Multimedia Communications :Chatting Application

Submitted to Professor Shervin Shirmohammadi in partial fulfillment of the requirements for the course ELG 5121

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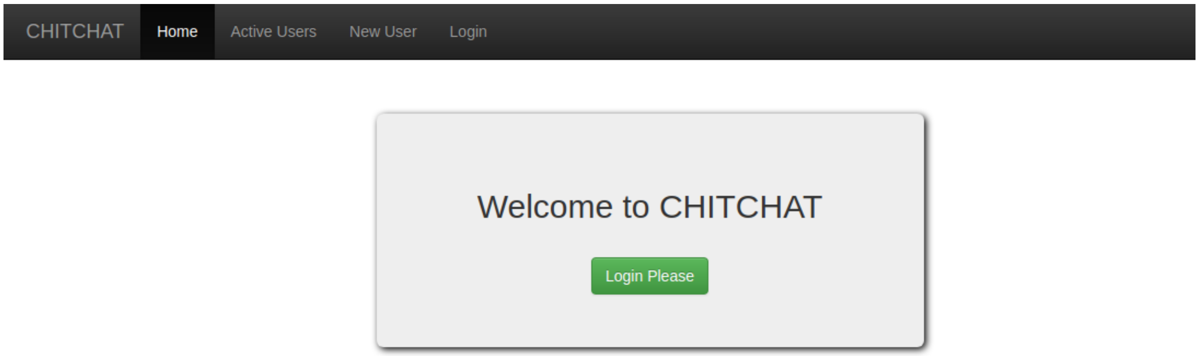


Figure 1.1: Welcome

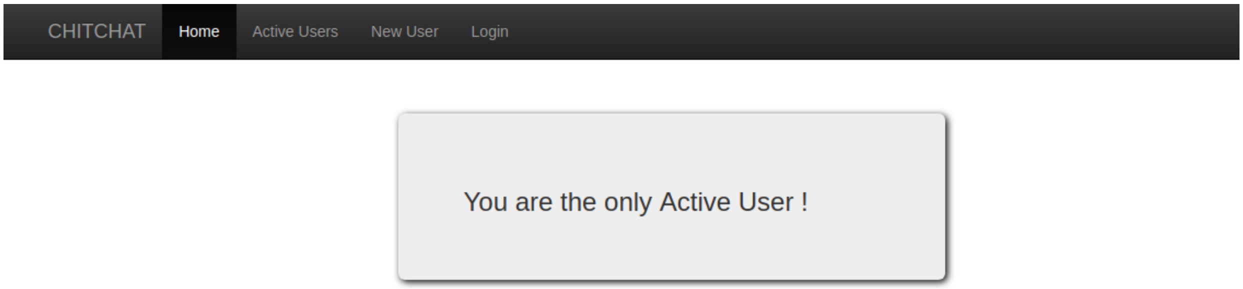
1.1 Overview

Online chatting refers to any kind of communication that offers a real-time transmission of text messages and images from sender to receiver over the Internet. Its a client-server chat application consisting of a Chat Client and a Chat Server and there exists a two way communication between them. This project is a cross.platform "client-server" chat application which has been implemented in PHP. This project is developed to make an online chatting system. This system name is ChitChat, which may address point-to-point communications.
The users can exchange text messages and images with each other through this project deliverable. The proposed systems architecture is a client-server architecture. In this there is a central server which is acting as a medium between two devices. Request(Message) goes to this central server first which directs it to the receiver and in this manner a connection is built amongst different devices.

1.2 Related Work/Background

There are many such systems in the market which we have studied about before creating this project.Implementing a chat server application is one of the most popular network programming projects with newbie programmers. There are many open source and closed source applications like this.

The most popular ones amongst are Whatsapp, Snapchat, Telegram and many more. Some of the examples of open source Chat applications are "FreeCS, "Chipchat" and "OpenCHAT" etc. With little



You are the only Active User !

Figure 1.2: Home

experience in network programming Multimedia Communications as well as a short duration for the project our intension was not to match or improve the existing implementations but to implement a basic version of our own.

Design and Implementation

2.1 Technologies and Softwares used

2.1.1 Front-end Technologies

1. HTML- Developing application structure.

2. CSS3- For designing the application Structure.

3. Bootstrap - Frontend Designing

4. Javascript - Scripting language

5. Jquery - For better user experience interface

2.1.2 Back-end Technologies

1. PHP-For creating a connection with database to view output on browser.

2. MySql-Storing messages username in the database.

2.1.3 Version Control System

1. Git- For storing different versions and to use it for future updations.

2. Bitbucket- As a backup

2.1.4 Tools Used

1. PHPMyAdmin - Open source administration tool for database

2. Apache HTTP Server - The Apache HTTP Server is an open-source and free web server software which is used to serve content on the web browser. As in this project, PHP: which is a server-side scripting language.

3. Sublime - A fastest text editor for writing code.

2.2 Project Design and Flow

The project design and flow is shown with the help of Floe diagrams.

1. Login Flow

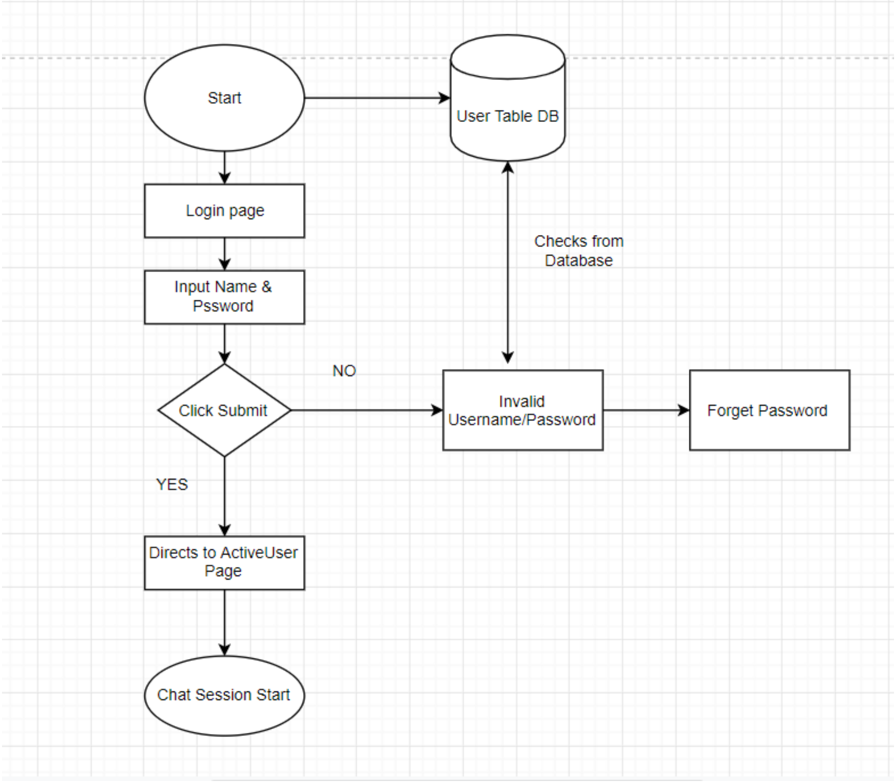


Figure 2.1: Project Flow-1

This is the first stage where users are created and after successful login both users will be marked as active. Then, they can start a chatting session with other to exchange data and images.

2. Chat Session Flow

In this, two users login and then a session started where they chat with each other.

3. Forget Password Flow

If user forgets the password, then its the flow to reset the password

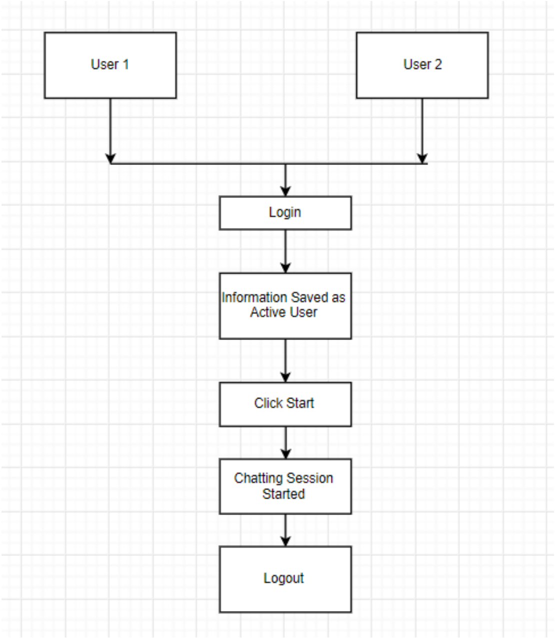


Figure 2.2: Project Flow-2

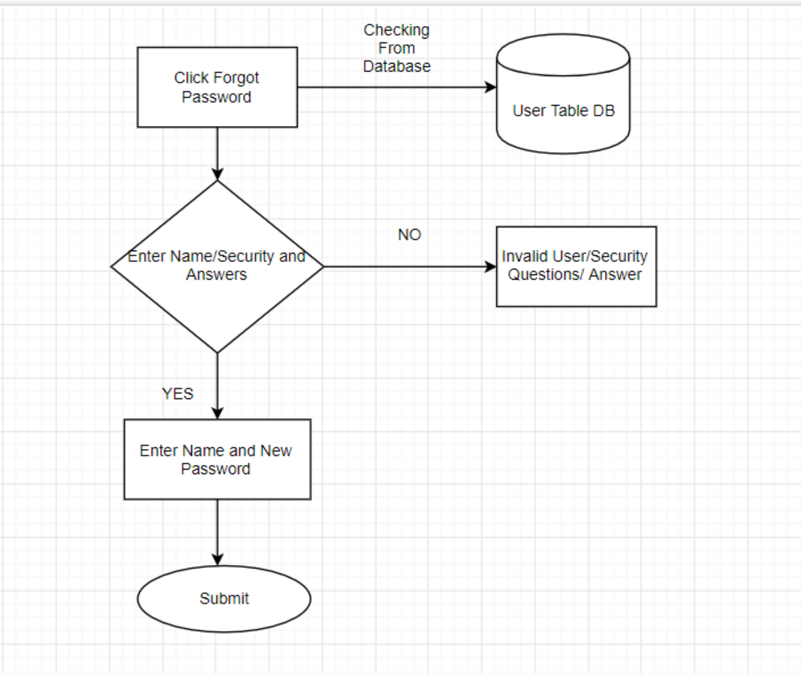

Click Forgot Password
Checking From Database
User Table DB
Enter Name/Security and Answers
NO
Invalid User/Security Questions/ Answer
YES
Enter Name and New Password
Submit

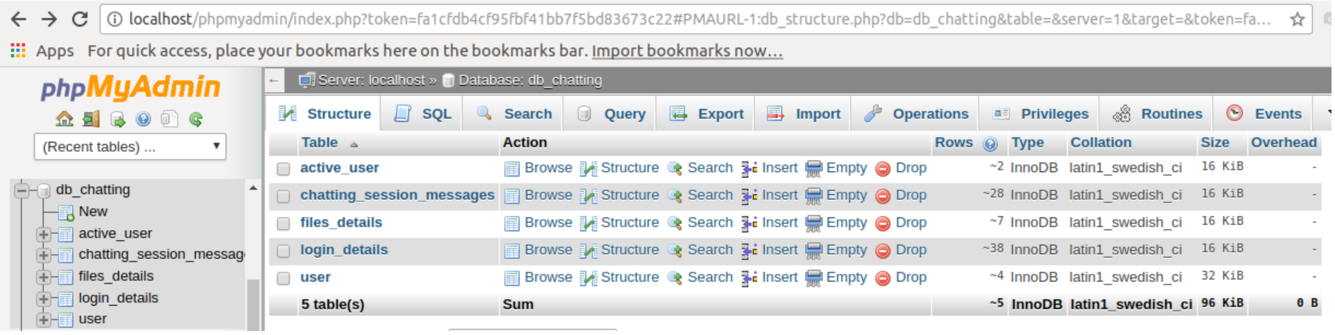
Figure 2.3: Project Flow-3

2.3 Implementation

2.3.1 Database

A database is created for this system with several tables to save login information of users, active users, messages and images with several columns in it. All the data is saved in the tables and then sent to broswer from here.

MySQL is used here as database and the database + tables has been maintained by using PHPMyAdmin. Regarding the images, the path of image is stored in the database and futher the image is displayed on the browser to save at the receiver's side.

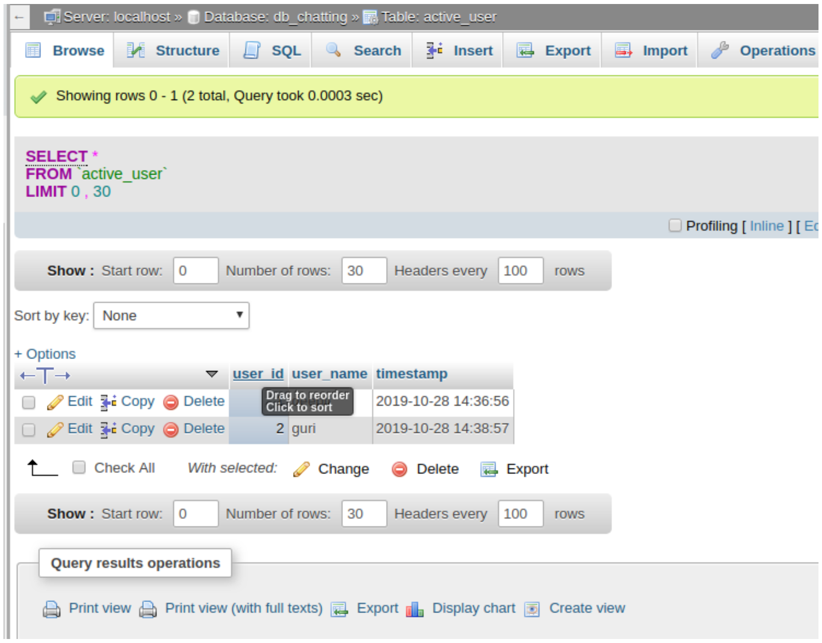


localhost/phpmyadmin/index.php?token=fa1cfdb4cf95fbf41bb7f5bd83673c22#PMAURL-1:db_structure.php?db=db_chatting&table=&server=1&target=&token=fa...

Server: localhost » Database: db_chatting

Table	Action	Rows	Type	Collation	Size	Overhead
active_user	Browse Structure Search Insert Empty Drop	~2	InnoDB	latin1_swedish_ci	16 KiB	-
chatting_session_messages	Browse Structure Search Insert Empty Drop	~28	InnoDB	latin1_swedish_ci	16 KiB	-
files_details	Browse Structure Search Insert Empty Drop	~7	InnoDB	latin1_swedish_ci	16 KiB	-
login_details	Browse Structure Search Insert Empty Drop	~38	InnoDB	latin1_swedish_ci	16 KiB	-
user	Browse Structure Search Insert Empty Drop	~4	InnoDB	latin1_swedish_ci	32 KiB	-
5 table(s)	Sum	~5	InnoDB	latin1_swedish_ci	96 KiB	0 B

Figure 2.4: Database Structure



Server: localhost » Database: db_chatting » Table: active_user

Showing rows 0 - 1 (2 total, Query took 0.0003 sec)

```
SELECT *
FROM `active_user`
LIMIT 0 , 30
```

Show : Start row: 0 Number of rows: 30 Headers every 100 rows

Sort by key: None

	user_id	user_name	timestamp
□ Edit Copy Delete			2019-10-28 14:36:56
□ Edit Copy Delete	2	guri	2019-10-28 14:38:57

Figure 2.5: Table Structure

2.3.2 Users Module

Users are first created in this and the id and password will be stored in the database. Further, this information is used to authenticate the user and user is able to login in the system.
Login information is saved and permission is granted to the user so that the user can interact with the server and a message should be delivered to the sender.
Thus it basically authenticates the username and password for successful login. Moreover, to secure the password we have encrypted the user's password using MD5 (Message Digest) Algorithm.
The MD5 message-digest algorithm is a widely used hash function producing a 128-bit hash value.

In this project we have created two web pages to accomplish this:

Signup Page

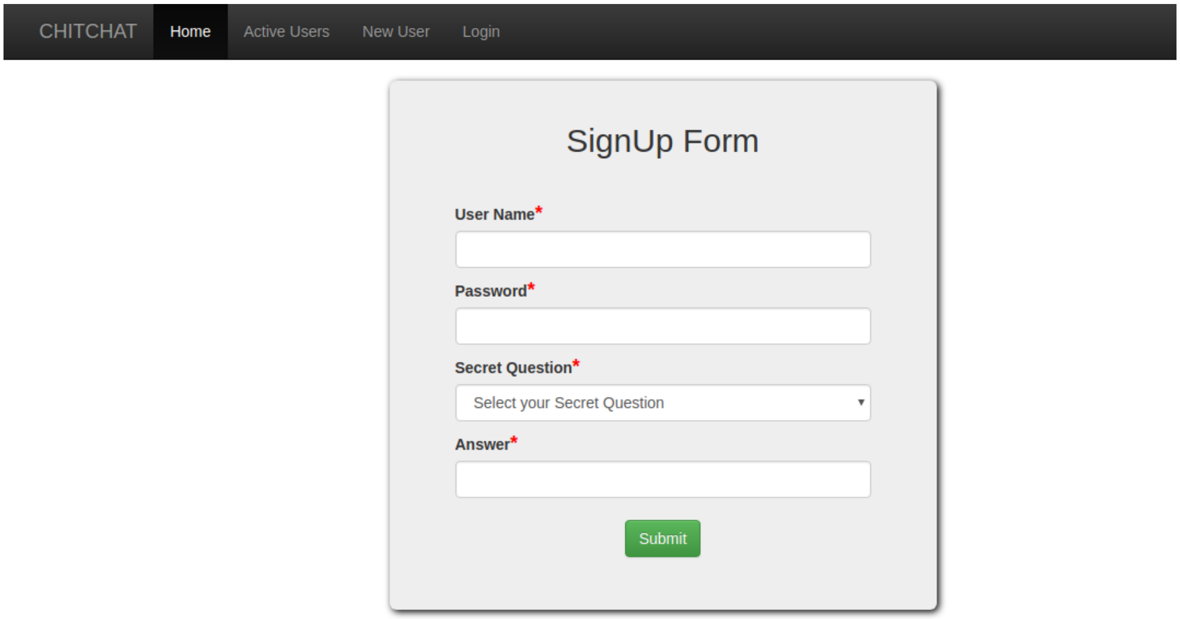
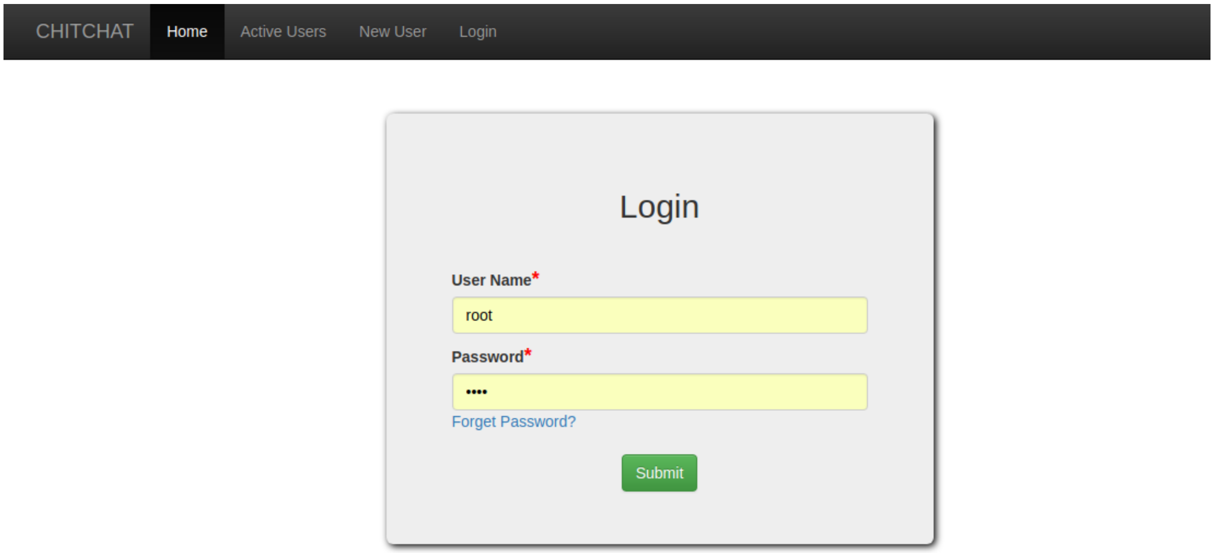


Figure 2.6: Signup Page

Login Page

Moreover, if the user forgets the password, then user needs to submit the answer of the security question. Further, he/she will be directed to the reset password screen.
Validations are there in every screen, if the user will not submit the correct answer of the security question, the user would not be redirected to the next page. Instead, a pop-up error will come that Incorrect Username/Answer.



Login

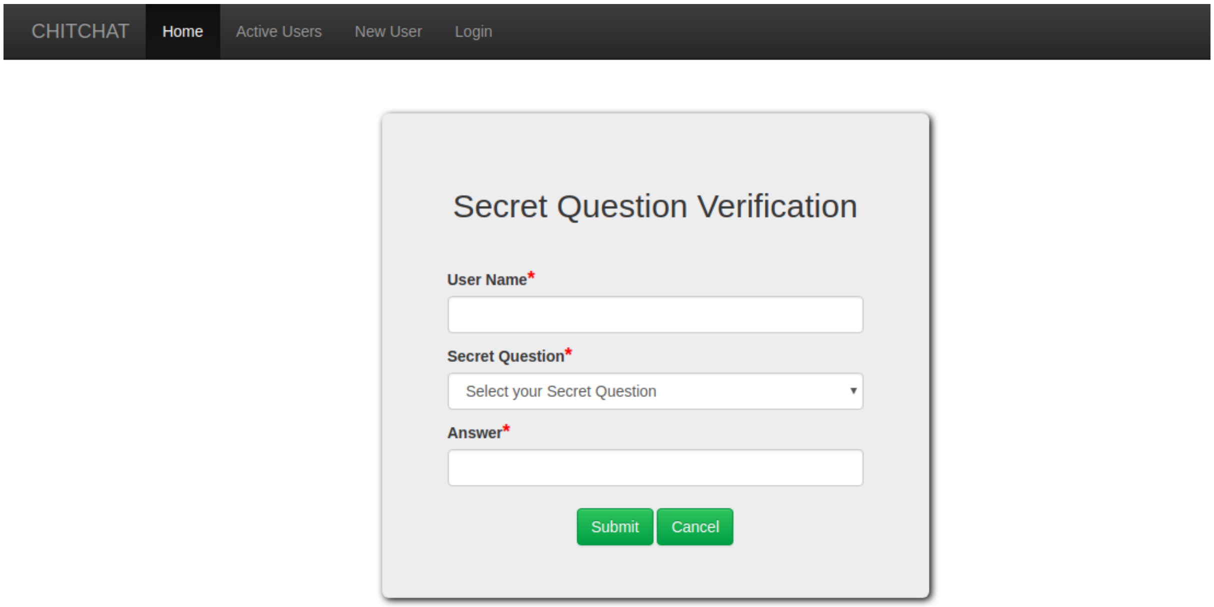
User Name*

root

Password*

••••

Figure 2.7: Login Page



Secret Question Verification

User Name*

Secret Question*

Select your Secret Question ▾

Answer*

Figure 2.8: Security Answer Verification

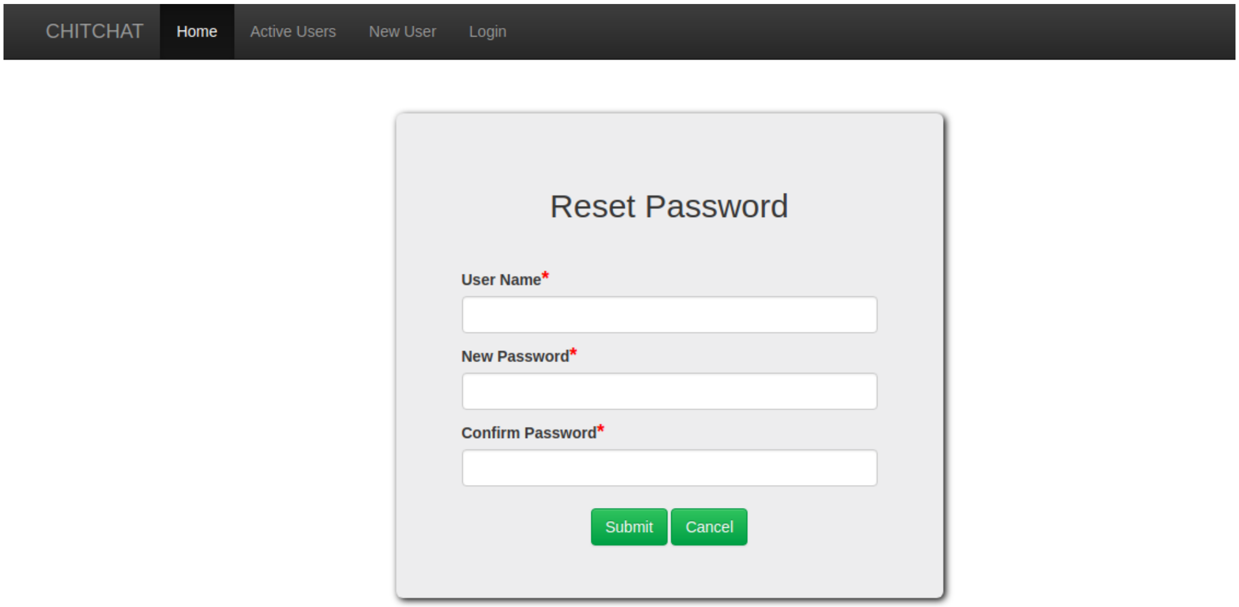
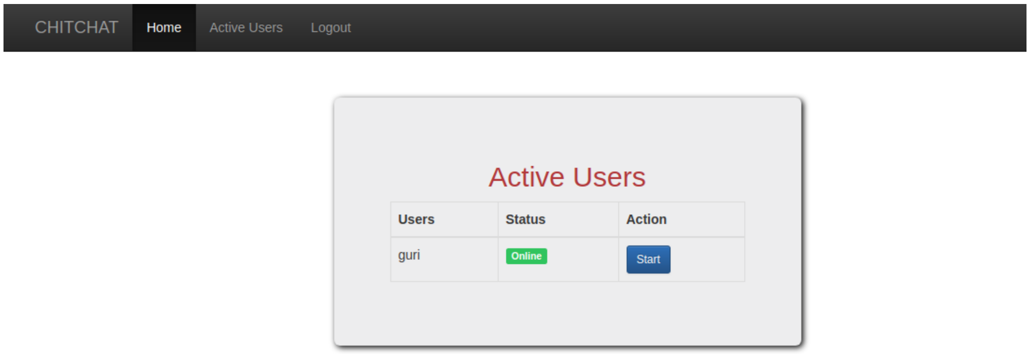


Figure 2.9: Reset Password

2.3.3 Communication Module

We have started the project by sending messages and images by creating different users on a single system using Database and PHP Sessions where different users can send messages to each other. Different sessions can be opened for particular user on different browsers.When this communication feature got implemented successfully, then the central server (domain) came into play using the data has been sent from one system (Laptop) to different device. It acts as a medium between the sender and receiver.
A user can communicate (chat) with other active users at that time. User can start the chat and can initiate transfer of messages or images.



Users	Status	Action
guri	Online	Start

Figure 2.10: Active Users

2.3.4 Image Compression and Transfer Method

Images has been the heaviest component of any website or project. In this prject, the image will be compressed. This project compresses the images at sender's end and thus compressed data has been send to the receiver. We have used Canvas HTML5 technique for compression in this project. This compression technique works in a way that it analyze and manipulate individual canvas pixels, and then it gets the image data from it, then modify the pixel array and then put data back into the canvas.

The method of Canvas can handle a number of formats. In Chrome it can export image/png, image/jpeg with a good quality. There is an assumption in our project (scope of the project), that the image compression will work with the image size beyond 300. We are basically redrawing. that is retracing a bigger size image to a smaller one.

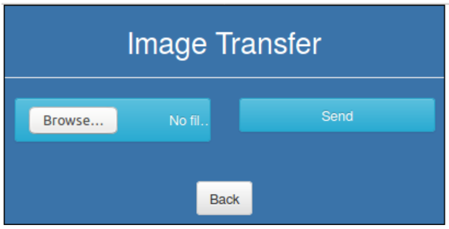
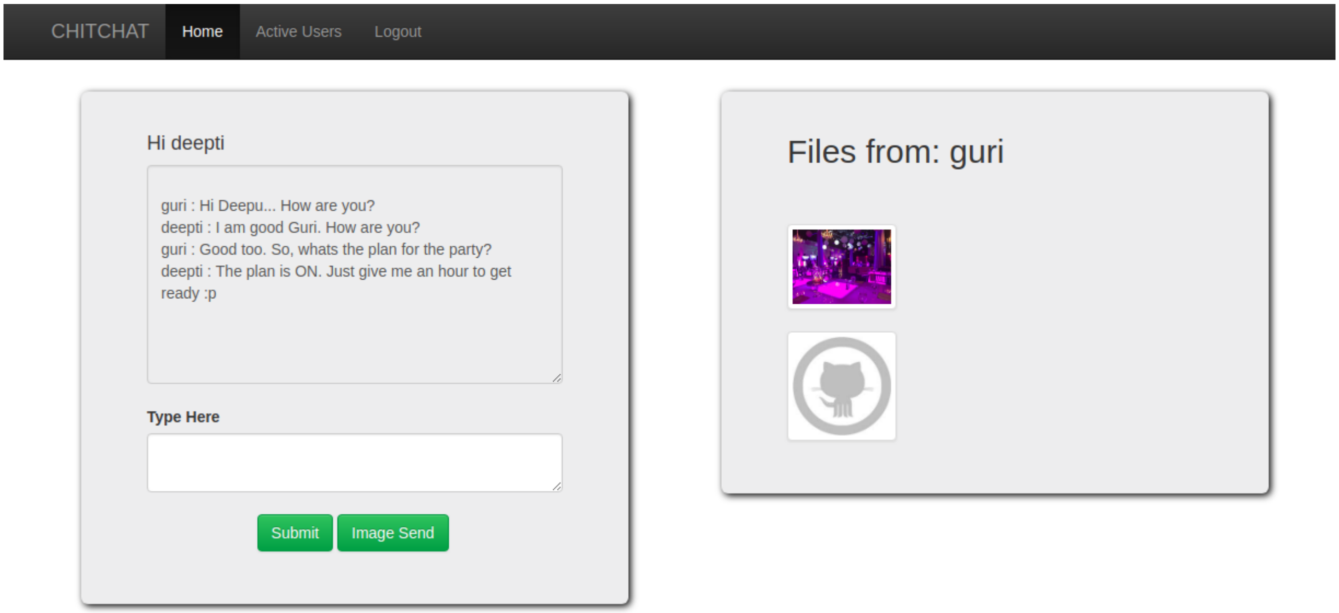


Figure 2.11: Image Selection

Moreover, for sending images from one user to other, the sender will click on send image and then he/she needs to browse image and then click on send button. An the receiver's side, the image will be displayed to save at other side. The final output i.e the image will be compressed.
The format supported by our system as of now are png and jpg.



Hi deepti

guri : Hi Deepu... How are you?
deepti : I am good Guri. How are you?
guri : Good too. So, whats the plan for the party?
deepti : The plan is ON. Just give me an hour to get ready :p

Files from: guri

Figure 2.12: Image Transfer

Justifying the design choices

3.1 Our Preferred Technologies vs the the other Alternatives

3.1.1 Backend

There were several options for languages and database. We could have gone with Java, Python etc as a computer language and MongoDB, PostGreSQL, Sqlite etc as the database. But for this project, the chosen language is PHP.

We selected PHP over others as it does not need any license. PHP is open source and free of cost, which helps developers to install it quickly and readily available for use.PHP is mainly supported by all the operating systems. The syntax is simple and flexible to use. This advantage of PHP is simple and easy to learn and code. The fast speed of PHP provides the developer with an edge to develop the web applications in PHP programming language. Moreover, we are familiar with PHP and have worked previously with it. So, we considering the short duration as our team skills we picked PHP.

Moreover, we pick Mysql as the choice for the implementation of this application as compared to other databases, based on its scalability and flexibility, high performance, high availability, strong data protection, web and data warehouse strengths, management ease, lowest total cost of ownership and open source freedom. Moreover, its widely used and we are familiar with SQL.
Further, for compression we have used Canvas HTM5 technique which is implemented using Javascript. This method of Canvas can handle a number of formats. In Chrome it can export image/png, image/jpeg with great quality. Moreover, it was easy to understand for beginners too and our team skills were revolving around this only. In case of java script, we have to just reduce the size of the image in terms of storage capacity. we had other options too but due to time constraint we chose canvas for retracing images.

Test Results

Below are the terms in the project and the functionality of each option:

Overview of Chit-Chat	
Term	Meaning
Home	You are the only user if nobody is logged in
Active Users	Displays list of active users
New User	Signup Page
Login	User credentials to login

Table 4.1: Easy CMS

Several test cases has been applied on this project and below are the results corresponding to each use case: This table consists of test cases regarding login and signup:

Test cases for main page(index.html)			
Operations	Desired Output	Actual Output	Status
Incomplete data during Signup	All fields are mandatory	All fields are mandatory	Pass
Incorrect data using Login	Invalid Username/Password	Invalid Username/Password	Pass
Incomplete data during Login	All fields are mandatory	All fields are mandatory.	Pass
Forget Password Link	Directs to Secret Verification Page	Directs to Secret Verification Page	Pass
User Credentials	Checked from DB and logged in	Checked from DB and logged in	Pass
Working of Submit Button (Login)	Directs to active user window	Directs to active user window	Pass
Working of Submit Button (Signup)	User is created (New user created)	User is created (New user created)	Pass

Table 4.2: Computational Analysis

Test Results		
Cases	Input	Output
Case 1	Signup	Credentials saved in database
Case 2	Authenticate user's credentials	Successfully logged in
Case 3	Wrong Login Credentials	Error:Invalid Username/Password
Case 4	Fields incomplete	Enter all the mandatory fields
Case 5	logout	Session terminated

Conclusion

The main objective of this project is to develop a Chat Application. We have learnt alot of methods while making this project and we have discovered alternatives too and have choosen the best techniques which works with our project and our team member skills. We have even tried making it a secure application by using md5 encryption method on passwords. To conclude, we have made a secure chatting system using PHP for communication purposes.