification languages and tools, and checking the specifications are addressed during this activity. The Requirement phase terminates with the production of the validate SRS document. Producing the SRS document is the basic goal of this phase.

### Role of SRS

The purpose of the Software Requirement Specification is to reduce the communication gap between the clients and the developers. Software Requirement Specification is the medium though which the client and user needs are accurately specified. It forms the basis of software development. A good SRS should satisfy all the parties involved in the system. The purpose of this document is to describe all external requirements for Project Control System. It also describes the interfaces for the system.

### Scope

This document is the only one that describes the requirements of the system. It is meant for the use by the developers, and will also by the basis for validating the final delivered system. Any changes made to the requirements in the future will have to go through a formal change approval process. The developer is responsible for asking for clarifications, where necessary, and will not make any alterations without the permission of the client.

### User Characteristics

The user of the system will be a member who is registered or administrator.

# FEASIBILITY STUDY

### Technical Feasibility

Evaluating the technical feasibility is the trickiest part of a feasibility study. This is because, at this point in time, not too many detailed design of the system, making it difficult to access issues like performance, costs on (on account of the kind of technology to be deployed) etc. A number of issues have to be considered while doing a technical analysis. Understand the different technologies involved in the proposed system. Before commencing the project, we have to be very clear about what are the technologies that are to be required for the development of the new system.

Find out whether the organization currently possesses the required technologies:

Is the required technology available with the organization?

If so is the capacity sufficient?

For instance –

"Will the current printer be able to handle the new reports and forms required for the new system?"

### Economic Feasibility

It refers to the benefits or Outcomes we are deriving from the product as compared to the total cost we are spending for developing the product. If the benefits are more or less the same as the older system, then it is not feasible to develop the product. In the present system, the development of new product greatly enhances the accuracy of the system and cuts short the delay in the processing of Birth and Death application. The errors can be greatly reduced and at the same time providing a great level of security. Here we don't need any additional equipment except memory of required capacity. No need for spending money on client for maintenance because the database used is web enabled database.

### Social Feasibility

Proposed projects are beneficial only if they can be turned into information systems that will meet the organizations operating requirements. Simply stated, this test of feasibility asks if the system will work when it is developed and installed. Are there major barriers to Implementation? Here are questions that will help test the operational feasibility of a project: Is there sufficient support for the project from management from users? If the current system is well liked and used to the extent that persons will not be able to see reasons for change, there may be resistance. Are the current business methods acceptable to the user? If they are not, Users may welcome a change that will bring about a more operational and useful systems. Have the user been involved in the planning and development of the project? Early involvement reduces the chances of resistance to the system and in General and increases the likelihood of successful project. Since the proposed system was to help reduce the hardship encountered in the existing manual system, the new system was considered to be operational feasible.

## MODULES DETAILS

### Modules

- Spatial Patterns
- Hotspots
- Click Patterns
- Tolerance Range
- Captcha Password
- Sound Signature
- Secure Recovery

### Spatial Patterns

The click-point distributions of PCCP along the x and y-axes fell within the range for random distributions with 95% probability, while those of Pass Points. Show a clear progression from top-left to bottom right based on the ordinal position of the click-points within the password. We believe that the difference is users' selection strategy is based on whether the click points are selected on one image, as in Pass Points, or distributed across several images. With one image, as in Pass Points, users tend to start at one corner of the image and progress across the image with each subsequent click-point. However, with CCP and PCCP, users see a new image for each click-point and tend to select each click-point independently, with no regard to its ordinal position within the password. Click-points within Pass Points were much closer together (i.e., shorter segments between successive click-points), while CCP's segments were the longest and within range of the random distributions. PCCP's segments were slightly shorter than CCP's. Given that no other spatial patterns are apparent for PCCP, we suspect that these shorter segments are an artifact of the viewport positioning algorithm, which slightly favored more central areas of the image. With respect to angles and slopes formed between adjacent line segments within passwords, analysis shows that PCCP passwords have large angles and favor no particular direction. In contrast, PassPoints passwords often form straight horizontal or vertical lines. Similarly, the frequency distributions for the overall shapes formed by following the path from the first to last click-point for PCCP are within the range of the random datasets. PassPoints passwords were much more likely to form identifiable shapes.

### Hotspots

Hotspots are areas of the image that have higher likelihood of being selected by users as password click-points. Attackers who gain knowledge of these hotspots through harvesting sample passwords can build attack dictionaries and more successfully guess PassPoints passwords. Users also tend to select their click-points in predictable patterns (e.g., straight lines), which can also be exploited by attackers even without knowledge of the background image; indeed, purely automated attacks against PassPoints based on image processing techniques and spatial patterns are a threat.

### Click Patterns

A precursor to PCCP, Cued Click-Points (CCP) was designed to reduce patterns and to reduce the usefulness of hotspots for attackers. Rather than five click-points on one image, CCP uses one click-point on five different images shown in sequence. The next image displayed is based on the location of the previously entered click-point, creating a path through an image set. Users select their images only to the extent that their click-point determines the next image. Creating a new password with different click-points results in a different image sequence.

### Tolerance Range

After creation of the login vector, system calculates the Euclidian distance between login vector and profile vectors stored. Euclidian distance between two vectors **p** and **q** is given by-Above distance is calculated for each image if this distance comes out less than a tolerance value D. The value of D is decided according to the application. In our system this value is selected by the user. Tolerance level used for get coordinated pixels for our selected click points in our image.

### Captcha Password

It was introduced to use both Captcha and password in a user authentication protocol, which we call Captcha-based Password Authentication (CbPA) protocol, to counter online dictionary attacks. The CbPA-protocol in requires solving a Captcha challenge after inputting a valid pair of user ID and password unless a valid browser cookie is received. For an invalid pair of user ID and password, the user has a certain probability to solve a Captcha challenge before being denied access.

### Sound Signature

Sound signature is mainly added to solve guessing attack as we provide multiple click points from different images guessing attack will be happened. So we assigning a specific sound signature for cued click points which as been represented as graphical password. In a guessing attack, a password guess tested in an unsuccessful trial is determined wrong and excluded from subsequent trials. The number of undetermined password guesses decreases with more trials, leading to a better chance of finding the password. To counter guessing attacks, traditional approaches in designing graphical passwords aim at increasing the effective password space to make passwords harder to guess and thus require more trials. No matter how secure a graphical password scheme is, the password can always be found by a brute force attack. In this paper, we distinguish two types of guessing. Attacks: automatic guessing attacks apply an automatic trial and error process but S can be manually constructed whereas human guessing attacks apply a manual trial and error process.

### Secure Recovery

If user forgets the click points or frequent guessing attacks user was redirected to recovery phase where user allowed resetting their graphical passwords of same images or they can select graphical passwords from new images along with sound signature. It mainly protects users from password re-usability.

## TESTING

Software testing is a critical element of software quality assurance and represents the ultimate review of specification, design, and code generation. Once source code has been generated, software must be tested to uncover as many errors as possible before delivery to the customer. A test case is one that has high probability of finding a yet undiscovered error. A successful test is one that uncovers as yet undiscovered error.

### The Basic Types of Testing are

- White Box Testing
- Black Box Testing

## White Box Testing

This is a code testing strategy and it checks for the correctness of the every statement in the program. To follow this testing strategy, there should be cases that result in the execution of every instruction in the program or module. That is every path in the program is tested. The test cases should make sure that independent paths within a module are executed at least once as and when required.

- Exercise all logical decision on their true or false side.
- Execute all loops at their boundaries and within their operational bounds.

The testing strategy, on the face of it, sounds exhaustive. If every statement in the program is checked for its validity, there doesn't seem to be much scope of error.

## Black Box Testing

To perform Black Box Testing, the analyst examines the specification taking the program or module. It checks for the basic functionality and how it should perform on the various conditions when submitted for processing. By examining the result, the analyst can report whether the program performs according to the specified requirements.

## Testing Strategy

Software testing consists of series of tests, which are implemented sequentially. These tests are:

- Test Plan
- Unit testing
- Integration testing
- System testing

## Test Plan

Test plan specifies the objective if testing for completion criteria, system integration plan, and methods to be used on modules and particular test cases to be used. The four types of test that a software product must satisfy are:

- Function Test specifies operating conditions, input values and expected result.
- Performance Test verify response time, execution time and throughout primary and secondary memory utilization links.
- Stress Test is to determine the limitations of the system.
- Structural Test is concerned with examining the internal processing logic of a software system.

## Unit Testing

Instead of testing the system as a whole, unit testing focuses on the modules that make up the system. Each module is taken up individually and testing for the correctness in the coding and logic. Errors resulting from interaction of modules are initially avoided.

## The Advantages of Unit Testing Are

- Size of a module is quite small and errors can easily be located.
- Confusing interaction of multiple errors in widely different parts of software eliminated.
- Module level testing can be exhaustive.

The obvious assumption made when unit test is pursued is that, individual modules can be isolated from the system module interacts with other modules in the system and, to isolate module, the analyst must stimulate these interactions. That is the analyst must create driver modules to call the procedures in the module and stub functions for the module to call. The cost involved in creation of this stimulated environment, may or at times is prohibited.

## Integration Testing

It tests for the errors resulting from integration modules. One specific target of integration testing is the interface: whether parameters match on both sides as to type, permissible ranges and meaning. Analyst tries to find areas where modules have been designed with different specifications.

This is the top-level testing. In this all modules tested separately would be put together and tested for producing the ultimate result of the system. The main emphasis during this testing will be on the interface between the modules. By applying various business rules generated as a part of test cases, we where able to ease certain design level complexities.

## System Testing

The main objective of the system testing is to find out the discrepancies between the developed system and its original objective, current specifications and the system documentation. It also verifies for the compatibility of the system with the operational environment. The following system testing tasks are essential.

## Peak Load Testing

It is done to determine whether the system will handle the volume of activities that occur when the system is at the peak of its processing demand.

## Stress Testing

This is performed to determine the capacity of the system stored to transactions. Stress testing executes a system in a manner that demands resources in abnormal quantity, frequency, or volume.

## Performs Time Testing

It is done to determine the length of time used by the system to process a transaction or user request.

## Recovery Testing

It is done to determine the ability of the software to recover from failure. The recover may be automatic or may need human intervention. In either case the mean time to repair is evaluated to determine whether it is within acceptable limits.

## Procedure Testing

It determines the clarity of the documentation operation and use of system. Asking the user to do exactly what the manual requests to perform.

# CONCLUSION

A common security goal in password-based authentication systems is to maximize the effective password space. This impacts usability when user choice is involved. We have shown that it is possible to allow user choice while still increasing the effective password space. Furthermore, tools such as PCCP's viewport (used during password creation) cannot be exploited during an attack. Users could be further deterred (at some cost in usability) from selecting obvious click-points by limiting the number of shuffles allowed during password creation or by progressively slowing system response in repositioning the viewport with every shuffle past a certain threshold. The approaches discussed in this paper present a middle ground between insecure but memorable user.

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