Development of Online Banking System with High Level of Security using ASP.NET Technology and Microsoft SQL

Pulakesh Roy, Dibyendu Roy
Department of Electronics and Communication Engineering, UIT, Burdwan University, Burdwan, India

ABSTRACT:
In this research a web based online banking system have been developed which is totally password protected and several customer data have been stored and these datas have been used for security crosscheck. The customer type and investment policies have been included individually. The ID proof of the customer has also been used for creation, editing and deletion of user account.

1. Introduction:-
With the development of science and technology, the information system has become necessary in our daily life. According to the speed of user response, QOS and the performance of database system we determine the vitality of the information system. With the going of time, the performance of SQL server database system degrades, and its response time increases. Optimization of the database system plays a very important role, and it runs through the entire life cycle of the database system.

SQL is mainly used to communicate with the database. SQL statements are mainly used to perform the tasks such as update the data on a database, or to retrieve the data from a database etc [1, 2].
1.1. Advantages of SQL:-

- SQL is used to execute queries against the database.
- SQL can be used to retrieve data from the database.
- SQL is used to insert the records into the database.
- SQL can be used to update the records in the database.

1.2. DOT NET Framework:-

The .NET Framework which is pronounced as DOT NET is a partially open source freeware software for framework developed by Microsoft that is primarily runs on Microsoft Windows. .NET Framework includes a large class library which is known as the Framework Class Library (FCL) and across the several programming languages it provides language interoperability. Programs which written for the .NET Framework execute in a software environment, which is known as the Common Language Runtime (CLR) [3], which is basically an application virtual machine that provides the services such as the security system, management of memory, and handling the exception.

1.3 ASP DOT NET:-

ASP stands for Active Server Pages which is a Technology of Microsoft. Basically for the Web service applications, Microsoft provides a newest version of ASP support called ASP.NET. ASP is a program that runs inside IIS where the IIS stands for Internet Information Services which is a free component with Windows 2000. It is also a part of the Windows NT 4.0 Option Pack where the Windows NT 4.0 Option Pack can be easily downloaded from the Microsoft. The Option Pack PWS is a smaller but fully the functional version of IIS.

2. RDBMS:-

RDBMS stands for the Relational Database Management System which is the basis of SQL, and all the modern database systems such as the MS SQL Server, IBM DB2, Oracle, MySQL and the Microsoft Access etc [5, 6].

2.1 Database Tables:-

Mostly a database contains one or more than one tables and each table is uniquely identified by a name (such as the "Customers" or "Orders" etc.). Each table contains the records (rows) with the datas.
An example of the database system is given below:

<table>
<thead>
<tr>
<th>CustomerID</th>
<th>CustomerName</th>
<th>ContactName</th>
<th>Address</th>
<th>City</th>
<th>PostalCode</th>
<th>Country</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Abhishake Chakrabarty</td>
<td>Abhishake</td>
<td>A.J.c.bose road street-40</td>
<td>Kolkata</td>
<td>700020</td>
<td>India</td>
</tr>
<tr>
<td>2</td>
<td>Bibek Nandi</td>
<td>Bibek</td>
<td>Behala street- 34</td>
<td>Kolkata</td>
<td>700034</td>
<td>India</td>
</tr>
<tr>
<td>3</td>
<td>Antonio Moreno Taquería</td>
<td>Antonio Moreno</td>
<td>Mataderos 2312</td>
<td>México D.F.</td>
<td>05023</td>
<td>Mexico</td>
</tr>
<tr>
<td>4</td>
<td>Around the Horn</td>
<td>Thomas Hardy</td>
<td>120 Hanover Sq.</td>
<td>London</td>
<td>WA1 1DP</td>
<td>UK</td>
</tr>
<tr>
<td>5</td>
<td>Berglunds snabbköp</td>
<td>Christina Berglund</td>
<td>Berguvsvagen- 8</td>
<td>Lulea</td>
<td>S-958 22</td>
<td>Sweden</td>
</tr>
</tbody>
</table>

2.2 SQL Statement:-

Most of the actions which we need to perform on the database are done with the help of the SQL statements. The following SQL command is use to see all the records in the table "Customers": -

```
SELECT * FROM Customers.
```

In our project 1-st a database is created then a table for the admin account is created in the following manner.

After that other five different tables for the customer is created in the same way on the same database. For this first a table for the Customer Personal Details account is created in the following manner.
Then a table for the Customer Account Details account is created in the following manner.
After that a table for the Customer Deposit Details account is created in the following manner.

Then a table for the Customer Password System account is created in the following manner.

Finally a table for the Customer Document Id account is created in the following manner.
3. ASP.NET:-

ASP.NET is the open-source server-side web application framework which is design for the web development to produce dynamic web pages [8]. It was developed by the Microsoft for allowing the programmers to build the dynamic web sites, web applications and the web services. ASP .NET is very much user friendly for the user to design any webpage. It provides the capability for editing, updating and managing the SQL Server database [7]. It was first released in January 2002 which is the version 1.0 of the .NET Framework.

3.1 Features of ASP:-

- ASP dynamically edits, changes, or adds any content of any Web page.
- It responds to the user queries or data submitted from the HTML forms.
- ASP can access any data or databases and finally return the results to the browser.
- ASP is very much useful to customize a Web page to make the Web page more useful for individual users.

3.2 Characteristics of ASP.NET:-

ASP.NET Web pages are officially known as the Web Forms which are basically the main building blocks for the development of application in ASP.NET. There are two basic methodologies for the Web Forms the first one is the web application format and second one is the web site format. The web applications are need to be compiled before the deployment, while the web sites structures allow the user to copy the files directly to the server without the prior compilation.

3.3 Session:-

ASP.NET session state helps us for storing and retrieving the values for the user as the user navigates the ASP.NET pages in the Web application. HTTP is the stateless protocol, which means that a Web server treats in every HTTP request for the page as an independent request. Basically for all the ASP.NET applications ASP.NET session state is enabled.
The Session state includes:
- Application state which is use to storing the variables that can be easily accessed by all the users of the ASP.NET application.
- Profile properties that persists the user values in the data store without expiring them.
- View state which is use to persist the values in the page.

3.4 BLOB:-

In the recent years’ the storing of digital data like image, video and document etc. in the database make a very important role for the advancement of the computer science and growing of the information technology. The indexing of the image is one of the important categories for retrieving the information from multimedia databases [4]. Images are stored in a large database, so the retrieving of image by the content attracted more attention [4]. In our project for storing the images in the database we use the BLOB technique.

According to Eric Raymond, the main idea about a BLOB is that the handler of the file has no way of understanding the file’s order to figure out how to deal with it. The database storage of large multimedia objects, such as films and television programs is the example of application that deals with BLOB.

4. Literature Review:-

SQL statements are mainly used to perform the tasks such as update the data on a database, or to retrieve the data from a database etc [1, 2]. Programs which written for the .NET Framework execute in a software environment, which is known as the Common Language Runtime (CLR) [3], which is basically an application virtual machine that provides the services such as the security system, management of memory, and handling the exception. RDBMS stands for the Relational Database Management System which is the basis of SQL, and all the modern database systems such as the MS SQL Server, IBM DB2, Oracle, MySQL and the Microsoft Access etc [5, 6]. ASP.NET is the open-source server-side web application framework which is design for the web development to produce dynamic web pages [8]. It provides the capability for editing, updating and managing the SQL Server database [7]. The indexing of the image is one of the important categories for retrieving the information from multimedia databases [4]. Images are stored in a large database, so the retrieving of image by the content attracted more attention [4].

5. Procedure and Operation:-

At first Home Page is created from where we can easily go to Log In page and Contact Us page as shown in figure 5.1. In Contact Us page all the necessary information like the Email Id, Phone Number, Address of the main branch of the Bank etc. are provided as shown in figure 5.2. In the Log In Account page there are two options, one is Admin Log In and another one is Customer Log In as shown in figure 5.3. In the Admin Log In Account page (shown in figure 5.4), if the Log Id and the Password is wrong more than three times then it is direct to the Access Denied page as shown in the figure 5.38 and if the password is right then it will direct go to the Admin Account Security Question page as shown in figure 5.5. If all the security questions in Admin Account Security Question page are right then the Admin Account page (shown in figure 5.6) is open and if the answers are wrong more than five times then it will directly go to the Access Denied page shown in the figure 5.38. In the Admin Account page there are two options, one is
Edit Customer Account and another one is Admin Account Control Panel and also from this page we can easily sign out from the account by clicking on the Sign Out button as shown in figure 5.6. After clicking on the Edit Customer Account or Admin Account Control Panel button the Admin Account Security Layer page is open (shown in the figure 5.7 and figure 5.32) and according to our answer in this page the desire page is open depending upon the selected option. If the Edit Customer Account option is selected then Chocimect Section page is open as shown in the figure 5.8 and from this page we can easily go to the Create Account, Update Account, Delete Account and View Account page by selecting the option and in every section there are five different accounts like the Customer Personal Details, Customer Account Details, Customer Deposit Details, Customer Password System and the Customer Document ID (shown in figure 5.9, figure 5.15, figure 5.21 and figure 5.24). For five different accounts we can easily create any account by filling all the necessary information after that clicking on the Create Account button (shown in figure 5.10, figure 5.11, figure 5.12, figure 5.13, and figure 5.14). In the similar way we can easily update any account by the help of Log In id and filling the necessary information which we want to update after that clicking on the Update Account button (shown in figure 5.16, figure 5.17, figure 5.18, figure 5.19, and figure 5.20). For deleting the account we can delete any account in all section by type the Log In id and then pressing the Delete Account In All Section button as shown in figure 5.23 or we can delete any account separately in all section like for the Personal Details Account we have to type the Log In id then click on the Delete Personal Details Account button as shown in figure 5.22. For viewing any account for all section we have two options one is the View Account By Log In Id and another one is the View All Account as shown in the figure 5.28. For view any account by Login Id we have to type the 10 digit Login Id and then pressing the View Details button for the Customer Personal Details Account, Customer Password System Account and Customer Document ID Account (as shown in the figure 5.25, figure 5.29 and figure 5.31) and for the Customer Account Details Account and Customer Deposit Details Account we have to type the 10 digit Login Id and 10 digit Account Id (as shown in the figure 5.26 and figure 5.27). For viewing all account in any section we have to press only the View All Customer Account button such as the Customer Password System Account, from here we can also search the account where the Favorite Color or Favorite Place is same as shown in the figure 5.30. In the Admin Account page if the Admin Account Control Panel button is selected then again the Admin Account Security Layer page is come as shown in figure 5.32 and all the necessary information provided in this page are correct then the page is directly go to the Admin Account Control Panel page as shown in the figure 5.33. In the Admin Account Control Panel page there are two options; one is the Edit Customer Account and another one is the Edit Admin Account as shown in the figure 5.33. In Edit Customer Account we can change the Login Id and the Account Id of any customer very easily and also we can delete all customer account very easily as shown in figure 5.34. For changing the Login Id and Account Id first we have to type the old Login Id and Account Id and then we have to provide the new Login Id and Account Id then we has to press the button as shown in figure 5.35 and for delete all customer account we have to simply press the Delete All Record button as shown in figure 5.36. In Edit Admin Account page we change the Login Id, Password Id, Secret Admin Id, Secret Code Id and Secret Number Id very easily as shown in the figure 5.37. In Customer Login Id page we have to provide the Login Id and Password Id of the customer as shown in figure 5.40 and if the provided information is wrong more than five times the page is directly go to the Invalid User page as shown in the figure 5.39 and the account is block for 24 hours and if all the provided information is correct then the Customer Account page is open as shown in figure 5.41. In
Customer Account page there are two options one is the Customer Account Choicement Section and another one is the Customer Account Control Panel. In Customer Account Choicement Section there are four options (shown in figure 5.42) by which we can easily view any account; such as the Customer Personal Details, Customer Account Details, Customer Deposit Details and the Customer Password System etc. by simply pressing the View Account button (as shown in figure 5.43, figure 5.44, figure 5.45 and figure 5.46). In Customer Account Control Panel we can easily change the Password, Favorite Number, Favorite Color and the Favorite Place of the customer very easily by providing the necessary information and then pressing the button as shown in the figure 5.47. In Customer Login Id page there is also another option by which if we forget the password of the account then we can easily change the password of the account by providing the Login Id, Favorite Number, Favorite Color and the Favorite Place after that we have to provide New Password and then pressing the Change the Password in the Forget Password page as shown in the figure 5.48.
Figure 5.6: Admin Account
Figure 5.7: Admin Account Security Layer

Figure 5.8: Choicement Section
Figure 5.9: Create Account Choicement Section

Figure 5.10: Create Customer Personal Details
Figure 5.11: Create Customer Account Details

Figure 5.12: Create Customer Deposit Details
Figure 5.13: Create Customer Password System
Figure 5.14: - Create Customer Document ID Account

Figure 5.15: - Update Account Choicement section

Figure 5.16: - Update Customer Personal Details

Figure 5.17: - Update Customer Account Details

Figure 5.18: - Update Customer Deposit Details

Figure 5.19: - Update Customer Password System

Figure 5.20: - Update Customer Document ID Account

Figure 5.21: - Delete Account Choicement Section
Figure 5.22: Delete Customer Personal Details Account

Figure 5.23: Delete Account in All Section

Figure 5.24: View Account Choicement Section

Figure 5.25: View Customer Personal Details

Figure 5.26: View Customer Account Details

Figure 5.27: View Customer Deposit Details

Figure 5.28: View Password System Choicement Section

Figure 5.29: View Customer Password System
Figure 5.30: View All Account of Customer Password System

Figure 5.31: View Customer Document ID Account

Figure 5.32: Admin Account Security Layer
Figure 5.33: Admin Account Control Panel
Figure 5.34: Edit Customer Account
Figure 5.35: Change Customer Log In and Account Id
Figure 5.36: Delete All Account
Figure 5.37: Edit Admin Account
Figure 5.38: Access Denied
Figure 5.39: Invalid User
Figure 5.40: Customer Login Account
Figure 5.41: Customer Account
Figure 5.42: Customer Account Choicement Section
Figure 5.43: Customer Personal Details Account

Figure 5.44: Customer Account Details account
Figure 5.45: Customer Deposit Details Account

Figure 5.46: Customer Password System Account
Figure 5.47: Customer Account Control Panel

Figure 5.48: Forget Password
6. Process Diagram:-

Block Diagram 6.1

Block Diagram 6.2

Block Diagram 6.3

Block Diagram 6.4
7. Conclusion:-

In this paper a web application is develop for the banking system. In this project the security system is mostly strong where if the Login Id and Password is wrong more than five times then the particular account Id is block for 24 hours and the page is direct to the Invalid User Page. The current system is very much informative as several datas of a customer will be available to cross check the customer details.

In future by developing this technique a highly robust technology can be made very easily.

References:-


