Design and Development of Web-based Employee Payroll Management System using MEAN Stack

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Abstract - Payroll management is the critical and main operations of any company. Every employee in each of the department on various position needs to be paid accordingly. It's always believed that the employees are paid on time with accurate amount, so that the company runs smoothly. In order to do that, the company should have a payroll system which is confined by the company policies. Calculating all those payrolls related takes enormous time and labour and a proper system to maintain all the activities. The payroll system should be error free, efficient and performance based, it should be on time and accurate. The payroll developed with the help of MEAN technologies (MongoDB, Express, AngularJS and Nodejs) provides a better way of error handling and specifying the functions with a unique user-friendly web-based user interface.

*Key Words***:** *MEAN Stack, Payroll, UML, MongoDB, AngularJS.*

1. INTRODUCTION

In any company, there will be many employees belonging to different departments. And each department have payroll process to manage all the payment activities. As the company grows, new employees are hired, and they need to be added in the payroll section. And the complexity increases with the increase count of employees is the company. The payroll system should be capable of meeting the demands of the changing employee numbers and the company's policies regarding the payroll. The existing systems should promise to manage the payroll activities across all the company's departments. The administrator of this payroll section on each department of a company should be always ready to provide the required services like maintaining employee personal details, leave records, salary details with bonus, deductions and allowances, crediting the salary and mailing the details of pay slip to the employee's mail. These activities should be carried out in a manner that, there should not be any room for errors. The time, efficiency and the quality play a major role in the payroll. The company's future lies with it. The employee should be paid on time with confined amount without any delays or error. To make sure all these activities are executed without any interventions, the company should have a smooth-running payroll system with one administrator to look after all the payroll related processes. So that there won't be any confusion or mistakes in the data entered. The data has to be stored and retrieved whenever it's needed so that the payroll activities can be carried out without any interruptions. To pay the salary of a individual employee, the payroll system should consider all the aspects like the position of the employee, leaves taken, bonus for that particular year, allowances and the taxes. Any one of these aspects' calculation goes wrong, the prize to fix the error increases and it might lead in payment delays.

2. LITERATURE SURVEY

The business which has a greater number of employees should have a payroll management system to manage the payroll. Paying employees on time and consistently without delays shows the company's morale and the financial stability of that company. And the payment should adhere with the company's policies and the state laws of that country. Since it's a complex process and needs an efficient management system which helps manage and centralize the payroll system the company.

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The payroll management system is a process of providing the employees with their wages and maintaining employee's financial records that compress of the salaries, leaves, wages, bonuses, employee details, deductions, and net pay. For the purpose of federal requirements, these details must be maintained and kept by the company. In cases like payroll taxes such as Income Tax Withholding Records, Federal Unemployment Tax (FUTA) Records and Social Security (FICA) Records [2].

Payroll management and processing plays a main role in an organization and it is regularly updated in the department human resource management. The organizations pay for the work done by the employees in their fields based on the company policies. Payroll management system helps the companies to accurately, timely, efficiently, and systematically maintain each employees' salaries, leaves, details of working overtime, allowance and deductions. It also helps the companies to follow the government laws and regulations like taxes and the minimum wages or the pays to meet the moral and statutory regulations which helps the employees in the form of provident fund [3].

3. METHODOLOGY

The proposed methodology will use the MEAN stack to develop the payroll application and the application provides six main functionalities, namely, the Administrator Login, Home Page, Employee, Salary, Expenses and Mailing.

1.Administrator Login is the one where Only authorized/registered person called as Administrator or a manager can login and only, he can update or manage the application.

2.Home Page contains different options like Manage-Employee details, Salary and Leave, AboutUs, FAQ and Terms which will be the face of the application. From this the Administrator can navigate to the remaining pages of the application.

3.Employee contains the information of the Employees which gives away the details about the salary, personal details, leaves and the position on the company with a reference to the Salary code, Leave code and Job code for each of the employee with the help of drop down menus for better user experience.

4.Salary contains Information of individual Employee which will take care of the salaries according to the leaves and the position of the employee in the company. Then the salary is updated against each employee with the help of salary code specified based on the position of the employee. It also provides an option to mail the salary details to the employee.

5.Expenses contains the job code, Salary code and Leave code on the basic of the position of the employee and the allowed leaves for the employee. These codes will help in identifying the employees' position, allowed leaves and salary for that employee.

6. The pay slip is mailed to individual employee's mail Id where the brief detail of the salary can be seen. With the help of salary code and job code the pay slip can be generated for each of the employee.

MongoDB will be the backend and helps in storing and retrieving the payroll details. The API calls are received with the help of Express and the Angular provides a front-end user interface.

4. UML-BASED PAYROLL PROCESSING SYSTEM

Unified Modeling diagram (UML) is a diagrammatic approach for visual representation of any system with the help of actors, states, classes, actions. It can also be called as the building block for all type of implementation. This helps to understand the system in a better way where it can be used to maintain, alter and store the information of the system. UML has various types of diagrams to explain the system in a better understandable way. To explain the payroll system, Class and Use case diagrams are used.

Fig-1 shows Class Diagram of the Application which depicts the structure of the system by showing the attributes involved in all the Classes. The top container contains the name of the Class like Administrator, Employee, pay slip, salary and Leave, the middle container contains the attributes and the last container contains the functions related to that class.
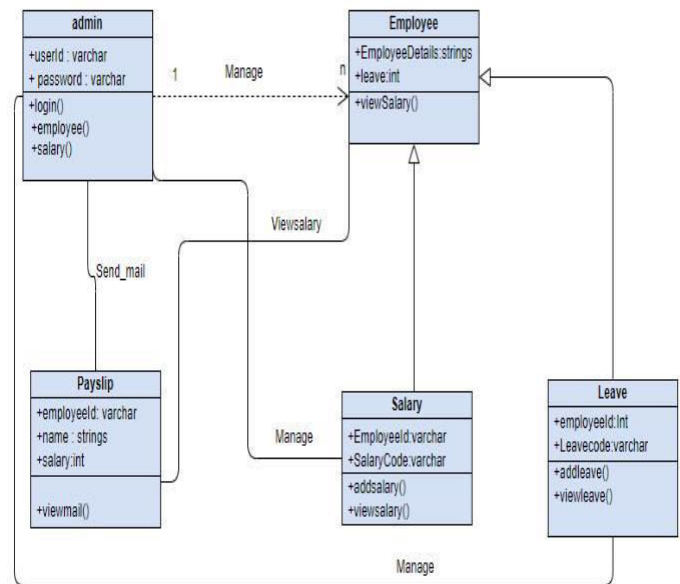

Fig -1: Class Diagram for Payroll Processing

Fig-2 shows Use case Diagram of the Application which is depicting how user and different component interact with the system. It represents the relationship between the user and the different use cases in which the user is involved. The Actors Employee and the Administrator has the use cases like login, manage employee details, manage payroll, manage salary, leave and mailing of the salary slips.
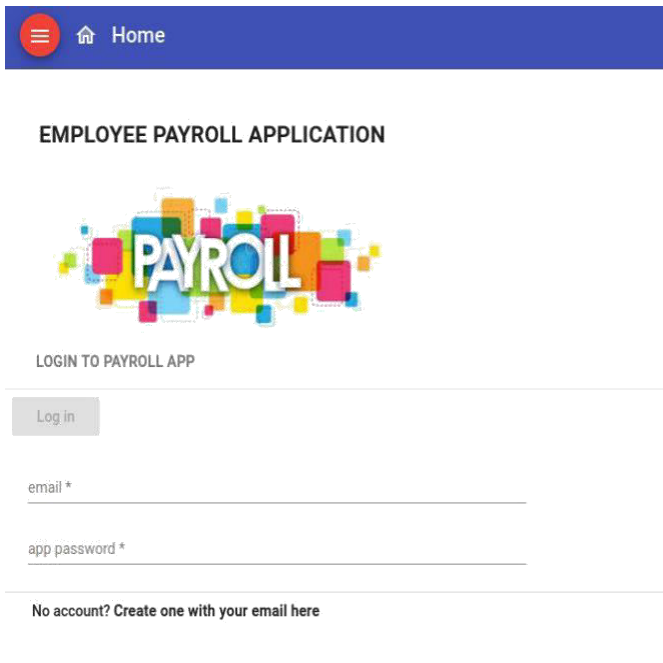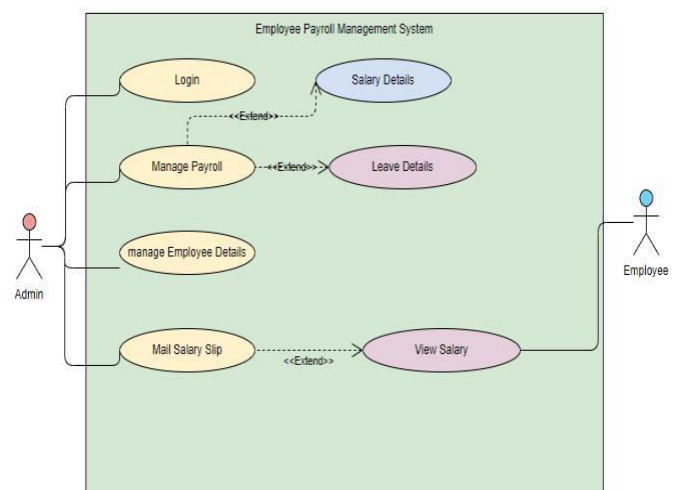

Fig -2: Use Case Diagram for Payroll Processing

5. RESULT OF PROPOSED SYSTEM

The application and the data can be modified or managed by authentic person or manger called Administrator. One who has the proper credentials to login into the application. Once the Administrator login into the application he can update the employee details and remove the employees and manage the payroll activities. As shown in Fig-3, the Administrator login into the application with proper credentials.
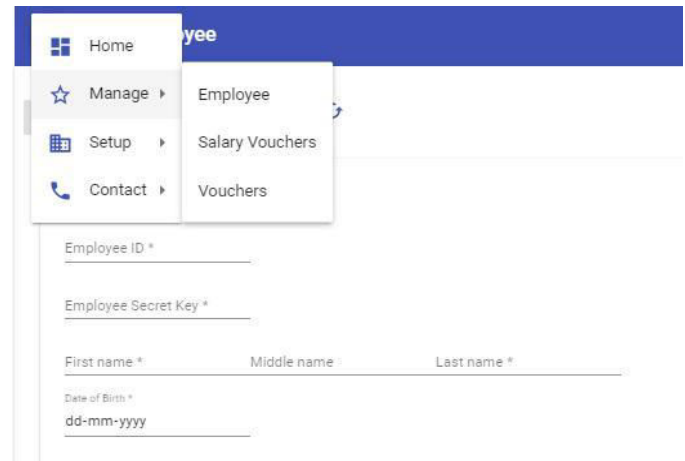
Fig -3: Screenshot of implemented Administrator page

Employee page allows the administrator to enter all the required details of each employee. Personal data, Address, Qualification drop downs consists of basic information of the employee and the HR drop down allows to enter the job code, leave code and salary code for each employee as shown in the Fig-4.
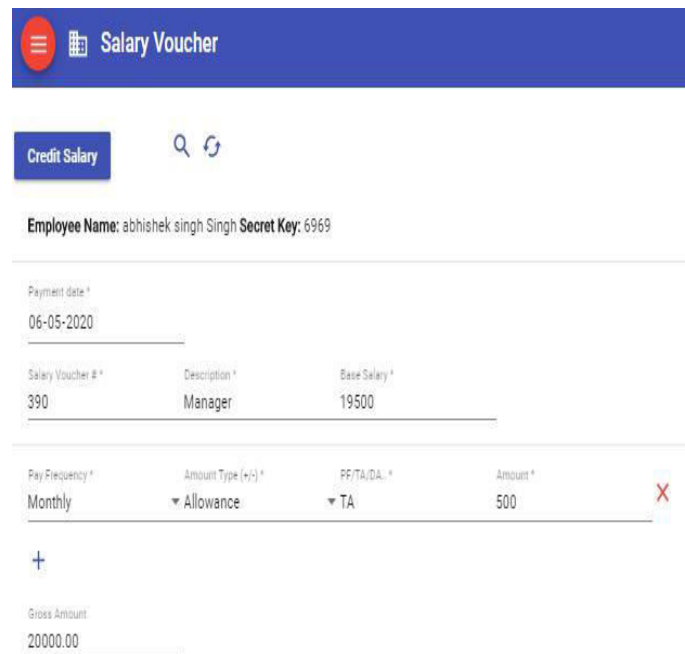

Fig -4: Screenshot of implemented Employee Detail page

The various other options can be seen in the Fig-5 where the employee details, Salary details, leave code, Salary code and Job code setup options can be seen along with the contact page navigation option. The Manage page will provide drop down menus to enter details of the employee and the salary. The Setup page will help in defining the leave, salary and job codes for the employees on various position.


Fig -5: Screenshot of all other options for adding employee details, Salary and to setup Leave, Salary and Job codes.

Salary page allows the administrator to add the salary according to the employee job code as shown in the Fig-6. Employee job code will provide the information of the employee position and how much salary is fixed for that position. The allowance and the deduction are made accordingly based on the occurrences. Then the total amount will be calculated, and the same details will be used to display for the employee through pay slip.

Fig -6: Screenshot of implemented Salary Page

Each employee receives a mail with the pay slip attached to it. Once the salary is determined to the employee, the application provides an option to credit it to the employee's bank account and the pay slip will be mailed to the employee's mail as shown in the Fig-7.
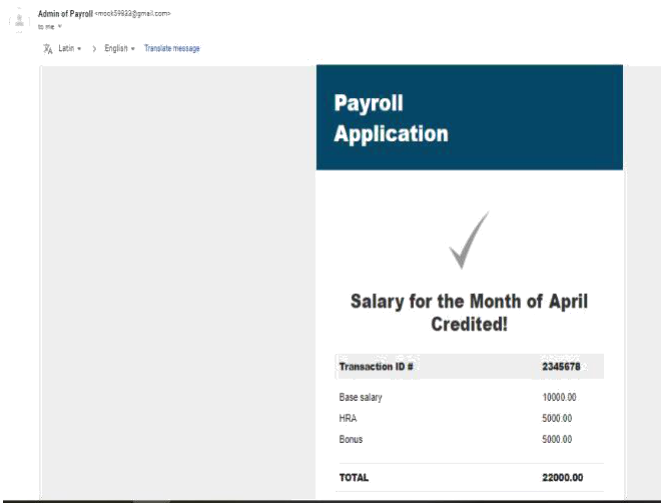
Fig -7: Screenshot of implemented Pay slip sent to Employee's Mail.

6. CONCLUSION

"Employee Payroll Management System" implemented will help in managing the organization 's business and the pay slip for the employees is efficiently improved. The error free process is implemented. Because the application contains a single user the probabilities of errors and confusion is a smaller amount. and therefore, the application reduces the time to manage the payroll method of the whole staff of the actual organization. And the payroll application developed will replaces the manual payroll method that consists of record keeping and manual calculations.

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