

# A Hierarchical Tree Based Online Web Portal

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**Abstract** - Information hierarchies are the best way to organize and manage most complex information of an organization. These tree based structures are used to define web site organization in a hierarchy which makes it easy to understand for the users. Now a day, Web applications cover the whole business market and the dynamic nature of web applications not only provide quality to the users but also make it more reliable and flexible.

In this work the hierarchical and modular web based online portal is developed in PHP, HTML5/CSS3 with latest technology paradigms like Bootstrap, Responsive designs, ORMs, Frameworks and MYSQL database which facilitates various services to the users to make this system dynamic in nature. In addition, Administrator of the portal has the full access rights and responsibilities to manage whole system data and modules as well assign roles and privileges to the employees at user level. Users of the portal are placed in the different modules through which they can access the application.

**Keywords:** object oriented paradigms, web application design and development, software engineering.

## I. INTRODUCTION

Modular programming follows a top down design strategy in which a program is divided into various subsections called module. Modules are the basic building blocks which can be easily loaded into the memory and can be reused in other section of code whenever required. Modularity of web design makes the complex system to be manageable for implementation and maintenance [1]. The hierarchical structure can be used to unify the disparate modules and create a super structure for organizing them [1, 2]. The hierarchical representation technique is used to divide the large and complex classes into smaller modules. In this paper, the modular structure of this system not only manages the services of one organization but also facilitate the various services to its all branches or units located on different geographical location [1, 2, 3]. In an organization, loosely coupled forms enable its users to achieve greater flexibility and higher modularity makes the system easy to adapt changes.

## II. OBJECTIVES

The objectives of this paper are as follows:

- To provide feasible and modular system to many companies through which it eliminates the need of paper work.

- To identify the complexity of software in dynamic web engineering in order to improve performance [4].
- To design a GUI-based dynamic web application framework and components [3, 5, 6].
- Access services and store data in the defined format which leads to consistency in the current system.
- To update employee's data without redundancy and collision.

## III. DESIGN ARCHITECTURE & PATTERN

Hierarchical MVC architectural design pattern is used to achieve highly organized modularity [1, 2, 4, 7]. The decomposition of client tiers results into the hierarchy of parent-child MVC layers. The triad can function from one another as well it can request access to another triad by their controllers. This allows the application to be distributed over multiple locations. The main advantage of using HMVC is the layering of triads which reduces the dependencies between the disparate parts of the program and encourages reuse of code and modules [1]. The key benefits of using HMVC reveal the advantages of object orientation which help to improve software quality and reduce development time [1, 7, 8, 9].

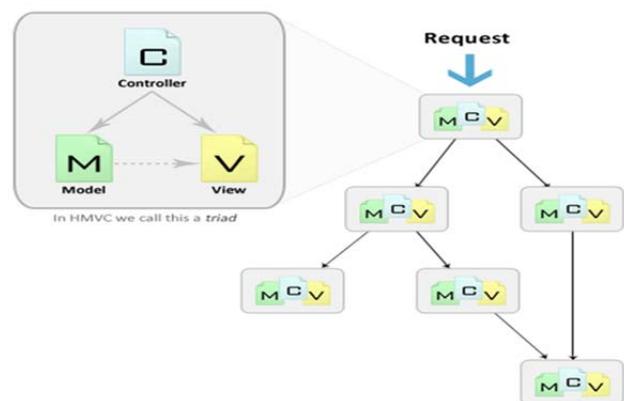


Fig 1: Hierarchical Model View Controller Pattern

HMVC pattern based architecture standardizes the presentation layer of web application. It helps to contribute in user interface consistency, interaction among various sub-components, extensible code and application flow [10, 11].

#### IV. PROPOSED WORK

In this work, A dynamic hierarchical web based intranet portal is designed and implemented in PHP, HTML5, CSS3 and MYSQL database with latest technology paradigms Bootstrap, ORMs Framework and responsive web design which provides an ease to access and switch into the modules within the organization at user level [8, 12, 13, 14]. Administrator assigns various roles and access rights so that users in the portal can interact with other modules by which they belong to.

A typical hierarchy of HR management system is shown in the given company graph where a company is at root level and its head office is at Level 1. Further all leaf nodes are arranged according to their given parent node. All non leaf nodes have no children. All departments of the company can be placed at different geographical location.



Fig 2: Hierarchical Structure of company

#### V. ANALYSIS AND RESULTS

##### A. Adding new employee in the company

While adding a new employee in a company with the following information, an employee is added to the system and a valid username and password is sent to the user via authentication mail. When the user verifies that email, he/she will be able to login with the given credentials.

```
<div class="row error" id="field_employee_id"></div>
<div class="row error" id="field_first_name"></div>
<div class="row" id="field_middle_name"></div>
```

```
<div class="row" id="field_last_name"></div>
<div class="row" id="field_nationality"></div>
<div class="row" id="field_gender"></div>
```

Fig 3: Adding employee in the company

```
<button class="saveBtn btn btn-primary pull-right"><i class="fa fa-save"></i> Save</button>
<button class="cancelBtn btn pull-right" style="margin-right:5px;"><i class="fa fa-times-circle-o"></i> Cancel</button>
```

Fig 4: Adding new employee in the company

##### B. Grant permissions to the employees at user level

After adding an employee, administrator provides access rights and permissions mentioned below in the figure-“admin”, “manager” and “employee”. According to that he/she will be able to enter into the system with the given privileges.

```
<div class="row" id="field_username"></div>
<div class="row" id="field_email"></div>
<div class="row" id="field_employee"></div>
<div class="row" id="field_user_level"></div>
<select type="select-one" class="form-control" id="user_level" name="user_level">
<option value="Admin">Admin</option>
<option value="Employee">Employee</option>
<option value="Manager">Manager</option>
</select>
```

Fig 5: Grant permissions to the employee at user level

If the “admin” user role is assigned to the employee then an administrator of the company is responsible to manage whole system data, user roles and manage modules of the system. In addition, administrator of the company will provide the access rights to the employees at user level “manager” or “employee”.

When administrator of the company assigns the access rights at manager level then he/she will be able to manage a given set of functions provided by the admin. The manager of the company can manage the project milestones and employee’s routine work as well he/she can approve employee’s leave applications working under his/her supervision.

##### C. Admin Dashboard with updated information

User dashboard will be displayed on the home page where a user can look into the updated information about current/pending/submitted projects, leaves, attendance and reports.

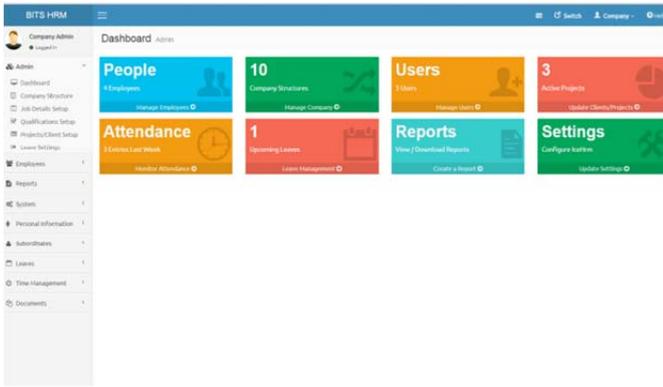


Fig 6: Admin Dashboard

**D. Manage Permissions**

At specific user level, admin provides permissions to the users to perform a set of functions into the system.

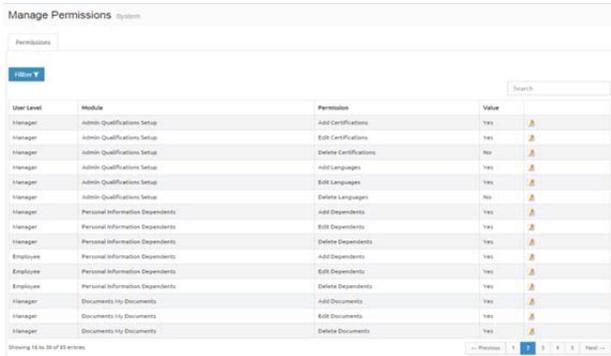


Fig 7: Manage Permissions

**E. Manage Modules**

Modules of the system will be managed by users according to their roles given by administrator.

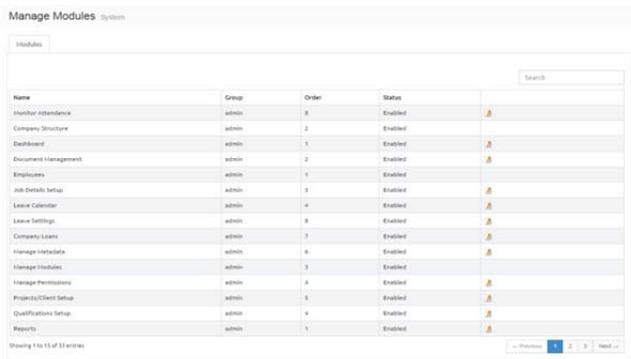


Fig 8: Manage Modules

**F. View/Edit Personal Information**

Users can edit their personal information including job and contact details.

The employee of the company can also track the information about his/her subordinates and supervisor.

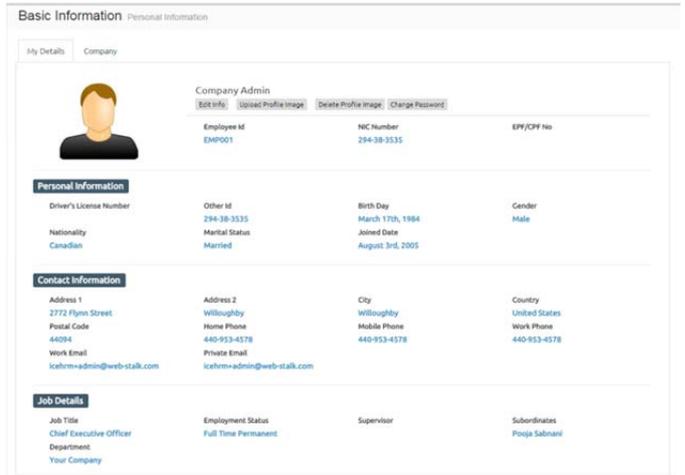


Fig 9: Basic information of an employee

**VI. CONCLUSION**

The conclusion of using hierarchical intranet online portal is to provide an ease and flexible environment to manage whole data about deliverables and milestones at one place in a systematic manner. The hierarchy of system data and information are fully managed in this web based online portal which makes the system highly modularized and dynamic in nature [4, 10, 11, 15].

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