1. Requirements of the HR Management System

The function of human resources (HR) departments is generally administrative and common to all organizations. Currently human resource management systems include functionalities such as payroll, time and attendance, recruiting/learning management, scheduling, etc. (Wikipedia, 2012, http)

In this assignment, it focuses on two main functionalities of HR management systems, which are employee management and payroll management. As well, for simplicity of the application, there are two types of users named as normal user and admin user. These users have different security levels, thus the information will be filtered according to the user type before it shown. The admin user will have the access to all the employee information including sensible information such as previous departments and roles, hire date and salary. However, a normal user can access general information of all employees without sensible information.

Accordingly, the main requirements of the two users are captured as shown in Figure 1.

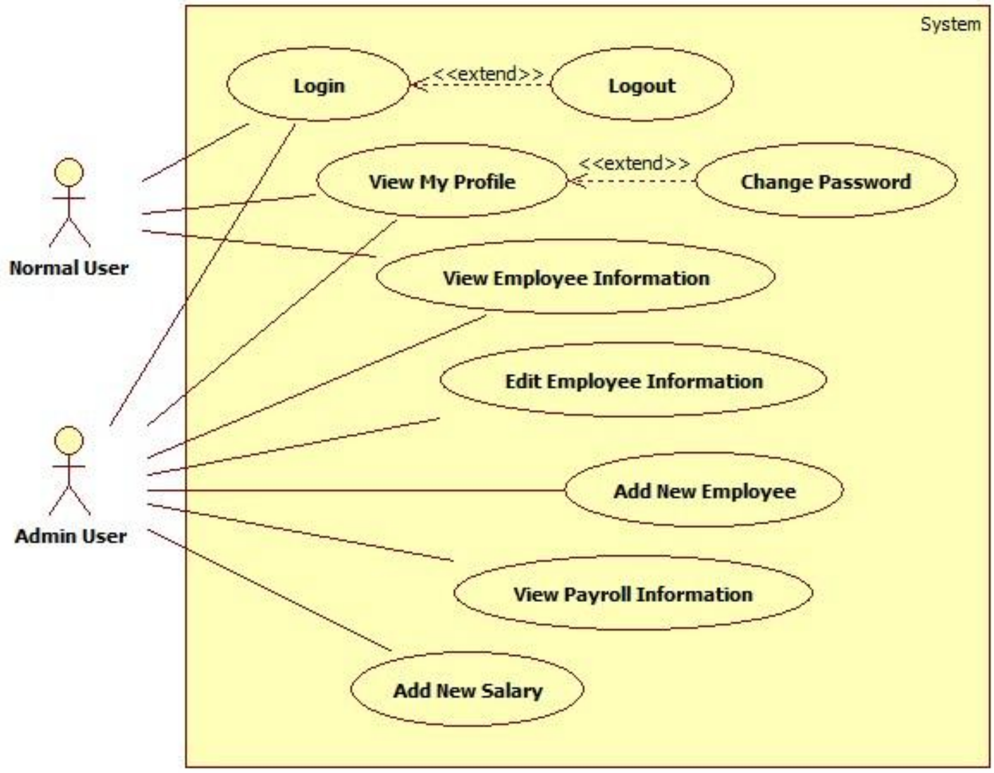


Figure 1 - Use case diagram of the HR management system

1.1. Functional Requirements

Furthermore, the detailed functional requirements of admin user and normal user are specified in Table 1, Table 2 and Table 3.

ID	Requirement	Description
FR1	**Login/Logout**	Both users are able to login to the system, where the logout is optional. Username and password values are mandatory in order to login.
FR2	**View My Profile**	Both users are can view their profile. Employee number, name, title, date of birth, hire date, gender, departments and departments' roles are shown.
FR3	**Change Password**	Both users can change their login password. Old password, new password and re-type password are mandatory in order to successfully change password.

Table 1 - Detailed common functional requirements of both admin and normal user.

ID	Requirement	Description
FR4	**View Employee Information**	Admin can view all employee information such as employee number, name, title, date of birth, hire date, gender, departments and departments' roles.
FR5	**Edit Employee Information**	Admin is able to edit first name, last name, date of birth, hire date, gender, departments and departments' roles of employees. Admin can update the employee photo by uploading a photo. Also first name, last name, date of birth, hire date, gender, departments and departments' roles of employees are mandatory in order to successfully perform edit.
FR6	**Add New Employee**	Admin is able to add new employee to the system. In order to add a new employee, first name, last name, date of birth, hire date, gender, departments and departments' roles are mandatory. Also admin can upload the employee photo.
FR7	**View Payroll Information**	Admin can view payroll information such as from date, to date and salary of employees, where the admin can search a particular employee by employee number.
FR8	**Add New Salary**	Admin is able to add new salary for a particular user for a given time period. Salary, from date and to date is mandatory in order to successfully add new salary.

Table 2 - Detailed functional requirement of admin user

ID	Requirement	Description
FR9	**View Employee Information**	Normal user can view all employee information such as employee number, name and present title, date of birth and gender.

Table 3 - Detailed functional requirement of normal user

Note: In order to change information in my profile page, the normal user needs to contact admin. Also both admin user and normal user can view sensible information such as hire date, departments and departments' roles in my profile page.

1.2. Non-Functional Requirements

Moreover, there are two important non-functional requirements for the application such as,

- It should use a REST API wherever possible.
- AJAX style of communication between browser and server.

2. Mock-Ups

Note: In section 3.1 (UML Class Diagram), Login page and LoginError page is designed as two pages. However as shown in Figure 2, these pages will be combined into one page named Login.

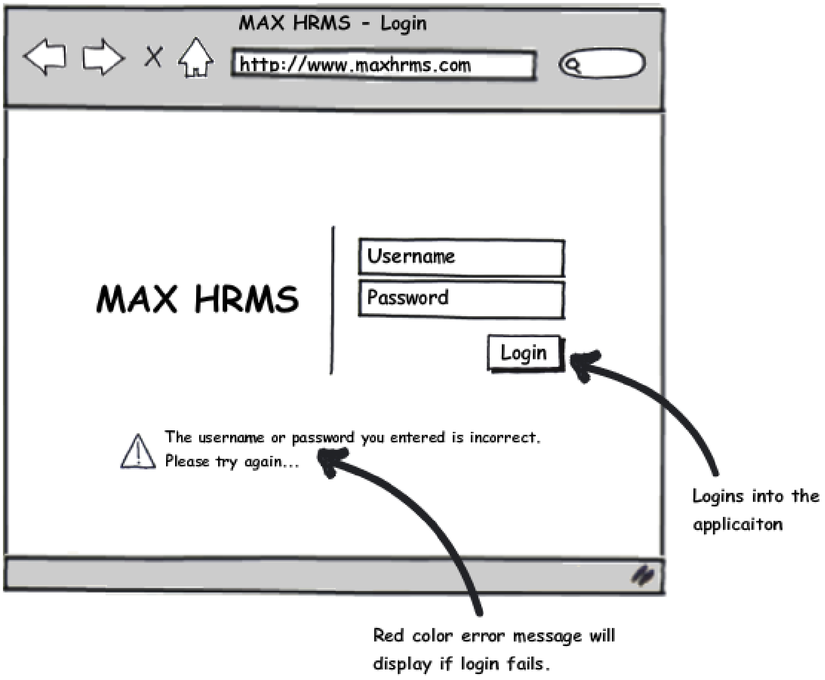
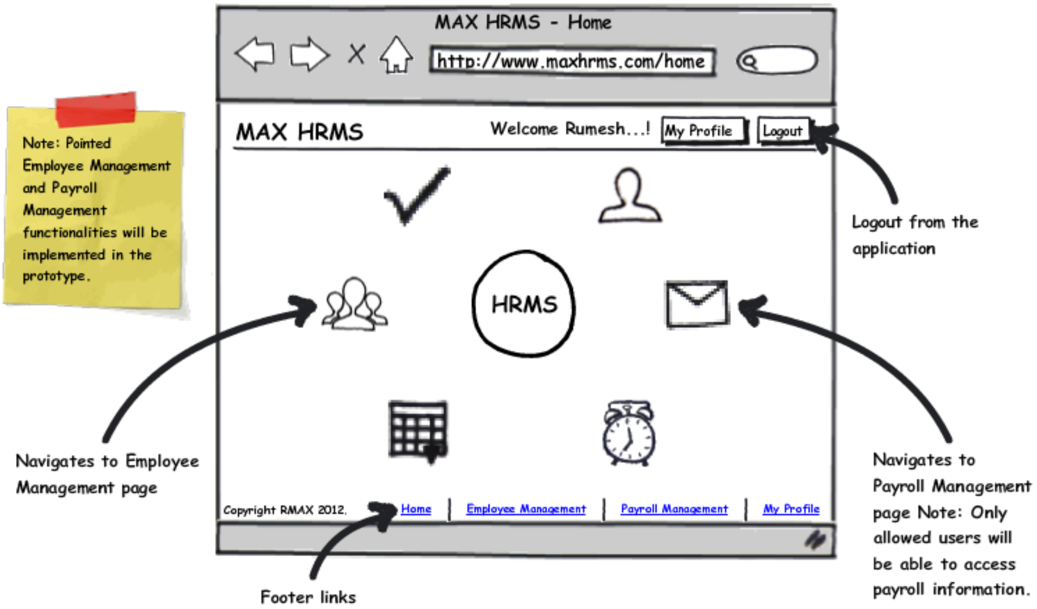

MAX HRMS - Login
http://www.maxhrms.com
MAX HRMS
Username
Password
Login
The username or password you entered is incorrect. Please try again...
Logins into the applicaiton
Red color error message will display if login fails.

Figure 2 - Login page



Note: Pointed Employee Management and Payroll Management functionalities will be implemented in the prototype.

Logout from the application

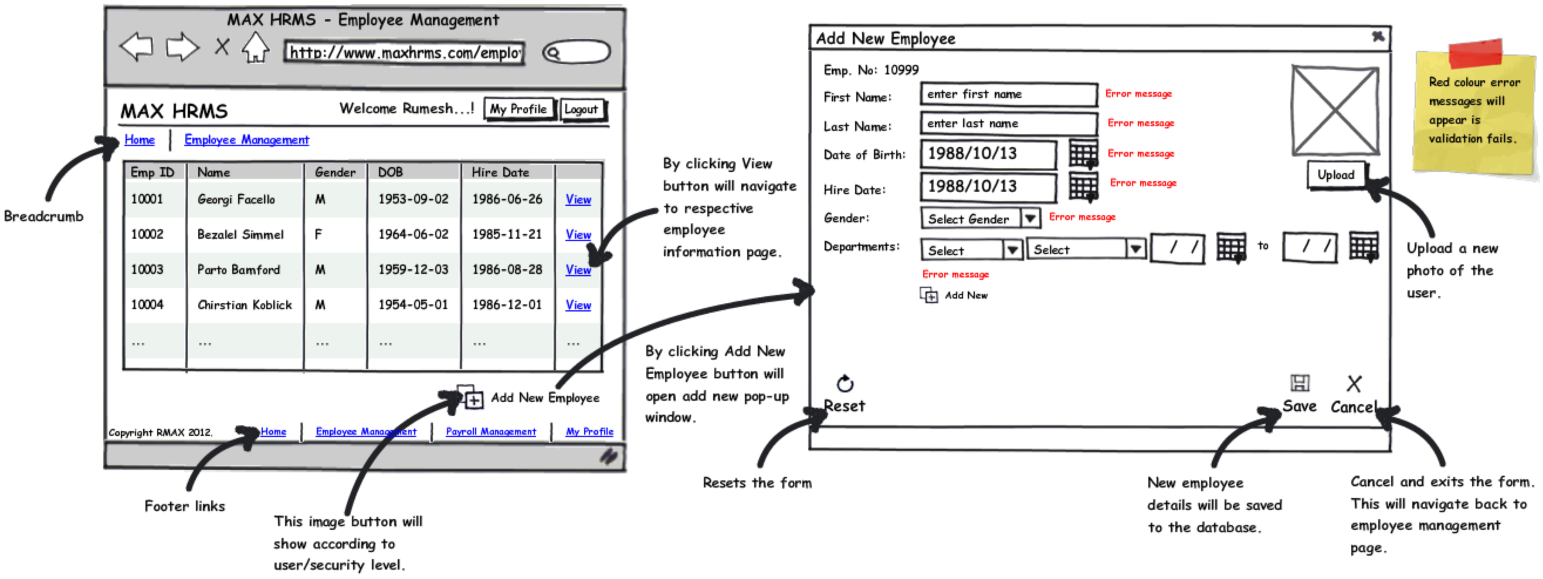
Navigates to Employee Management page

Navigates to Payroll Management page Note: Only allowed users will be able to access payroll information.

Footer links

Figure 3 - Home page

Note: By pressing add new employee button in employee management page, the user can navigate to add new employee page/pop-up window. By pressing cancel in add new employee page, the user can navigate back to employee management page. As well, when adding new user, admin can only add employee information without salary. Through payroll management, admin can add salary to new employee.



Emp ID	Name	Gender	DOB	Hire Date	
10001	Georgi Facello	M	1953-09-02	1986-06-26	View
10002	Bezalel Simmel	F	1964-06-02	1985-11-21	View
10003	Parto Bamford	M	1959-12-03	1986-08-28	View
10004	Chirstian Koblick	M	1954-05-01	1986-12-01	View
...	...	...	...	...	...

Emp. No: 10999

First Name: enter first name Error message

Last Name: enter last name Error message

Date of Birth: 1988/10/13 Error message

Hire Date: 1988/10/13 Error message

Gender: Select Gender Error message

Departments: Select Select / / to / /

Error message

Breadcrumb

By clicking View button will navigate to respective employee information page.

By clicking Add New Employee button will open add new pop-up window.

Red colour error messages will appear is validation fails.

Upload a new photo of the user.

Footer links

This image button will show according to user/security level.

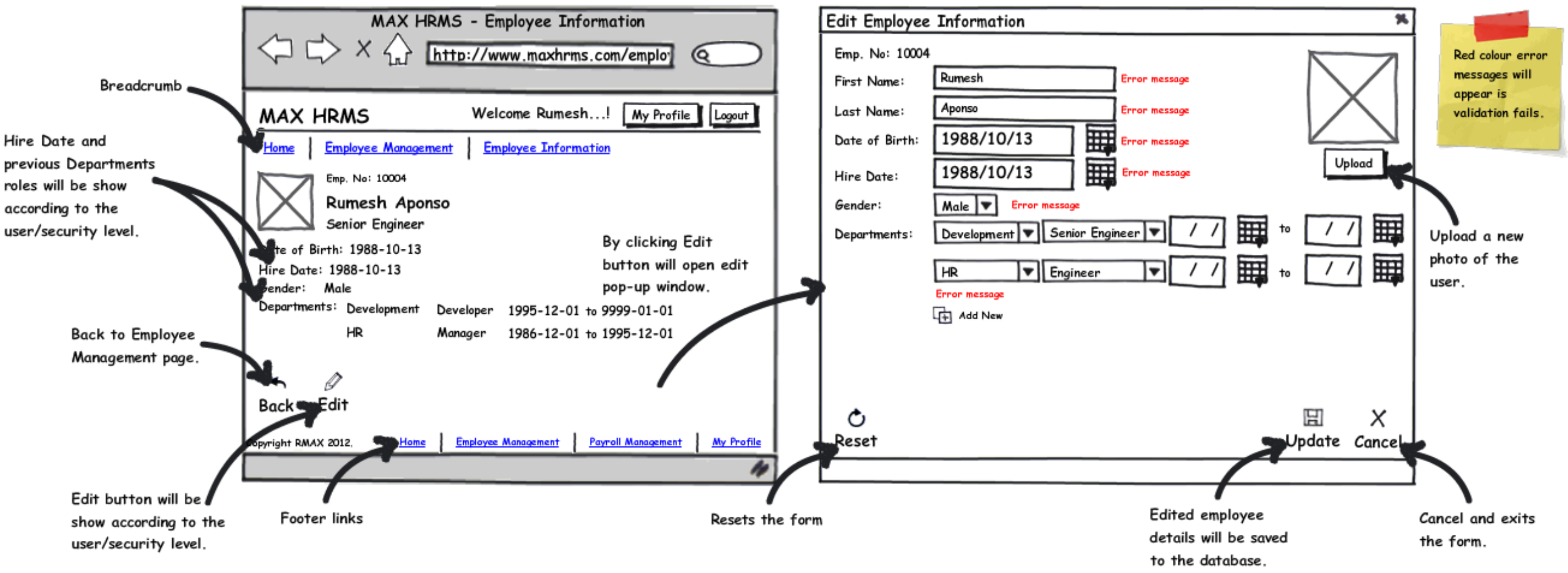
Resets the form

New employee details will be saved to the database.

Cancel and exits the form. This will navigate back to employee management page.

Figure 4 - Employee management home page and add new employee pop-up

Note: By pressing edit button in employee information page, the user can navigate to edit employee information page/pop-up window. By pressing cancel in edit employee information page, the user can navigate back to employee information page.


MAX HRMS - Employee Information
http://www.maxhrms.com/emplo
MAX HRMS
Welcome Rumesh...!
My Profile
Logout
Home | Employee Management | Employee Information
Back
Edit
Copyright RMAX 2012.
Home | Employee Management | Payroll Management | My Profile
Edit Employee Information
Upload
Error message
Add New
Reset
Update
Cancel

Emp. No: 10004
Rumesh Aponso
Senior Engineer
Date of Birth: 1988-10-13
Hire Date: 1988-10-13
Gender: Male

Departments:	Development	Developer	1995-12-01 to 9999-01-01
	HR	Manager	1986-12-01 to 1995-12-01

Emp. No: 10004
First Name: Rumesh
Last Name: Aponso
Date of Birth: 1988/10/13
Hire Date: 1988/10/13
Gender: Male
Departments: Development, Senior Engineer, / / to / /
HR, Engineer, / / to / /

Breadcrumb

Hire Date and previous Departments roles will be show according to the user/security level.

Back to Employee Management page.

Edit button will be show according to the user/security level.

Footer links

By clicking Edit button will open edit pop-up window.

Resets the form

Red colour error messages will appear is validation fails.

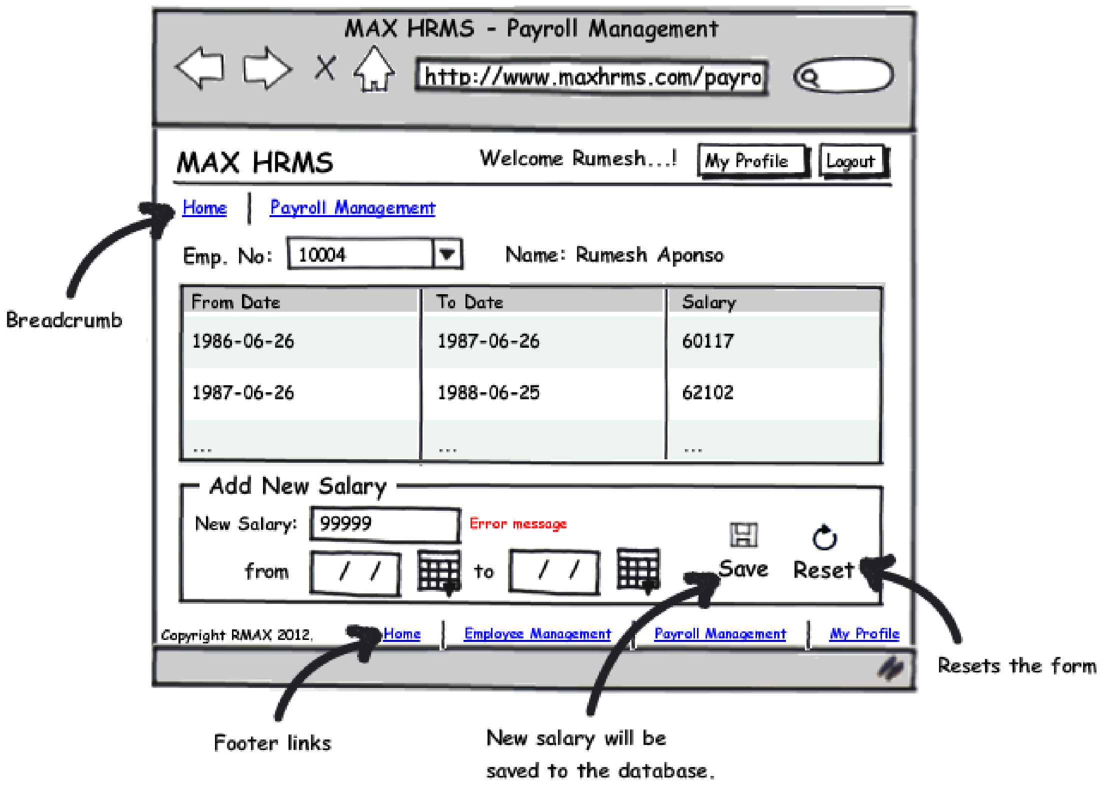
Upload a new photo of the user.

Edited employee details will be saved to the database.

Cancel and exits the form.

Figure 5 - Employee information page and edit employee information pop-up

Note: Only admin can access payroll management page and he can add new salary to a particular employee.


MAX HRMS - Payroll Management
http://www.maxhrms.com/payro
MAX HRMS
Welcome Rumesh...!
My Profile
Logout
Home | Payroll Management
Add New Salary
Error message
Save
Reset
Copyright RMAX 2012.
Home | Employee Management | Payroll Management | My Profile

Emp. No: 10004 Name: Rumesh Aponso

From Date	To Date	Salary
1986-06-26	1987-06-26	60117
1987-06-26	1988-06-25	62102
...	...	...

New Salary: 99999
from / / to / /

Breadcrumb

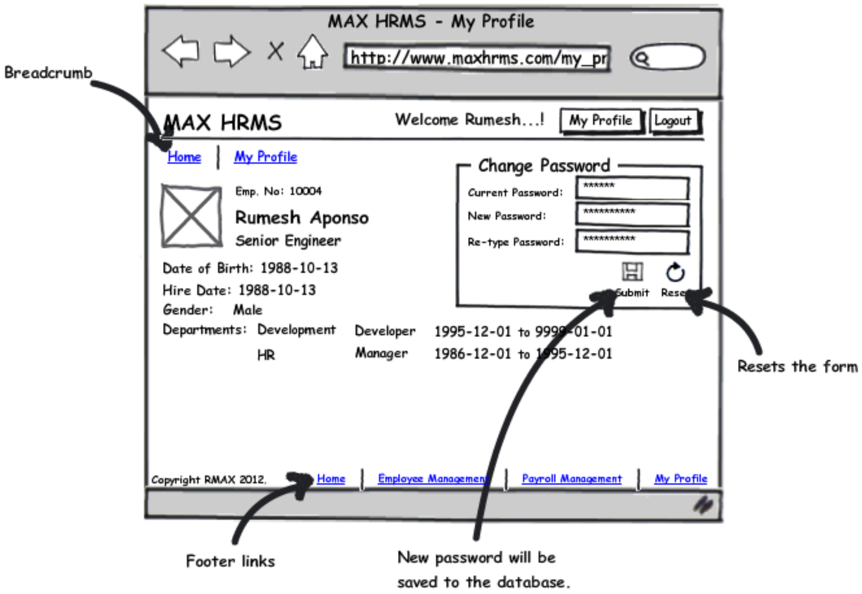
Footer links

New salary will be saved to the database.

Resets the form

Figure 6 - Payroll management home page

Note: My account page is different from employee information page and the user is able to change his/her password.



MAX HRMS - My Profile

http://www.maxhrms.com/my_pr

MAX HRMS

Welcome Rumesh...!

Emp. No: 10004

Rumesh Aponso

Senior Engineer

Date of Birth: 1988-10-13

Hire Date: 1988-10-13

Gender: Male

Departments: Development Developer 1995-12-01 to 9999-01-01

HR Manager 1986-12-01 to 1995-12-01

Change Password

Current Password: ******

New Password: **********

Re-type Password: **********

Submit
Reset
Copyright RMAX 2012.
Home | Employee Management | Payroll Management | My Profile

Breadcrumb

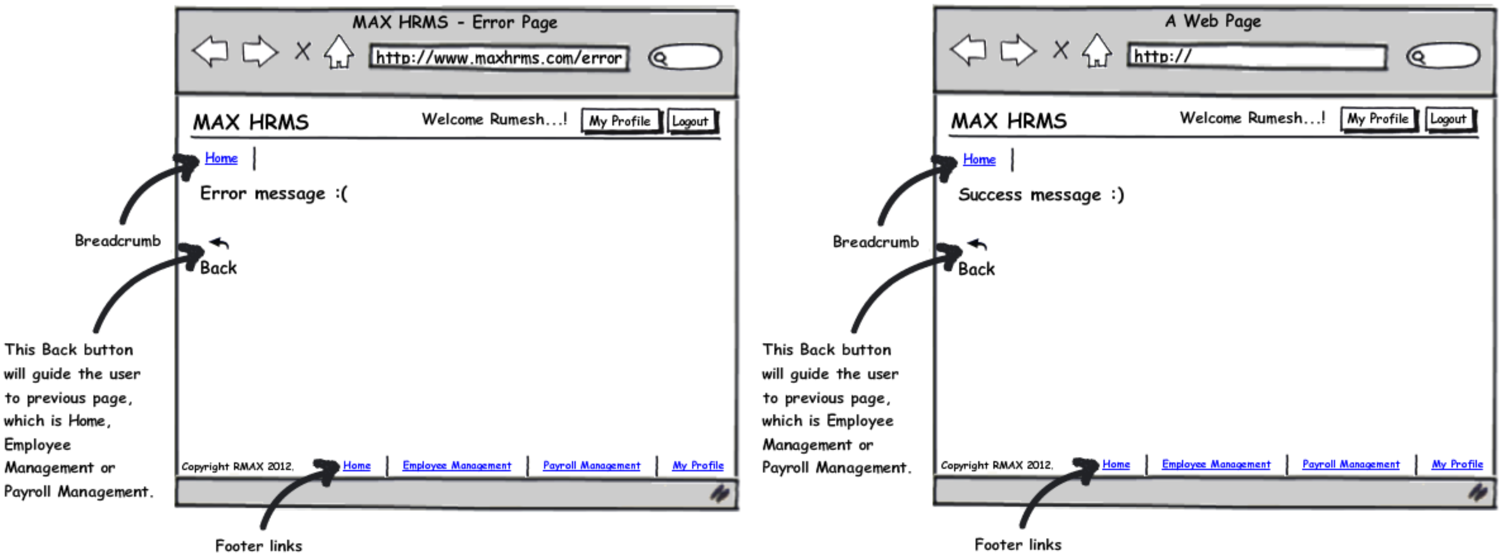
Resets the form

Footer links

New password will be saved to the database.

Figure 7 - My profile page

Note: Success/Error page is common throughout the web application, where the success/error message is subject to change depending on the previous action taken by the user.



MAX HRMS - Error Page

http://www.maxhrms.com/error

MAX HRMS

Welcome Rumesh...!

Error message :(

Back
Copyright RMAX 2012.
Home | Employee Management | Payroll Management | My Profile

Breadcrumb

This Back button will guide the user to previous page, which is Home, Employee Management or Payroll Management.

Footer links

A Web Page

http://

MAX HRMS

Welcome Rumesh...!

Success message :)

Back
Copyright RMAX 2012.
Home | Employee Management | Payroll Management | My Profile

Breadcrumb

This Back button will guide the user to previous page, which is Employee Management or Payroll Management.

Footer links

Figure 8 - Common success page

Apart from the above pages/mock-ups, there are few static pages such as company profile, about, contact us, etc. will be included to the web application. Also jQuery data table will be used in employee management page and payroll management page. As a result the web application will be uses the built-in jQuery data table library features such as search, sorting, pagination etc.

3. MVC Based Web Application Using A UML Class Diagram

3.1. UML Class Diagram

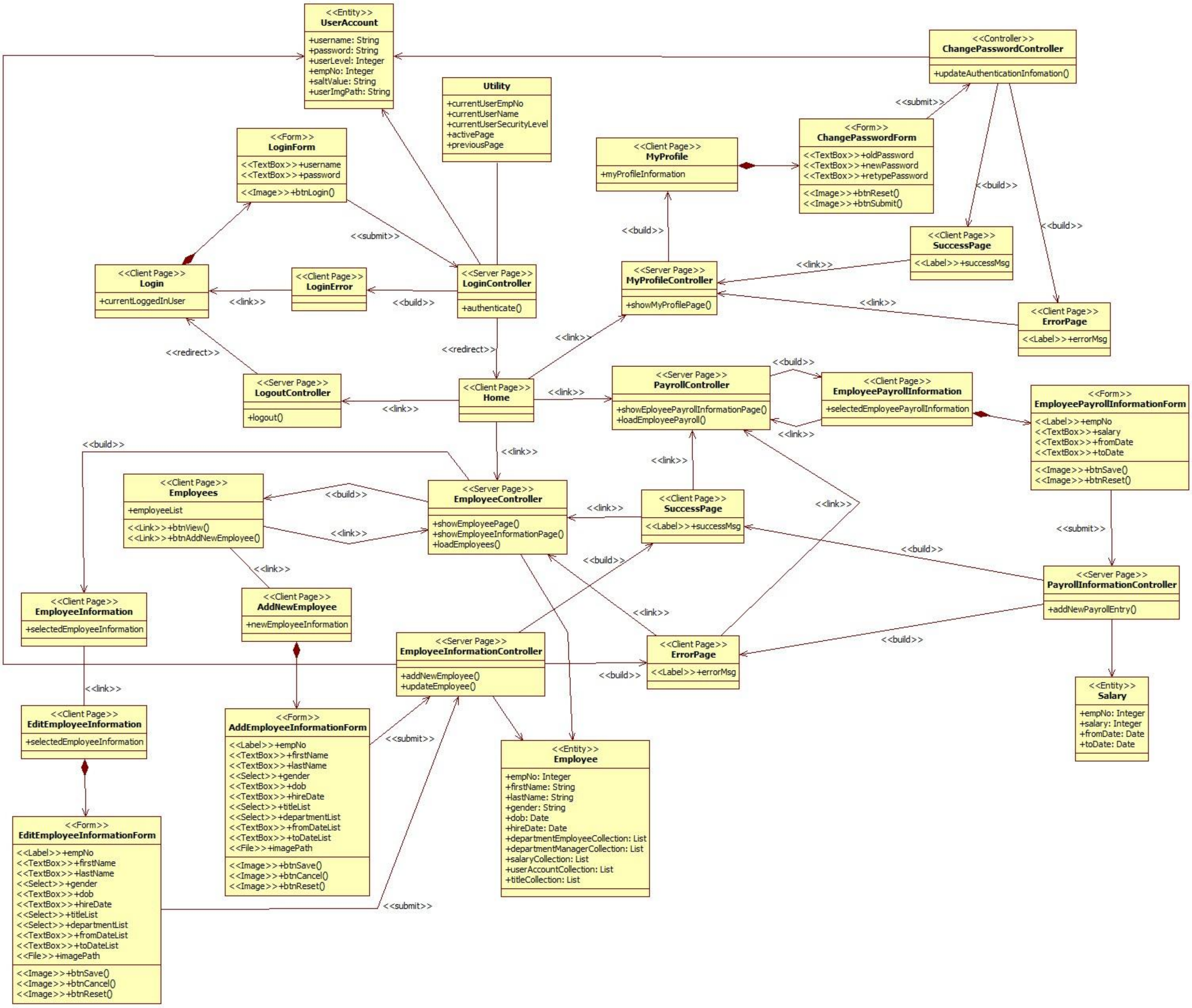


Figure 9 - Detailed class diagram of the HR management system

Notes:

- The above diagram is designed assuming that the user has admin privileges. Thus it shows the entire flow of the HR system. In a case of a normal user, there are some restrictions which should apply when rendering the views. These restrictions will be handled via controllers at the server side.

- SuccessPage and ErrorPage client pages are common throughout the above diagram.
- Utility class will be uses to store the session data of the application.
- In the above design, only the main flows have been considered. Therefore as shown in section 2 (mock-ups), there are alternative ways such as breadcrumb, footer links, back buttons and banner links to navigate throughout the web application.
- EmployeeController, PayrollController and MyProfileController normally associated with an ErrorPage. But in the diagram it considered only the success scenario.
- When adding a new user to the system, a user account for him/her will be created automatically with a default password.
- Search functionality in employee management page and payroll management page comes with the jQuery data table plug-in. As a result the search is not extracted as a form in the design. Furthermore, it will load data in AJAX style, thus a separate search result page is not defined.

3.2. Full Entity-Relationship Diagram

Following diagram shows the full entity-relationship diagram of the HR management system with modifications has been done to support the requirements stated in section 1.1.

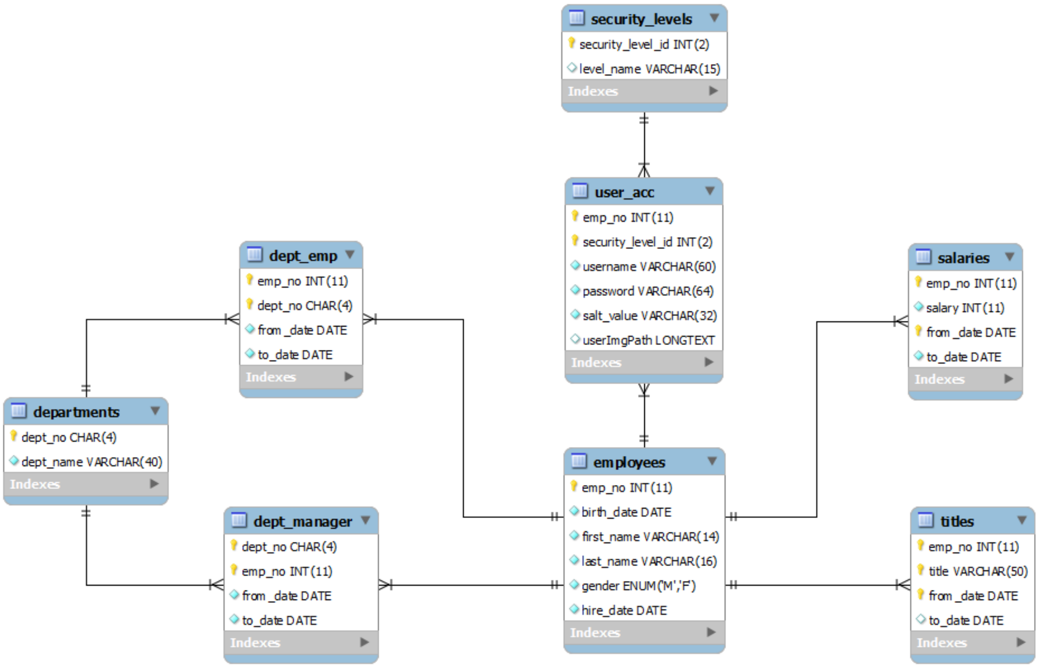


Figure 10 - Full entity-relationship diagram with modifications

4. Design and the Process of User Authentication

4.1. User Authentication Process

As per the discussion above, there are two types of users and as shown in Figure 11, both these users must login at the beginning in order to use the HR management system.

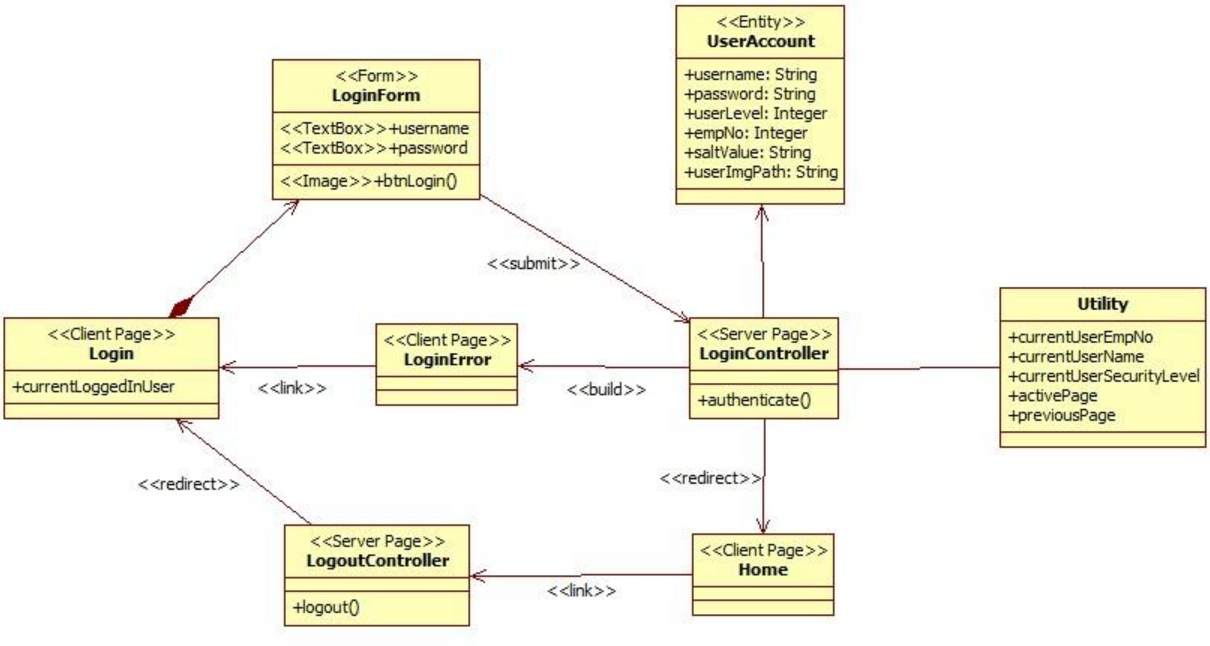


Figure 11 - Class diagram for user authentication

Basic Scenario of the Authentication Process

The user must enter both username and password then should press the login image button. At that time the user will authenticated against the database through the server. If the authentication successful, the user will be redirects to the home page, otherwise the user will be redirects back to the login page with an error message.

Moreover, after a successful login, the user details including security level will be stored in a session, until the user logout. As per the discussion in section 1 (requirements), users can view information and perform actions depending on the security level.

Security Aspect of the Authentication Process

Accordingly, in order to increase the security of the authentication process, the password will be encrypting using a hashing function (SHA-256) with a random salt value in it. Generally this will take place during adding a new user to the system or when a user changes his/her password in my profile page. At that time, the encrypted password and the random salt value will be stored in the database. Similarly when the authentication occurs, the login user's password and the stored salt value will be encrypting using the same hashing function and will be match against the stored password (hash value) of that particular user.

Moreover, in order to enhance the authentication process, SSL certificate and Spring Security might use in the implementation phase if necessary.

4.2. Changes in the Sample Database

Accordingly, to satisfy the mentioned user authentication process, following modifications have been done to the original entity-relationship diagram of the employee sample database, which available at the MySQL website.

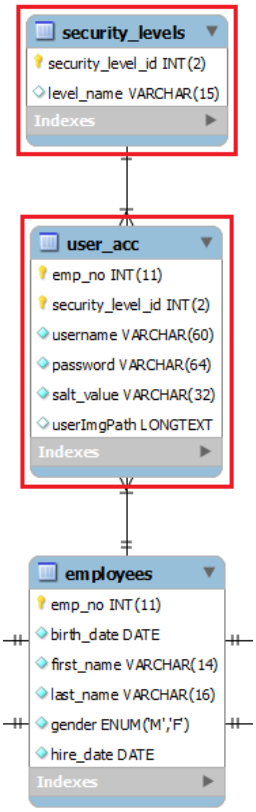


Figure 12 - Original entity-relationship diagram with modifications

As highlighted in Figure 12, user_acc and security_levels tables are added to the original entity-relationship diagram in order to support the user authentication process.

Note: Please see Figure 10 for full entity-relationship diagram.