

Authentication Using 3D Passwords

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Abstract

Various password schemes provide a way to authentication. The existing authentication schemes which we use today have many problems. Therefore it is possible to have a concept of 3D password for more secured authentication making use of real world environment in which we live and making use of objects which we make use of everyday. In this new scheme, the password is set in such a way that it is difficult to be shared with others as it is even difficult to be written down on paper. This new scheme provides secrets which are easy for user to remember but at the same time it makes it difficult for attackers or intruders to guess. Therefore we present our idea, the 3D passwords which are more customizable and very interesting way of authentication

Keywords

3D Password, Security Enhancement, Tough to share, Easy to remember, Real objects Interaction

I. Introduction

Intruders and Hackers are the growing threats to most password system because of the knowledge of anti-technology which they gain to misuse it. The concept of security is important for all whether it's a company, an organization within a nation or a complete nation as a whole. There is requirement of providing security to information, things, equipment etc. whether bigger or smaller in size, based on its importance and sensitivity to protect them from fear of danger, damage, theft or crime.

Security Systems actually help to maintain a strong, secure front against attackers. All information security measures focus on

- Stopping any changes to data or program by any unauthorized user
- Making data available only to authorized user
- Maintaining consistency of data or program by preventing improper modifications

Authentication is the process of making sure that person or things that are trying to make access are the same as they are claiming themselves to be, by the means of stored data or values. Various password schemes provide a way to authentication.

The existing authentication schemes which we use today have many problems and most important of which is that it can be hacked by hackers. They are experts in hacking the passwords for their own selfish purposes as a result of which the authentication scheme fails and creates problem in very significant issue like the national security which is very important and anyhow needs to be protected by the national officials.

Currently we have three different types of password schemes that are textual passwords, biometric passwords and token based passwords. Each of these have their own disadvantages. The textual password can be very easily be cracked by decrypting of algorithm and this has become a child's game today. In biometric passwords, a person might refuse to undergo radiations specially in the most sensitive organs of body. Another disadvantage to biometric passwords is that authorized person might be forced to undergo the authentication procedure to get the access to secured object even though the user might have refused to provide access to secured object. In the token based password, there is a possibility that token gets lost by the user or token gets stolen by some thief. In this paper I have covered the concept in four sections which are Introduction, Literature Review, Implementation, Discussion and the Conclusion.

II. Literature Review

I propose this topic of 3D passwords using real time environment. Here the use of objects is such that objects are added dynamically. Proposed Scheme is about how normal day to day objects can be used in proper sequence and combination to create Secured Password.

Currently the research done on 3D passwords gives the concept of making use of virtual environment the main concept in this virtual environment [8] is to create a virtual room where everything is existing within the screen of a computer or a laptop similar to the environment created when we play any video games but with advancement of technology, there are various electronic devices available with us which would help to create 3D password system with real time environment. Thus the proposed system states that user would be having the freedom to choose the number of objects which he wants to use. Once he has chosen the number of objects he would decide the type of object which he wants to use and this can be a cylindrical object, a conical object in the form of a cap, a cuboidal object like an eraser, a cubical object, any real-time object available around us including laptops, duster, marker etc. and then all the objects are to be arranged in a particular format that would only be known to the user who has to undergo the password authentication. This arrangement would be detected by various sensors and devices, available with us. Since there are infinite possible combinations of arrangement in which the objects can be arranged and any one among so many combinations is selected by user and the arrangement is only known to user thus this password is providing us with high level of security and next level of authentication scheme as compared to those which we make use of today.

Another important aspect of this method is that in order to increase further levels of authentication, many already existing authentication schemes like textual password, biometric password or token based passwords, can be used along with the new proposed idea of 3D password. There are various other advantages of this technique. One of which is that in worst case if any other person somehow got to know about the object used in the 3D password, then also the arrangement is only known to the user and since there are large number of combinations thus this cannot be guessed or judged. Hence the system protected by the system is still secured.

The important aspects which play significant role in the password determination procedure are as follows:

Area that would determine the password the area of surface of the working table we are making use of, during the whole

procedure

The number of objects to be used is the decision of the user whatever number of objects that the user wants to use.

Type of object which would be used in the password procedure will be from the day to day object which are available and user make use of everyday . This makes the front end things easier from user point of view

The position of the object matters because that decides the passwords and is only known to the user . The position of the object is decided by the co-ordinates in the perpendicular planes of the Cartesian plane

The priority of objects in which they are being picked also determines the password because the value of the priority is being changed and also being stored in memory . While the verification of the password although the whole arrangement of objects in the password might be correct but if the order of priority of object is wrong then the password won't be accepted for accessibility to secured object .

Sensors which are used in the procedure are the position sensors , motion sensors , gravitational sensors etc. which are available to human after so much of advancement in technology .

Sensor Mat is required to be used to make the actual connectivity possible .This sensor mat is something which is required to be laid over the surface of the table such connection can be established.

After the object selection of appropriate type is done it is required to integrate every device that tell rotation or gravity whether landscape or portrait and the location to the sensor mat

Angular Orientation Detecting Device:

Extra feature called angular orientation is required to be used wherein object can be rotated to 90 degrees , 180 degrees , 270 degrees and 360 degrees which can actually represent the flip in the objects. This is another Password verification data . If the flip is of 180 degrees then it implies that object is in upside – down position . if the flip is of 360 degrees then it implies that entire rotation of object is done but it has ended up in a position which was its original position . there can also be the shift of 90 degrees which implies that if the object (consider the example of an eraser) was in horizontal position initially then become in vertical position from anti-clock direction while in 270 degree the rotation of 90 degree is in clockwise direction.

III. Implementation

In order to implement our concept of real 3D environment , we have implemented a prototype which shows how would the real 3D objects work be used for making the authentication more secured. Prototype is designed and implemented with Visual Studio 2013 using C# as the programming language. Implementation involved below steps

- Designing the Entry form
- Designing form to set the password
- Designing the form to validate the authentication
- Designing the form to provide access to the confidential information

Below screenshots of the prototype explains the basic functionality of the concept and gives the clear picture of our implementation . These screenshots displays from the initial stage of first interaction to the stage where the password is accepted



Fig. 1 : First time user interaction



Fig 2 : Password setting form



Fig 3 : Password has been set



Fig 4 : Authentication phase



Fig 5 : Password has been entered by the user and accepted by system

Basic Coding Concept

In our proposed project ,for the implementation of the prototype the coding has been done in c sharp ,and also the many of the coding group has been used for the proper functioning of the program such as for article movements

For the LEFT movements of the picture box

```
pictureBox1.Location = new Point(p1x - 10, p1y);
p1x = pictureBox3.Location.X;
p1y = pictureBox3.Location.Y;
```

For the RIGHT movements of the picture box

```
pictureBox1.Location = new Point(p1x + 10, p1y);
p1x = pictureBox1.Location.X;
p1y = pictureBox1.Location.Y;
```

For the UP movements of the picture box

```
pictureBox1.Location = new Point(p1x, p1y - 10);
p1x = pictureBox1.Location.X;
p1y = pictureBox1.Location.Y;
```

For the DOWN movements of the picture box

```
pictureBox1.Location = new Point(p1x, p1y + 10);
p1x = pictureBox1.Location.X;
p1y = pictureBox1.Location.Y;
```

For the Angular Rotation 90 X axis

```
pictureBox1.Image.RotateFlip(RotateFlipType.Rotate90FlipX);
```

For the Angular Rotation 90 Y axis

```
pictureBox1.Image.RotateFlip(RotateFlipType.Rotate90FlipY);
```

For the Angular Rotation 180 X axis

```
pictureBox1.Image.RotateFlip(RotateFlipType.Rotate180FlipX);
```

For the Angular Rotation 180 Y axis

```
pictureBox1.Image.RotateFlip(RotateFlipType.Rotate180FlipY);
```

For the Angular Rotation 270 X axis

```
pictureBox1.Image.RotateFlip(RotateFlipType.Rotate270FlipX);
```

For the Angular Rotation 270 Y axis

```
pictureBox1.Image.RotateFlip(RotateFlipType.Rotate270FlipY);
```

For Drag and Drop

```
private void pictureBox1_MouseMove(object sender,
MouseEventArgs e)
{
    if (e.Button == MouseButtons.
    Left)
    {
        pictureBox1.Left += e.X - move.X;
        pictureBox1.Top += e.Y - move.Y;
        textBox1x.Text= pictureBox1.Location.X.ToString();
        textBox1y.Text= pictureBox1.Location.Y.ToString();}}
Private void pictureBox1_MouseDown(object sender,
MouseEventArgs e)
{
    move = e.Location;
}
```

IV. Discussion

This scheme of authentication takes authentication to next level by providing higher security because of increased complexity at the backend for achieving accessibility to secured object . Therefore if any person makes any attempt to reach out your secured object then that person is befooled. The various advantages to this authentication scheme which are as follows:

- In this new scheme , the password is set in such a way that it is difficult to be shared with others as it is even difficult to be written down on paper
- This new scheme provides secrets which are easy for user to remember but at the same time it makes it difficult for attackers or intruders to guess.
- In this new scheme secrets can be easily revoked or changed

In this authentication scheme sensor mat is to be laid down over normal working table which is available in working place for providing such a method which overcome the disadvantages of character based password and other forms of password as discussed above including textual password , biometric password and token based passwords .

V. Conclusion

The 3D password is a multi factor scheme providing authentication that brings together the different authentication schemes 3D password using real time objects of real environment would prove to be next level of authentication providing protection in critical areas like national security, Fighter planes and jet planes so as not to be misused in any circumstances , critical servers in big organizations .

3D passwords gives an interesting way of providing protection. Advancement of Technology takes place every second day. This

technology has provided us with so many sensors including position sensor, motion sensor , gravitational sensor that would create the password scheme .

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References

- [1] X. Suo, Y. Zhu, and G. S. Owen, "Graphical passwords: A survey," in *Proc. 21st Annu. Comput. Security Appl. Conf.*, Dec. 5–9, 2005, pp. 463–472.
- [2] D. V. Klein, "Foiling the cracker: A survey of, and improvement to passwords security," in *Proc. USENIX Security Workshop*, 1990, pp. 5–14.
- [3] NBC news, *ATM Fraud: Banking on Your Money, Dateline Hidden Cameras Show Criminals Owning ATMs*, Dec. 11, 2003.
- [4] T. Kitten, *Keeping an Eye on the ATM*. (2005, Jul. 11). [Online]. Available: ATMMarketPlace.com
- [5] BBC news, *Cash Machine Fraud up, Say Banks*, Nov. 4, 2006.
- [6] G. E. Blonder, "Graphical password," U.S. Patent 5 559 961, Sep. 24, 1996.
- [7] R. Dhamija and A. Perrig, "Déjà Vu: A user study using images for authentication," in *Proc. 9th USINEX Security Symp.*, Denver, CO, Aug. 2000, pp. 45–58.
- [8] 3D password for more secured authentication By:- Fawaz A. Alsulaiman and Abdulmotaleb El Saddik

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