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Virtual Reality based 3D password

Submitted in partial fulfillment of the requirements

of the degree of

Bachelor of Engineering

by

Kusum Manmothe 40
Sydney Sequeira 59
Rajesh Thakur 67
Vikas Jain 68

Supervisor:

Prof. Vaishali Kavathekar

UNIVERSITY OF MUMBAI

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Don Bosco Institute of Technology

2016-2017

AFFILIATED TO

UNIVERSITY OF MUMBAI

DON BOSCO INSTITUTE OF TECHNOLOGY

Kurla, Mumbai - 400070

Department of Information Technology

CERTIFICATE

This is to certify that the project entitled **'Virtual Reality based 3D password'** is a bonafide work of

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Vikas Jain	**68**

submitted to the University of Mumbai in partial fulfillment of the requirement for the award of the degree of **Undergraduate** in **Bachelor of Information Technology**

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Project Report Approval for B.E.

This project report entitled **'Virtual Reality based 3D password'** by **Kusum Manmothe, Sydney Sequeira, Rajesh Thakur, Vikas Jain** is approved for the degree of **Bachelor of Engineering in Information Technology**

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(Supervisor's Name and Signature)

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Date:

Place:

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Declaration

I declare that this written submission represents my ideas in my own words and where others' ideas or words have been included, I have adequately cited and referenced the original sources. I also declare that I have adhered to all principles of academic honesty and integrity and have not misrepresented or fabricated or falsified any idea / data / fact / source in my submission. I understand that any violation of the above will be cause for disciplinary action by the Institute and can also evoke penal action from the sources which have thus not been properly cited or from whom proper permission has not been taken when needed.

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Abstract

When it comes to providing security to the system, authentication is considered as one of the most important features. Authentication is performed so that trusted users can use the system. Recall and recognition schemes are the two authentication schemes. Currently textual passwords, graphical passwords, token-based passwords and biometric passwords are used in a large scale but they also have their own drawbacks. In actual scenario of 3D password technology, 3D password is a combination of recall and recognition techniques as it consists of a combination of textual passwords, graphical passwords, token-based passwords and biometric passwords. The project Virtual Reality based 3D password is totally different authentication scheme from already existing ones since the software development only focusses on users clicks in virtual environment and this does not include performing textual or graphical passwords and performing token-based recognition or biometric password recognition. Our project is about user getting authenticated by clicking on entities in a non-immersive 3D virtual environment and the sequence of clicks performed by him/her with unique virtual entities is the password set for the user to get authenticated. Our software will include non-immersive virtual environments and each non-immersive virtual environment will have its different entities to be used for password setting process. This is an unique way of getting authenticated and user can form any length of passwords with an ease of remembering them easily

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Chapter 1

Introduction

1.1 Problem Statement

The 3D password is the sequence of virtual entities clicked by the user in the non-immersive 3D virtual environment. The 3D password presents a 3D virtual reality outlook containing various virtual entities. The user observes this atmosphere and clicks on these virtual entities. 3D virtual environment contains several 3D objects on which the user can perform sequential clicks. These 3D entities being clicked in a sequence by the user in the chosen non-immersive virtual environment is stored as a password.

1.2 Scope of the Project

3D password has non-immersive virtual environments. This password can be remembered in the form a story. The user is presented with 3D virtual environment where clicks on various objects sequentially. Information is stored in the database in the encrypted form. 3D password can be used for locking applications and files.

1.3 Current Scenario

3D password is the rapidly growing technology. In the current statistics of technology and market, 3D password is a technique which is the combination of both recall based passwords and recognition based passwords. As given in the research papers studied, the 3D password generation is by providing textual password, graphical password, biometric password, token based password and

then interaction with the other virtual entities in the virtual environment. Four Types of authentication techniques that are used in day to day life: Four Types of authentication techniques that are used in day to day life:

- Knowledge based (e.g. Textual password)
- Token based (e.g. Credit cards, ATM cards)
- Biometrics (e.g. Thumb impression)
- Recognition Based (e.g. graphical password, iris recognition, face recognition, etc.)
- Currently,Online Retailers in UK and Italy are using this technology. 3D Password security is veried by visa and master cards in these countries.

1.4 Need for the Proposed System

The proposed system is only recall based authentication technique. Everyday the technology progresses and there is always a demand for the creative minds and ideas. This project is also a part of the idea to combine 3D graphics and authentication which is a very different combination. The project is also a successful project and works properly with the provided requirements as stated in SRS. The software system includes various virtual environments out of which the user registers with one. This system, in future, can be developed with many newly integrated advanced features thus, creating newer versions of existing software paving way for more technological development in the field of science Thus, the benefits of 3D password can be summarised as follows:

- 3D Password is easy to remember.
- Any length of passwords can be formed thus ensuring good security.
- This a different and unique authentication scheme.

1.5 Summary of the Results / Task completed

1. Literature Survey:Study of published papers on 3D passwords.
2. Finalizing the scope of the project.
3. Installation of Blender animation tool.

4. Installation of NetBeans IDE 8.1
5. Installation of SQLyog.
6. Study of Blender animation tool.
7. Study of JAVA programming language.
8. Finalizing the components to be used.
9. Implement the algorithm in java programming language.

Chapter 2

Review of Literature

2.1 Summary of the investigation in the published papers

Each entity in Virtual Reality has its unique 3D co-ordinate. The user when clicks on these entities, their 3D co-ordinates are stored in the text file in a sequence in which the user clickss. This text file is stored in database and is encrypted for security. [1]

The drawback of 3D password is it can be seen by the hacker and hacker can perform same actions again and thus get authenticated with user's account. To deal with this problem security alert feature is integrated that is admin sends email to user about the account hacking which might happen. Also, OTP can be sent to user to reset the 3D password. [2]

2.2 Comparison between the tools

Table:1

Blender animation tool	**IDE NetBeans 8.2**	**SQLyog**
[1]Creation of virtual entities.	**[1]**Designing of GUI.	**[1]**Connection with IDE.
[2]Creation of virtual environments.	**[2]**User registration process.	**[2]**Storage and Retrival of data from respective account.
[3]Export of .blend files to .obj files.	**[3]**User login process.	**[3]**Security of account information.

2.3 Algorithm(s) with example

Algorithm proposed:

While registering, user chooses a virtual environment from the given list and sets 3D password by clicking on the various entities. Thus, while logging in, user has to click on the same entities. Now, it is not possible to click at the exact same point where the user has clicked while registration process. For this purpose, the mathematical equation has been modelled and the threshold value is used. An example is given below. Suppose the user clicks on point (x=4,y=5)

9									
8									
7		2,7	3,7	4,7	5,7	P 6,7			
6		2,6	3,6	4,6	5,6	6,6			
5		2,5	3,5	Click x=4,y=5	5,5	6,5			
4		2,4	3,4	4,4	5,4	6,4			
3		p 2,3	3,3	4,3	5,3	6,3			
2									
1									
0,0	1	2	3	4	5	6	7	8	9

Figure 1: Algorithm explaination

Threshold value = 2

User clicks on (4,5)

x1 = x -2 = 4 -2 = 2 y2 = y -2 = 5 -2 = 3

Hence, p(x1,y1) = (2,3)

x2 = x1 + threshold + threshold = 2+2+2 = 6 y2 = y1 + threshold + threshold = 3+2+2 = 7

Hence, P(x2,y2) = (6,7)

Thus, a loop goes on to reach P(6,7) starting from p(2,3).

The co-ordinate values stored in database would be in the form as:

Pixel = 2:3-2:4-2:5.....

Thus, while logging in, if the user clicks on any of these points that are coloured i.e., points lying in their special range, the user gets authenticated for that particular click.

Thus, proposed algorithm can be summarised as follows:

- User clicks on the software.
- Press Login/Register.
- If the user is accessing for the first time then he has to register. User has to share personal details then user has to set 3D password .
- User will select the virtual environment
- User clicks on the entities in the virtual environment and sets 3D password
- User's 3D password is generated successfully.
- If the user is already registered then enter username and registered virtual environment appears.
- User performs the action.
- If the password is correct user is authenticated.
- If the password is incorrect then go to back to login page.

Chapter 3

Analysis and Design

3.1 Methodology / Procedure adopted

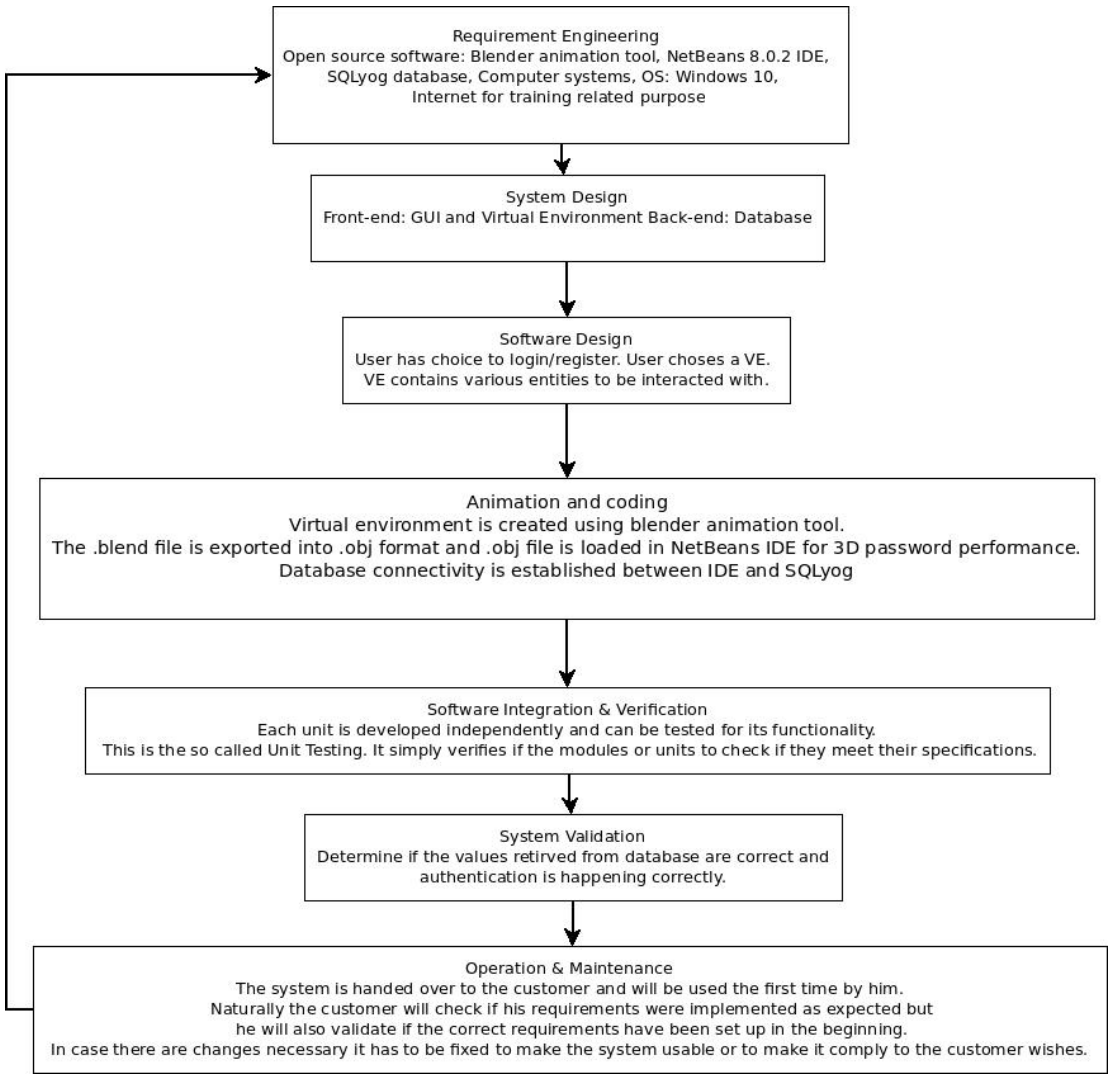


Figure 2: **Process model:** Spiral

We are using a spiral model here so that if the users are unsatised with the product and propose changes to be made, the newer versions can be created in future. IDE for project is NetBeans 8.0.2 software and blender tool is used for animation. Database connectivity between NetBeans and SQLyog has been established.

3.2 Analysis

While doing the research work, python and java have been mainly focussed when it comes to advanced graphics and 3D modelling. Also various open source gaming tools are available both for 2D and 3D animation. Our team has initially worked with Blender animation tool to create virtual environments and to navigate through them. The team's efforts were successful only for virtual environment development and moving in it but the further software development which included co-ordinates tracing and co-ordinate values storage in database was not getting successfully done. Thus, to find a solution for this problem, the team worked with java programming language. NetBeans IDE provides a way to open 3D models in .obj format. Thus, files made in Blender with .blend format have been exported to .obj format and thus, these developed 3D environments in Blender animation tool have been used in NetBeans IDE and the co-ordinate values of entities clicked in the chosen virtual environment by the user could be thus successfully recorded and stored in database which further get retrieved during log in process.

3.2.1 Software / System Requirements Specification - IEEE format.

It is attached in appendix.

3.2.2 Hardware / Software requirements

Hardware requirements:

- Computer system: Processor- Intel(R) Core(TM) i5-4210U CPU @ 1.70 GHz 2.40 Ghz Installed memory (RAM)- 8 GB System type- 64-bit OS, x64-based processor Graphic card (Keyboard, mouse, CPU, monitor)

- Internet connectivity: Training purposes Password recovery process Security alerts

Software requirements:

- Blender animation tool: Blender is the free and open source 3D creation suite. It supports the entirety of the 3D pipeline—modeling, rigging, animation, simulation, rendering, compositing and motion tracking, even video editing and game creation. Blender comes packed with import/export support for many different programs, including: Image JPEG, JPEG2000, PNG, TARGA, OpenEXR, DPX, Cineon, Radiance HDR, SGI Iris, TIFF Video AVI, MPEG and Quicktime (on OSX). 3D Alembic, 3D Studio (3DS), COLLADA (DAE), Filmbox (FBX), Autodesk (DXF), Wavefront (OBJ), DirectX (x), Lightwave (LWO), Motion Capture (BVH), SVG, Stanford PLY, STL, VRML, VRML97, X3D.

- IDE NetBeans 8.0.2: Most developers recognize the NetBeans IDE as the original free Java IDE. NetBeans IDE is the official IDE for Java 8. With its editors, code analyzers, and converters, you can quickly and smoothly upgrade your applications to use new Java 8 language constructs, such as lambdas, functional operations, and method references. It lets you easily refactor code, with a range of handy and powerful tools, while it also provides code templates, coding tips, and code generators. NetBeans IDE provides drivers for the Java DB, MySQL, Oracle, and PostgreSQL database servers so that you can connect to these databases very easily. You can also register any other JDBC driver with the IDE, so that you can explore any database that provides a JDBC driver. The 3D animated virtual environments are loaded using java programming in NetBeans in .obj format.

- SQLyog for database connection: SQLyog is programmed and developed in C++ using Win32 API . It has no dependencies on runtimes (.NET, Java etc.). It uses MySQL C API to communicate with MySQL servers. No dependencies on 'database abstraction layers' (like ODBC/JDBC). Its uses SQLite to store internal data like Grid settings. Consequently, these settings are persistent across sessions on a per-table basis.

- Operating System- Windows 10: Microsoft described Windows 10 as an "operating system as a service" that would receive ongoing updates to its

features and functionality, augmented with the ability for enterprise environments to receive non-critical updates at a slower pace, or use long-term support milestones that will only receive critical updates, such as security patches, over their five-year lifespan of mainstream support.

3.3 System architecture and design.

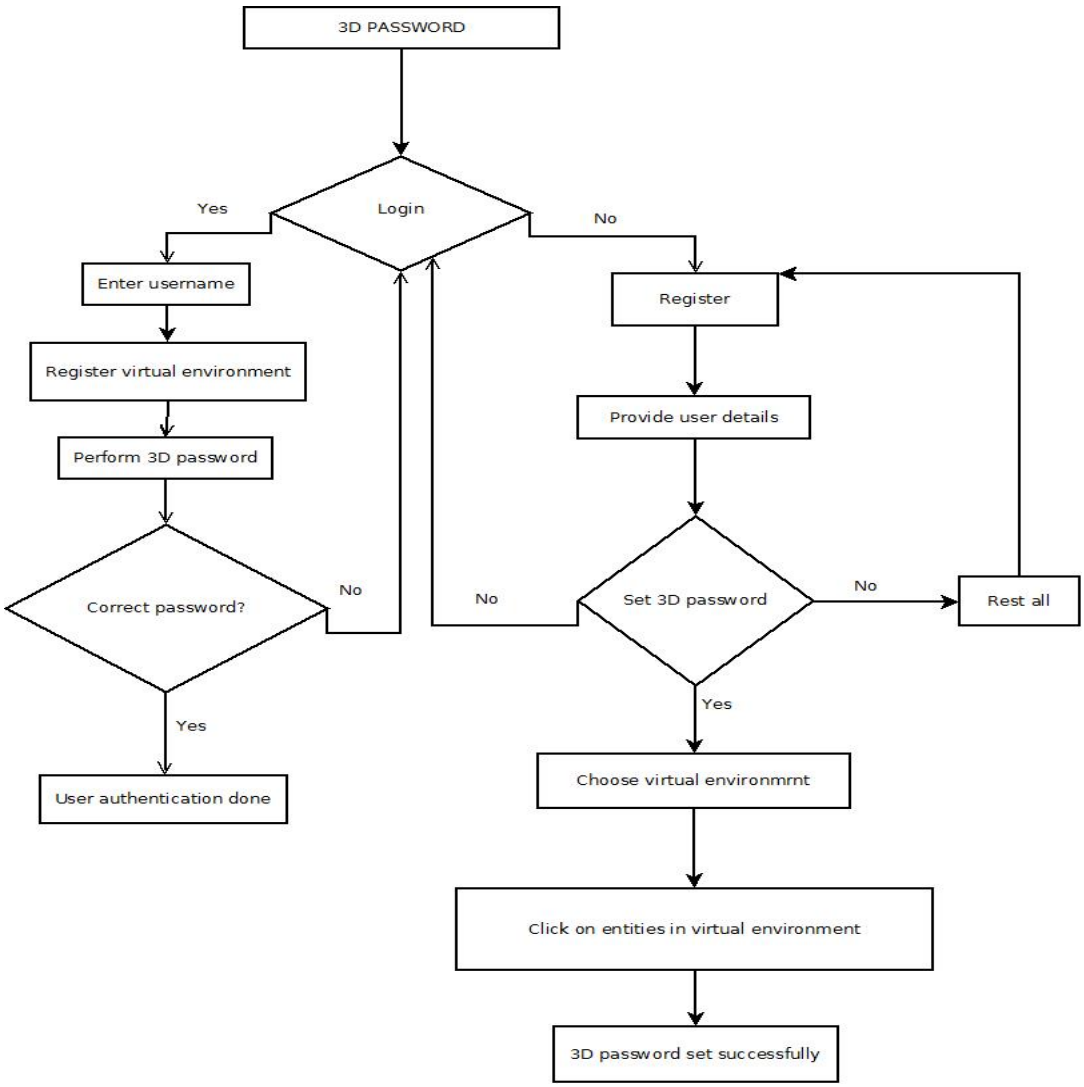


Figure 3: **Workflow and architecture**

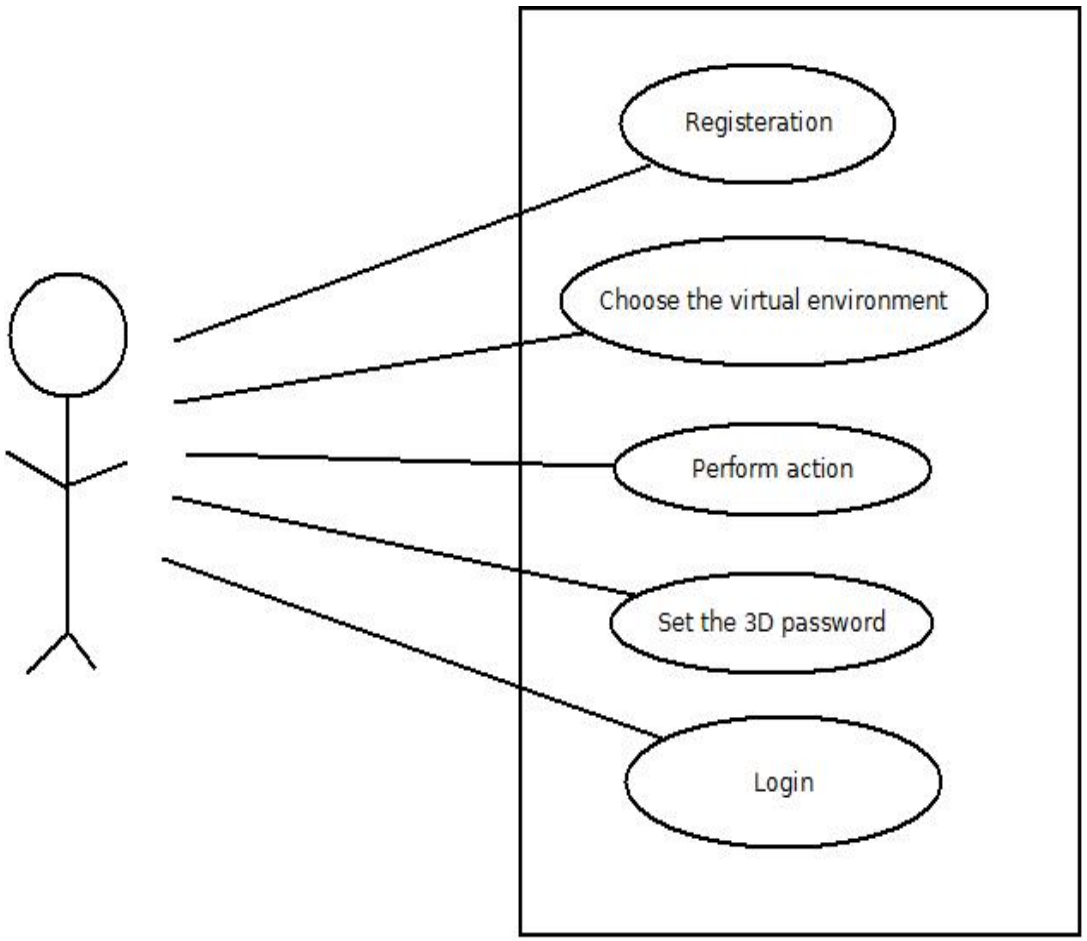


Figure 4: **Use case diagram**

Advantages of proposed system:

This is a very different way of authentication. The passwords formed can be of any length. They are easy to remember. The combination of 3D graphical animation and authentication is a very new idea. The new ideas and creativeness is beneficial for both the technical development and the financial profits on the organisational level.

3.3.1 Modules and their description

In this software system, there are following modules:

- Registration.
- List of virtual environments.
- Selected virtual environment.
- Login.
- Database.

These can be described in detail as follows:

Registration:

The user provides his/her details while registering himself/herself into the system.These details include the followings: Users full name, Address, Email id, Mobile no., Gender, Username, Password (textual), Confirm password (textual), Number of clicks that user wants to perform in virtual environments.

All these details provided by the user are stored in the database securely. They are retrieved from the database while logging in. The username is the most unique identity of each user. The number of clicks user chooses to perform in virtual environment while registering are the only number of clicks user can perform when the chosen environment appears in the next stage of 3D password registration process. The email id of the user is mainly used to ensure security features and enable user to reset 3D password if he/she forgets it in future.

List of virtual environments:

This window appears when the user is done providing basic details. The .obj files are loaded in NetBeans IDE from a folder in the computer system. These .obj files are the 3D virtual environments. The virtual environment is designed in blender animation tool and exported to .obj format. The addition or removal of the virtual environments is easy because it takes only addition or removal of .obj files in the folder which is connected to the IDE.

Selected virtual environment:

This is the last stage of registration process. The user after selecting the virtual environment from the list is taken to the chosen virtual environment. This one particular chosen virtual environment(.obj) is retrieved from the folder. The number of clicks specified by the user while registering are exact number of clicks the user can perform on the entities in virtual environment.

This is the stage where the user actually does 3D password setting. The co-ordinates clicked by user on various entities are taken into consideration. The range consisting of nearby co-ordinates of points is created for each clicked point. Thus, database stores the range of co-ordinates values in a sequence as per the sequence in which clicks are done on entities.

Login:

Here, the user provides his/her unique username. This username is fetched from the database and the corresponding details are also retrieved. The registered virtual environment and number of clicks associated with the username is retrieved successfully and the non-immersive 3D virtual environment appears to perform the 3D password. The database connectivity plays a very vital role, here. If the user fails to give the correct 3D password for more than three times, his/her account gets blocked and an email is sent to the user on his/her registered email id. This security feature enables the user to reset the password also in future, if he/she wishes to do so.

Database:

The SQLyog software is used for storing user's data provided during registration.The data is encrypted using encryption algorithms. Thus, data security is maintained as much as possible.

Chapter 4

Implementation

4.1 Implementation plan for sem-8

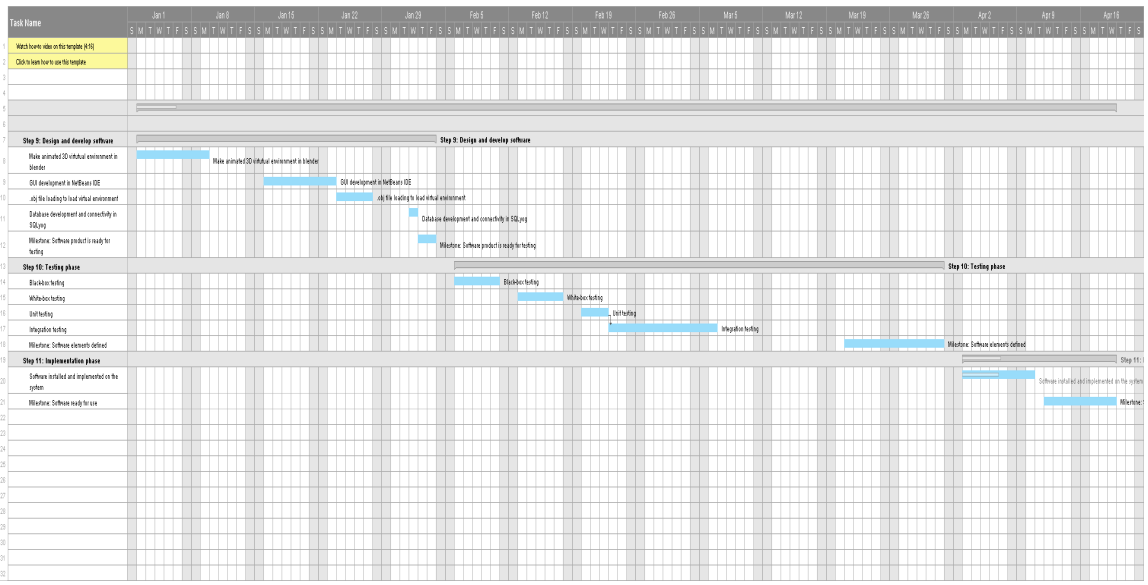


Figure 5: **Timeline chart for 3D password project.**

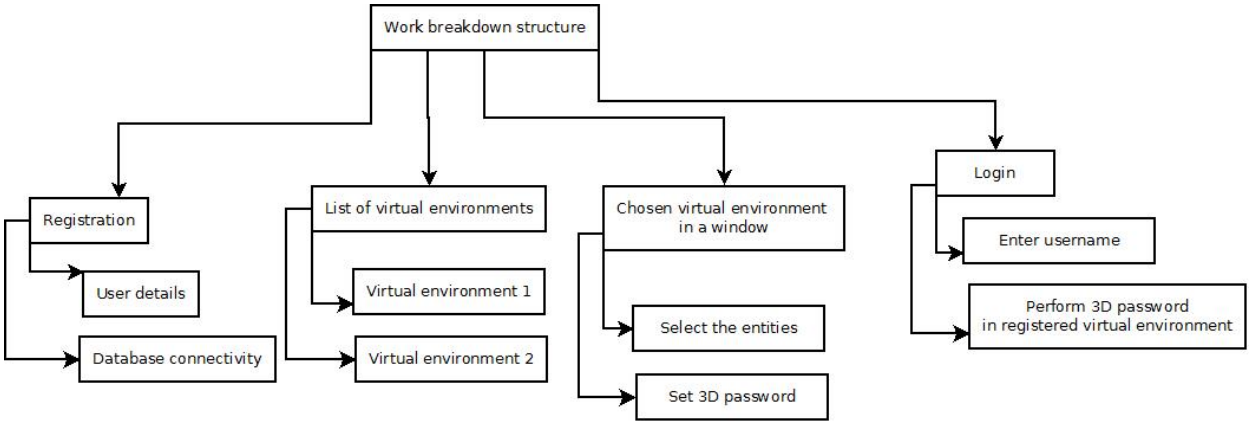


Figure 6: **Work breakdown structure.**

4.2 Coding Standard

Implementation Comments: Java codes should have implementation comments delimited by /*...*/ or //. For commenting out code a double slash i.e. // is recommended, while for multiple or single-line comments given as overview of code, the c-style comments i.e. /* */ should be used.

Returns section: This section is used to describe the method return type. Specifically, it needs to detail the actual data type returned, the range of possible return values, and where applicable, error information returned by the method. Every function should return the correct value at every function return point or throw correct Exceptions in case of Errors.

Exception section: The purpose section is a complete description of all the non-system exceptions that this method throws.A description about whether the exception is recoverable or not should also be included. If applicable, a recovery strategy for the exception can be described here.

For Statements: When using the comma operator in the initialization or update clause of a for statement, avoid the complexity of using more than three variables. If needed, separate statements before the for loop (for the initialization clause) or at the end of the loop (for the update clause) may be used.The keyword 'for' and the parenthesis should be separated by a space and the expressions in a for statement should be separated by blank space. The statement block is placed on the next line. The closing curly brace starts in a new line, indented to match its corresponding opening statement.

Getters: Getters are methods that return the value of a field. The word 'get' should be prefixed to the name of the field, unless it is a boolean field where 'is'

should be prefixed to the name of the field . e.g. getTotalSales(), isPersistent(). Alternately the prefix 'has' or 'can' instead of 'is' for boolean getters may be used. For example, getter names such as hasDependents() and canPrint() can be created. Getters should always be made protected, so that only subclasses can access the fields except when an 'outside class' needs to access the field when the getter method may be made public and the setter protected.

Setters: Setters, also known as mutators, are methods that modify the values of a field. The word 'set'should be prefixed to the name of the field for such methods type. Example: setTotalSales(), setPersistent(boolean isPersistent)

Standards for Interfaces: The Java convention is to name interfaces using mixed case with the first letter of each word capitalized like classes. The preferred convention for the name of an interface is to use a descriptive adjective, such as Runnable or Cloneable. Interfaces should be documented specifying the purpose of the interface and how it should and shouldn't be used. Method declarations in interfaces should explicitly declare the methods as public for clarity.

Always use JDBC connection Pooling: Always use javax.sql.DataSource which is obtained through a JNDI naming lookup. Avoid the overhead of acquiring a javax.sql.DataSource for each SQL access. This is an expensive operation that will severely impact the performance and scalability of the application.

HttpSessions when finished: Abandoned HttpSessions can be quite high.HttpSession objects live inside the engine until the application explicitly and programmatically releases it using the API,javax.servlet.http.HttpSession.invalidate (); quite often, programmatic invalidation is part of an application logout function.

Release JDBC resources when done: Failing to close and release JDBC connections can cause other users to experience long waits for connections.Although a JDBC connection that is left unclosed will be reaped and returned by Application Server after a timeout period, others may have to wait for this to occur. Close JDBC statements when you are through with them. JDBC ResultSets can be explicitly closed as well. If not explicitly closed, ResultsSets are released when their associated statements are closed. Ensure that your code is structured to close and release JDBC resources in all cases, even in exception and error conditions. 00

4.3 Testing

Software Testing

Software testing is a process of executing a program or application with the intent of finding the software bugs.

- Can also be stated as the process of validating and verifying that a software program or application or product
- Meets the business and technical requirements that guided it's design and development
- Works as expected
- Can be implemented with the same characteristic.

Black-Box Testing

The technique of testing without having any knowledge of the interior workings of the application is called black-box testing. The tester is oblivious to the system architecture and does not have access to the source code. Typically, while performing a black-box test, a tester will interact with the system's user interface by providing inputs and examining outputs without knowing how and where the inputs are worked upon.

White-Box Testing

White-box testing is the detailed investigation of internal logic and structure of the code. White-box testing is also called glass testing or open-box testing. In order to perform white-box testing on an application, a tester needs to know the internal workings of the code. The tester needs to have a look inside the source code and find out which unit/chunk of the code is behaving inappropriately.

Unit Testing

This type of testing is performed by developers before the setup is handed over to the testing team to formally execute the test cases. Unit testing is performed by the respective developers on the individual units of source code assigned areas. The developers use test data that is different from the test data of the quality assurance team. The goal of unit testing is to isolate each part of the program and show that individual parts are correct in terms of requirements and functionality.

Integration Testing

Integration testing is defined as the testing of combined parts of an application to determine if they function correctly. Integration testing can be done in two ways: Bottom-up integration testing and Top-down integration testing.

4.3.1 Test cases

Table 2:

Test case ID	Test case	Steps and Data	Expected result	Actual Result	Verdict
1	To check if user's full name is of length greater than 5 during registration.	User chooses to register. User enters his/her full name of 7 letters and other details.	User's full name is accepted.	User's full name is accepted.	Pass
2	To check if user's address is of length greater than 5 during registration	User chooses to register. User enters his/her address of 7 letters and other details	User's address is accepted.	User's address is accepted.	Pass
3	To check if user's email id is in the standard format during registration	User chooses to register. User enters his/her email id and other details.	User's email id is accepted	User's email id is accepted.	Pass.

4	To check if username provided by the user is accepted by the system as it has to be unique.	User chooses to register. User enters his/her username maintaining the property of uniqueness and other details.	User's username is accepted .	User's username is accepted	Pass.
5	To check if user's password is of length greater than 5 during registration.	User chooses to register. User enters his/her password of 7 letters and other details.	User's password is accepted.	User's password is accepted.	Pass.
6	To check if user's mobile number is of length greater than 10 during registration.	User chooses to register. User enters his/her mobile number of 9 no.s and other details.	User's mobile number is not accepted.	User's mobile number is not accepted.	Pass.

7	To check if username is of length greater than 5 during registration.	User chooses to register. User enters his/her username of 7 letters and other details.	User's username is accepted.	User's username is accepted.	Pass.
8	To check if number of clicks are not infinite or zero.	User chooses to register. User enters his/her no. Of clicks as 4 and other details.	User's number of clicks are accepted.	User's number of clicks are accepted.	Pass.
9	To check if clicked co-ordinates form a range of nearby co-ordinates values to store range in database.	User selects a virtual environment. User clicks on several points. User registers successfully. User clicks on nearby clicked co-ordinates.	User logs in successfully	User logs in successfully.	Pass.

10	To check if system locks the user for inserting wrong password for more than three times.	To log into the system with username. To perform wrong 3D password.	The account gets locked to avoid account hacking.	The account gets locked to avoid account hacking.	Pass.
11	To check if user recieves security alert from the admin when system gets locked.	To log into the system with username. To perform wrong 3D password. To get email from admin stating account security alerts.	Security alert recieved when account is locked.	Security alert recieved when account is locked.	Pass.
12	To check if user can reset the password when OTP is sent by admin.	To check the email. To reset the password with username, textual password, email id and OTP.	OTP recieved and 3D password gets changed successfully securely	OTP recieved and 3D password gets changed successfully securely.	Pass.

13	To check if the chosen virtual environment appears from the folder while registering.	Provide user details while registering. Selecting a virtual environment from the list.	Virtual environment appears from the list	Virtual environment appears from the list.	Pass
14	To check if registered virtual environment appears while logging in after giving username.	Provide username. Perfrom 3D password in environment.	Registered virtual environment appears.	Registered virtual environment appears.	Pass

4.3.2 Results of testing and system performance

The testing has been performed on the following modules and submodules:

Registration:

- User inputs
- User's full name
- User's address
- User's email id

- User's mobile no.
- User's gender
- User's username
- User's password
- User's preffered number of clicks

Virtual environment list:

- Virtual environment-Room 1
- Virtual environment-Room 2

Virtual environment window: Appearing virtual environment that user registers with

- Login:
- User's username
- User's each click
- User's 3D password generation

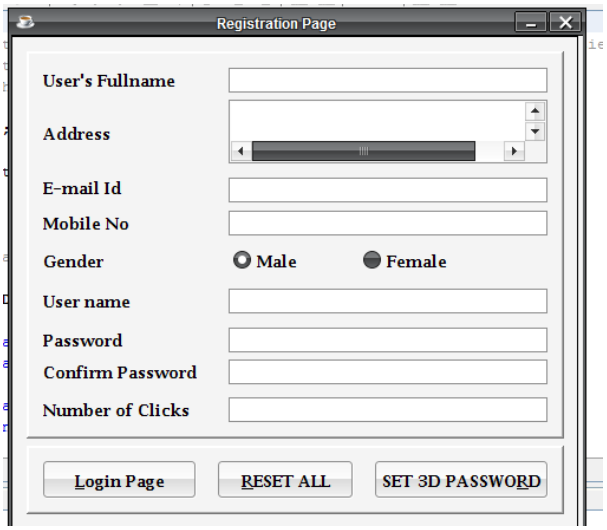
The system performance is good under suitable circumstances like proper provision of environment for software system to produce the expected output. The software testing has been successfully carried out with positive results. Thus, the software is ready to be used by the user. It will give the desired results and satisfy the purpose of its development.

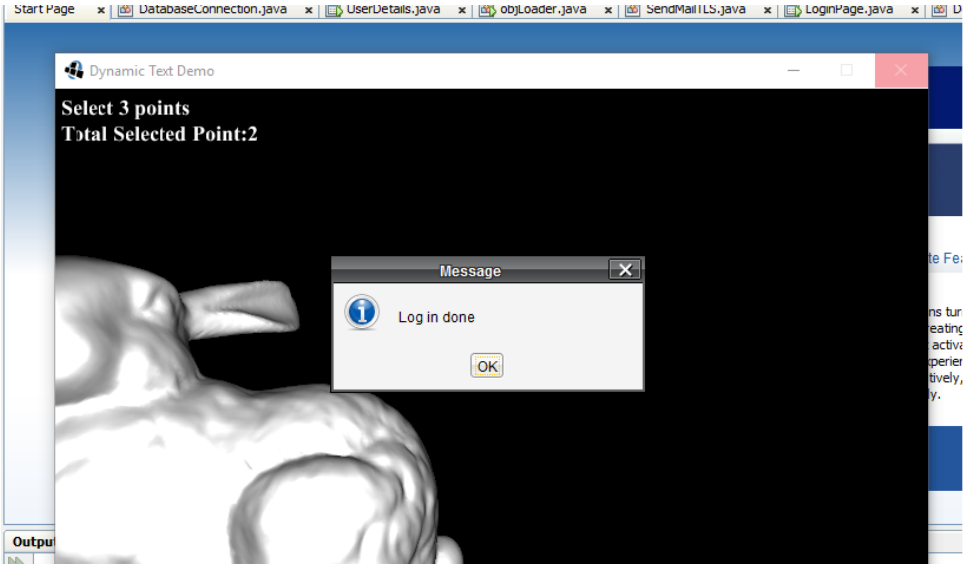
Chapter 5

Results and Discussion

Virtual reality is a very vast and interesting topic. Combining animation with security is a very a new concept. Image processing has been used in biometric recognition and graphical passwords deal with 2D animation. Since the project aims at animation and security, we have come up with an idea of performing authentication with 3D animation. 3D password involves developing a virtual environment.Many open source tools that are available for game development can be used to create a virtual environment. To develop a 3D virtual environment, we have finalised Blender software for animation and NetBeans IDE with SQLyog database.Developing this software system takes many learning procedures in field of graphics and virtual reality. Along with this, GUI has been developed using Java programming language. The inbuilt features of NetBeans IDE has enabled the core functioning to be a possibility. Also, database connectivity has been enabled between IDE and SQLyog database. Therefore, in the final result of the product, the user can click on various entities in the non-immersive 3D virtual environment and get authenticated with the 3D password.

Figure 7: **Screenshots of output**





Chapter 6

Conclusion and Future work

The authentication can be improved with 3D password,because the unauthorized person may not interact with the same object at a particular environment as the legitimate use.

Thus, this is an unique way of authentication where one doesn't need to remember user id and password. Only actions will do authentication.This system has been made with the non-immersive virtual environment. The environment can also be made immersive using sensor technology. Also, along with textual password used while registration process for recovery purposes, graphical password, biometric password and token based password can be integrated to generate very high security.

Appendix - I

Software Requirements Specification plan- IEEE format

Introduction

Purpose

The purpose of this document is to give a detailed description of the requirements for the "VirtualReality Based 3D password" software. It will illustrate the purpose and complete declaration for the development of system. It will also explain system constraints, interface and interactions with other external applications.This document is primarily intended to be proposed to a customer for its login and approval.

Scope

3D password has non-immersive virtual environments. This password can be remembered in the form a story. The user is presented with 3D virtual environment where clicks on various objects sequentially. Information is stored in the database in the encrypted form. 3D password can be used for locking applications and files.

Definitions

Term	Definitions
User	Someone who interacts with the mobile phone application
Admin	System administrator who is given specific permission for managing and controlling the system.

Overview

The remainder of this document includes five chapters and appendixes. The second one provides comparison between the tools and methodologies. This chapter also introduces different types of algorithms. The third chapter provides the analysis and design in detailed terms and a description of the system interfaces. Different specification techniques are used in order to specify the requirements more precisely for different audiences. The fourth chapter deals with the results and discussions. The Appendixes in the end of the document include the all results of the requirement prioritization.

Overall Description

Product perspective

This system will consist of dekstop application. The desktop application will be used to login and store the passwords.While logging it will need somewhere to store the data.For that, a database will be used. The desktop application will communicate with the database.The application will only use the database to get data.

Product functions

With this application, the users will be able to search for multiple environments. The result will be based on the criteria the user inputs. There are several search criteria and it will be possible for the administrator of the system to manage the options for those criteria that have that. The result of the search will be viewed in the netbeans.

User characteristics

There are different types of users that interact with the system. Each of these types of users has different use of the system so each of them has their own requirements. The dekstop application users can only use the application to set a 3D pass. This means that the user have to click on the registration button and select the virtual environment. If the users failed to login in 3 clicks then that particular user will be blocked for certain period of time. The administrators also only interact with the web portal. They are managing the overall system so there is no incorrect information within it. The administrator can manage the information for each user.

Design and Implementation constraints. In netbeans z co-ordinates cannot be traced.So the image is viewed in 3D format without the z co-ordinates.While importing the .blend files to .obj files lot of errors are seen.To eliminate those errors several line of codes have to be removed.So importing files from blender software is also a contraint. The Internet connection is also a constraint for the application. Since the application fetches data from the database over the

Internet, it is crucial that there is an Internet connection for the application to function.

External interface requirements

System Interfaces

The 3D virtual environment should consider what systems will be protected by a 3D password. The number of objects and the types of objects that have been used in the 3D virtual environment should reflect the importance of the protected system.

User Interfaces

A first time user of the desktop application should see the login page when he/she opens the application.If the user has not registered, he/she should be able to do that on the login page. If the user is not a first time user, he/she should be able to login directly.

Software Interfaces

The desktop application communicates with the netbeans in order to start the login/registration process.The database is used in order to get the information about the users. The communication between the database and the netbeans consists of operation concerning both reading and modifying the data.

System Features

3D password has non-immersive virtual environments.The user is presented with 3D virtual environment where clicks on various objects sequentially. User has to remember the clicks while registering for a successful login.Information is stored in the database in the encrypted form. Information such as user name,email-id,phone number is stored.If the user fails to login in 3 attempts then the users login process will be blocked and a mail would be sent saying some is trying to access the account.3D password can be used for locking applications and files.

Development software used:
Blender for animation, NetBeans IDE for GUI and java programming and SQLYog for database.

References

[1] Fawaz A. Alsulaiman and Abdulmotaleb El Saddik, “Three-Dimensional Password for More Secure Authentication”. Transaction Action on Instrument and Measurement Vol. 57, No. 9.September2008.

[2] Nisha Salian, Sayali Godbole, Shalaka Wagh, “Advanced Authentication Using 3D Passwords in Virtual World” International Journal of Engineering and Technical Research (IJETR) ISSN: 2321-0869, Volume-3, Issue-2, February 2015

[3] https://github.com/nithinp/3D-Password

[4] https://github.com/sayyedfarheen/3d-Password/commits/master

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Acknowledgements

A Project is a teamwork which includes the contribution and commitment of the people involved. Many people have been influential in the development of this project. We wish to express our sincere gratitude to all who have taken interest in our work and have motivated us throughout. Developing a project needs a lot of human effort, dedication, commitment, teamwork and responsibility among the people involved. We sincerely thank our project guide, Prof. Vaishali Kavathekar, who never ceased to help us from the very initial stage of this project

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