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A Web Based Employee Management System

Sanuji Nanayakkara[1], Uditha Ekanayake[2], Gayesha Subasinghe[3], Chamuditha Jayasena[4], D. I. De Silva[5] and Dulanji Cooray[6]
[1]Department of Software Engineering, Sri Lanka Institute of Information Technology, SRI LANKA
[2]Department of Software Engineering, Sri Lanka Institute of Information Technology, SRI LANKA
[3]Department of Software Engineering, Sri Lanka Institute of Information Technology, SRI LANKA
[4]Department of Software Engineering, Sri Lanka Institute of Information Technology, SRI LANKA
[5]Department of Software Engineering, Sri Lanka Institute of Information Technology, SRI LANKA
[6]Department of Software Engineering, Sri Lanka Institute of Information Technology, SRI LANKA

[2]Corresponding Author: it20243258@my.sliit.lk

ABSTRACT

Employees are the backbone of any company. Often employee data such as personal details of employees, salary, leaves, and work allocations are managed using manual methods. These manual methods generate a lot of paperwork and make it complex to effectively manage the tasks. Most of the computerized systems proposed for employee management mainly focuses only on attendance management, leave management and salary management. This paper proposes a web-based Employee Management System solution to address the difficulties faced. The system will address the shortcomings of the existing systems and provide functions to manage employee data effectively. It will use trending technologies such as React JS, Node JS, Express JS, and MongoDB as the database which are faster and more user friendly compared to the technologies proposed in the literature. The system will use the concepts of distributed systems, client server architecture and show features of 3-tier architecture. The paper concludes that the proposed system addresses the shortcomings of the similar systems proposed in the literature but should be further improved by studying the subject area. Further research should be done to provide more features related to managing employee data and to provide a responsive design that can be accessed through mobile devices as well.

***Keywords*—** Employee Management System, Web Based System, Employee Management

I. INTRODUCTION

Since employees are thought of as the foundation of a company, managing them effectively is essential to the success of the enterprise**.** It is often necessary to deploy technology that efficiently addresses time constraints and management challenges to fully utilize a company's most important asset, its people resources. The employer may easily and effectively keep track of all the records thanks to an employee management system. This employee management system is anticipated to be user-friendly, provide simple data access, and allow the employees to generate and save their records.

Proposed employee management system consists of user management, salary management, assert management, attendance management, announcement management, task management, and submissions management functions. In employee management systems done by others, many of them used old technologies for their systems. A system proposed by Engr. Mosud Y. Olumoye Olumoye [1] uses C# and MySQL as their technologies for a staff management system. In proposed system, it's planning to use MERN stack as technology. And planning to use MongoDB as the database.

Many employee management systems [2] only focus on user management, attendance management and salary management only. But in proposed system, it focuses on every aspect on employee management system. Employees who are working remotely are a very common in this 21st century. Therefor remote workers also can work easily with this proposed system.

In this research, next section highlights the literature review. It'll describe about the work done by others to solve problems on an employee management system and how it relates to employee management system that have been proposed. Next section after the related work section, it highlights the methodology. First, it mentions about the tools and technologies the system planning to use to implement the employee management system. Flow charts ease to understand the techniques and approaches system planning to use, in this section. In next section, proposed system explains in a very descriptive manner including their images as figures. Main functions and features of the proposed employee management system will explain in that section.

After the proposed system section, it's discussion section. It discusses the key findings, expected results, and testing methods that can be used to test the proposed system. Non-textual elements such as tables, figures, charts, images help to understand the findings and expected results in a better way. After the discussion section, this research includes the conclusion section. It summarizes the main functions of the proposed employee

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management system and prove that developed system is valuable.

II. LITERATURE REVIEW

Plenty of research about systems that address the problem of managing employee data efficiently using a computer based system exist in the literature. Most of them focus on attendance and leave management, but they lack some important features such as managing assets assigned to employees and tracking the work progress of employees.

A web based Employee Management System developed for Keymans Malaysia Sdn Bhd [3] considers employees attendance, leaves and salary related details. PHP, Xampp and MySQL has been used for the development. Prototyping model have been used as the methodology as many of the features are often misunderstood.

A Web Based Employee Management System proposed by BUET [4] also proposes features such as leave management and task notification. PHP, MySQL and HTML has been proposed as the tools for development. Different kinds of report generation have also been considered for this system. A modular architecture has been proposed.

Another system proposed [2] focuses on leave management in depth and little on other aspects of Employee Management. CSS, HTML, MySQL, and PHP technologies are used to develop the system.

Another Employee Management System proposed [5] use HTML, CSS and PHP as technologies and proposed to develop features such as employee profiles and, leave and task management.

A system proposed by Gloria, Padua B. [6] proposes features such as getting a list of employees, their tasks, and the working times. It also proposes that the system should have easy access to employee details such as employee ID, name, and address.

Most of the [2] [3] [4] [5] [6] research in the literature focuses on attendance and leave management and focuses little on the other aspects of employee management such as tracking work progress, tracking company assets assigned to employees, broadcasting information to employees and salary management.

Most of the systems in the literature proposes to use old technologies such as PHP and MySQL instead of trending technologies such as React JS, Angular JS, Express JS, and Node JS. Instead of using distributed databases such as MongoDB it is proposed to use MySQL.

III. METHODOLOGY

This paper discusses the proposal to develop an Employment Management System, and to develop the proposed system, developers could use the MERN stack. React JS for the front-end development and Node JS with Express JS could be used to develop the system's backend. With all of that, MongoDB could use as the database of the system. React JS is most suitable for this proposed system as it uses Document Object Model to deal with the user and with that, the entire system can work faster than most web applications and React JS have a wide JavaScript library. With reusable components, developers can easily develop and avoid re-inventing the wheel again and again. React JS is introduced by Facebook and with their introduction, they built it SEO-friendly across the search engines. With those features, it is also easy to code, has a variety of UI-focused designs, and React JS supports cross-platform use. Hence proposed system could use React JS for the frontend.

Express JS is the best platform to apply at the backend of the proposed system as several platforms cannot handle the higher levels of requests, but the Express JS system can work faster and perfectly synchronize with the frontend without any latency between the user and the server. Express JS has a vast community to help and support when it comes to issues. Express JS can easily integrate with other third-party applications and services. Data is the most essential part of the proposed system. MongoDB is suitable as a database with higher speed, flexibility, and scalability. MongoDB can handle a large amount of data without any interruptions.

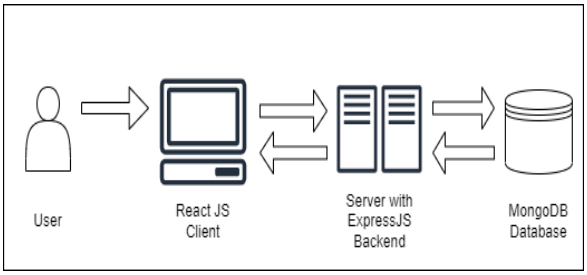

Figure 1: Architecture of the System

To show data to the user, the first frontend needs to fetch data from the database. To do that, the frontend should request data from the backend APIs as shown in the Figure 1, and the backend will fetch data from the database. After that, the backend will return data to the frontend, and the front-end will show data to the user with user-friendly components that the user can interact with easily.

With this approach the system developed will be distributed and scalable. Users will be able to access the system from anywhere. With MongoDB the system will be scalable as the number of users grow.

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In the backend of the proposed system there are different APIs associated with each function as shown in the Figure 2. When a request for a certain function is received from the frontend the backend fetches data from the MongoDB database and forwards the requested data to the frontend as a response.

The system shows the features of the 3-tier architecture. It is expected to run fast with the use of the Express JS backend and provide a user-friendly experience with the use of React JS.

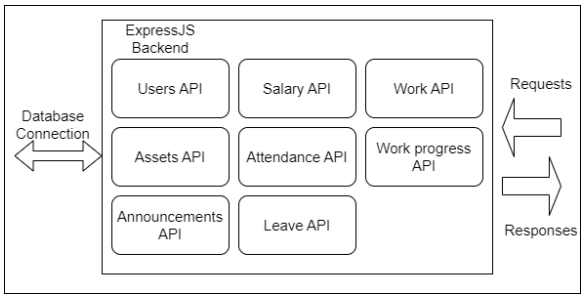

Figure 2: Backend Functionality

IV. PROPOSED SYSTEM

A. User Handling and Attendance

In the proposed system, there's a user management function. Admin can add users, edit users, change user role, and remove users. For the process of editing users, admin can search username of users. Then they can edit user details as shown in the Figure 3.

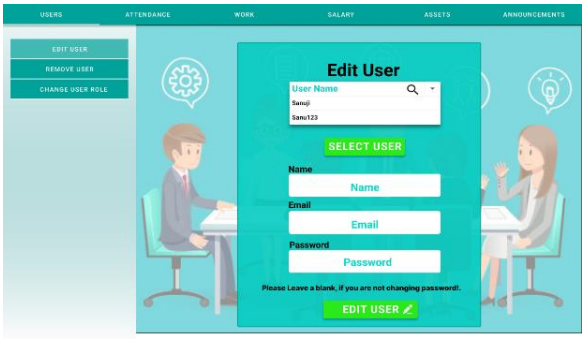

Figure 3: Edit User Interface

Admin can change user role same as edit user feature as shown in the Figure 4.

Figure 4: Change User Role Interface

Admin can remove users by searching their usernames as shown in the Figure 5.

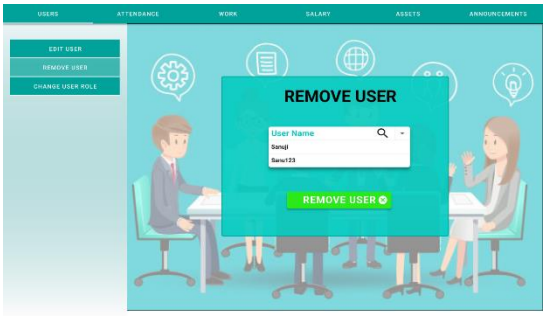

Figure 5: Remove User Interface

In the proposed system, attendance management is a high priority function. Both admin and employee can mark their attendance and leave from this system as shown in the Figures 6 and 7. Marked time will record to the system and display.

Figure 6: Mark Attendance Interface

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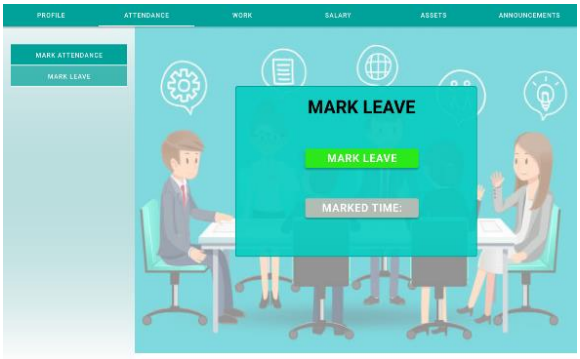

Figure 7: Mark Leave Interface

Admin could view the attendance report, search attendance details, and download attendance report as a PDF as shown in Figure 8.

Figure 8: Search Attendance Details Interface

Admin could view the leave report, search leave details, and download the leave report as a PDF (Figure 9) same as the attendance process.

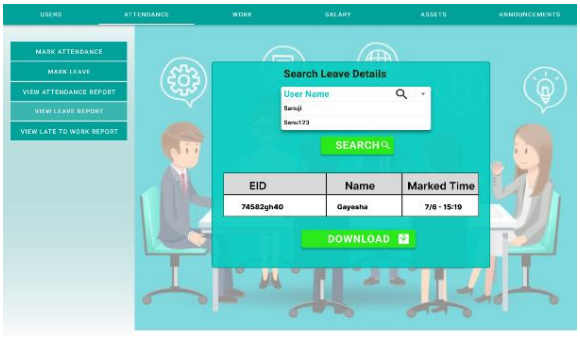

Figure 9: Search Leave Details Interface

Also, admin could view late to work report as shown in the Figure 10.

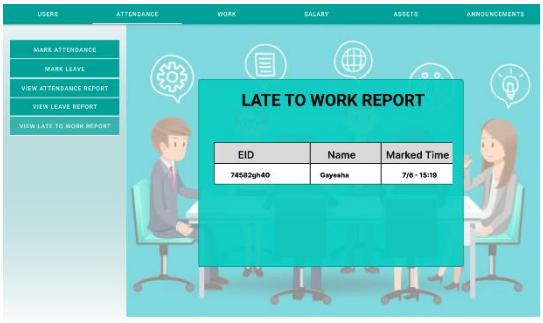

Figure 10: View Late to Work Report Interface

B. Assets

The proposed system will have the Asset Management feature which will cover the functions related to managing the employees and company assets assigned to them. This feature will provide the admins the ability to add company assets to the system and assign them to different employees. It helps to keep track of the company assets and who they are assigned to, and their status. It will also provide all the operations on added asset items such as adding, removing, editing, and searching through the items to the admins as shown in Figures 11,12 and 13.

Employees will have the ability to view the assets assigned to them and change the status of the assets so that admins can view them. Further the system will have report generation options to generate a detailed report of the assets in the system as shown in the figure 13. This report will be available to download as a PDF file.

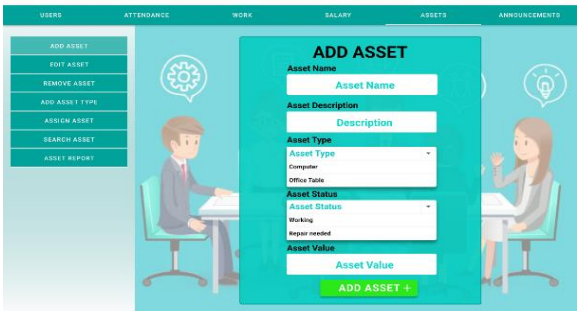

Figure 11: Add Asset Interface

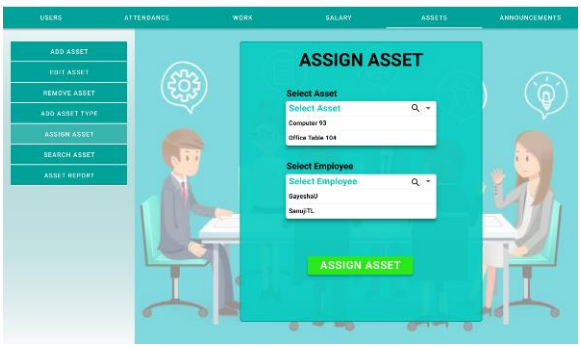

Figure 12: Assign Asset Interface

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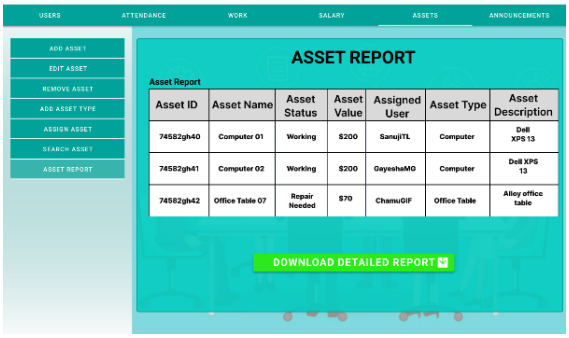

Figure 13: Asset Report Interface

As shown in the figure 14 and 15 the employees can view their assets and change the status in the system so that it is visible to the admins.

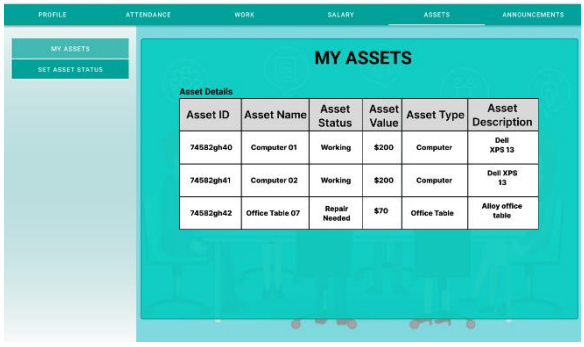

Figure 14: My Asset Interface

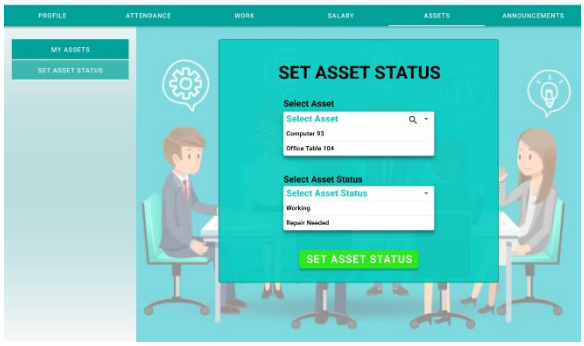

Figure 15: Set Asset Status Interface

Only the administrator here can generate salaries for all the system's employees. Admin can also generate holiday bonuses and regular bonuses for everyone at once. Every employee has access to a concise breakdown of their base pay, bonuses, and additional benefits when they are added to their profiles. figure 18.

C. Announcements and Salary

Add announcements, update (edit), and obtain information using search results are all functions that are available. Additionally, it has a method for creating reports that may be saved as PDF files.

This type of database transaction is broken into two groups: Saving a new announcement's records under selected department and adding a record to an announcement's data records. figure 16.

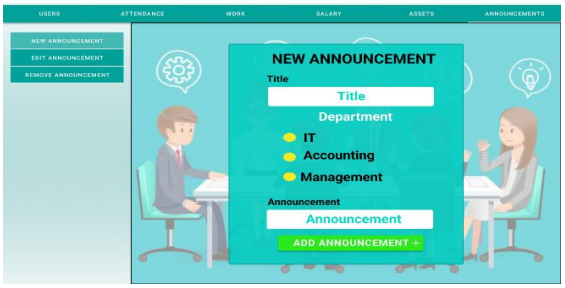

Figure 16: New Announcement Interface

User logged in as an employee, User can see All Departments Announcements and Full report for it. User can search relevant department from according to the relevant selected department then User can get report each relevant department announcement details separately. figure 17.

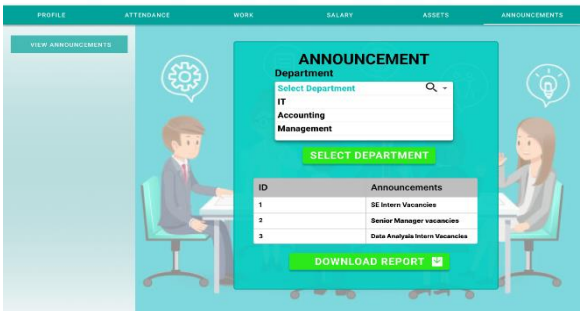

Figure 17: Announcement Interface

Only the admin has this privilege in the system to Update and delete each department announcement.

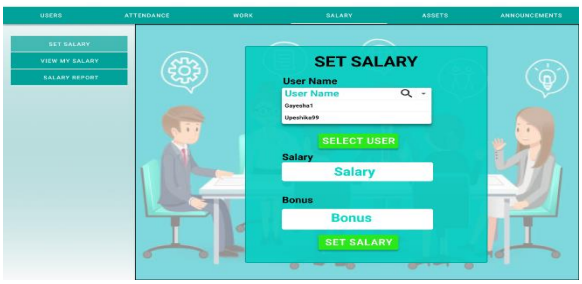

Figure 18: Set Salary Interface

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The administrator wants to get the employee salary details of a required employee; the administrator can search that employee for get relevant employee's salary details. Admin can download salary report. It will be downloaded as a PDF format. figure 19.

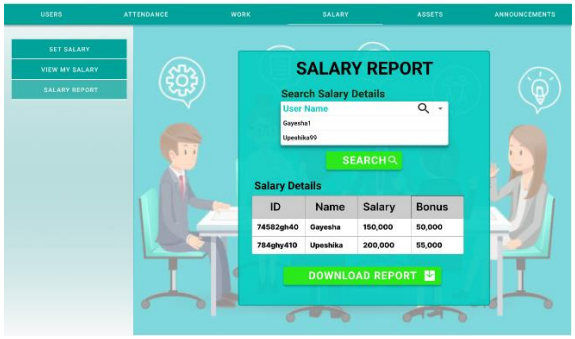

Figure 19: Salary Report Interface

User login as Employee, it will display the salary, bonus and total according to that relevant employee. figure 20.

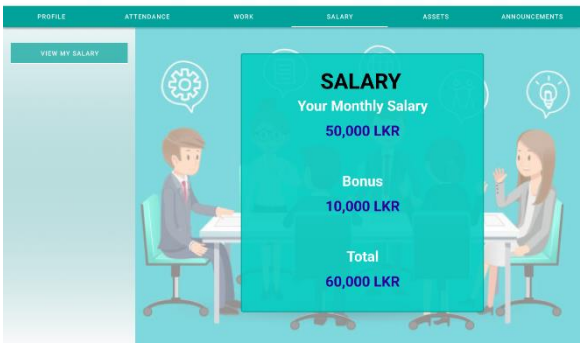

Figure 20: Salary Interface

D. Work and Progress

The proposed system will have the work management system feature which includes related to the employee's and manager's task management functions. These functions will provide the admin to add (Figure 21), edit, and remove tasks from the system and it will help to keep track of every task in one place and manage every employee with a single action. Also, Admin can rate the task as an employee evaluation as shown in figure 23. With feedback, the admin can make a list of top employees in the system and assign tasks to them. Admins can also view the progress as report as shown in the Figure 22.

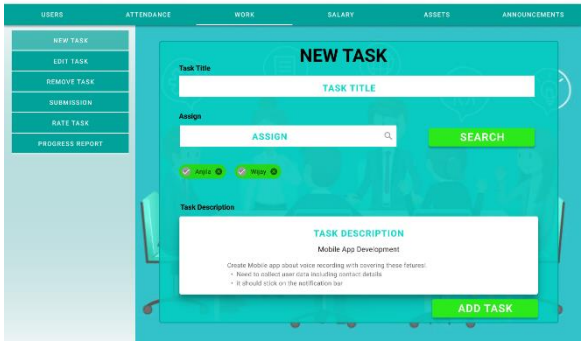

Figure 21: New Task Interface

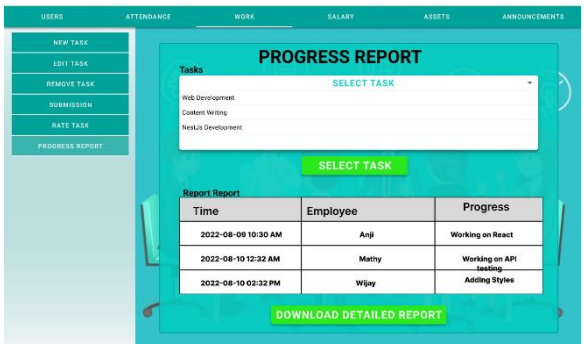

Figure 22: Progress Report Interface

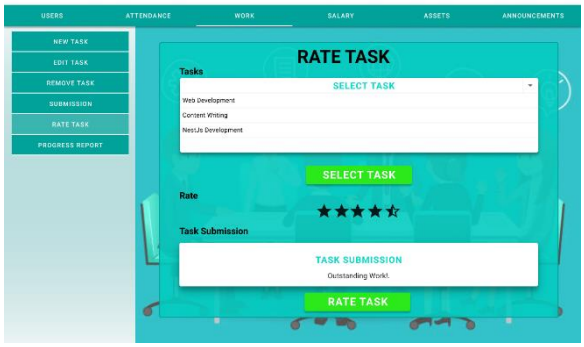

Figure 23: Rate Task Interface

The employee will have the ability to view the assigned task and they can submit their progress via submitting progress function shown in Figure 24. Further, the employee can submit their final delivery to the admin, and employees can improve their skill through the rating system as shown in Figure 25.

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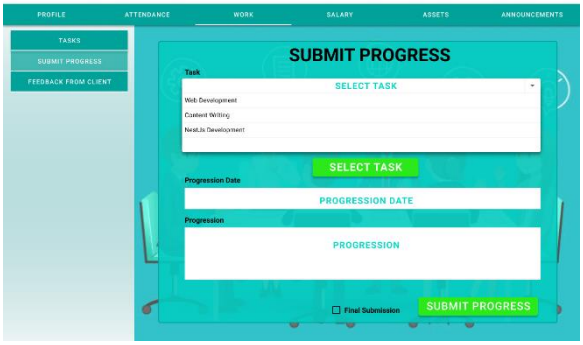

Figure 24: Submit Progress Interface

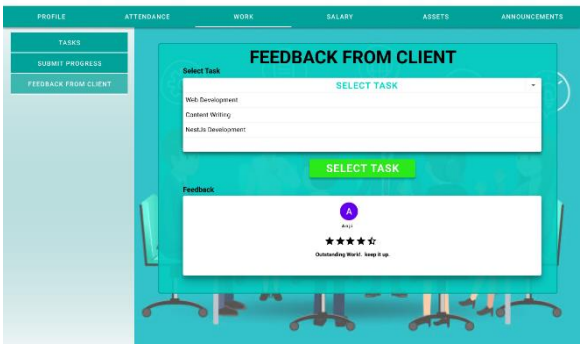

Figure 25: Feedback from Client Interface

V. DISCUSSION

The system is expected to solve most of the problems encountered in workplace related to employee management. Providing functions to effectively solve the problems faced in the work environment, the system is expected to minimize the manual effort put into managing employee data. And the system will provide functionalities to communicate information to the employees as well. The system will act as an intermediary to interact between employees, managers, and admins as illustrated in the Figure 26. It will minimize the manual effort and make the process effective.

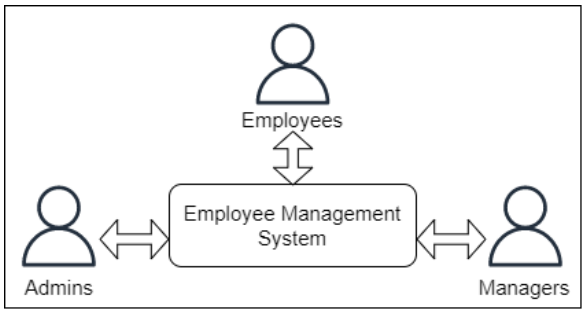

Figure 26: Interaction with the System

Selenium can be used as a testing tool to test the system. Selenium provides the ability to write test scripts to run the system through and check if all the functionalities are working properly and working as expected. Test scripts can be written for each function separately to see if the CRUD operations are working properly, and data is handled according to the proper user APIs.

The system can be prototyped first to get the user input into the development process. The prototypes and wireframes can be shown to the real users of the system and see how they interact with it to find out the improvements that should be done.

VI. CONCLUSION

It has been the attempt of this paper to propose a computer-based system to manage employee data in the workplace as manual methods used are outdated and produces a large amount of paperwork. A web-based Employee Management System is proposed to develop using the distributed system concepts. Trending technologies such as React JS, Node JS, and Express JS has been proposed to use as the development tools and MongoDB has been proposed as the database.

The system will be built as a distributed web-based application. The clients will be able to access the application through a web browser. The web browser with the React JS frontend will forward the requests to the Node JS backend and the backend will communicate with the MongoDB database to fetch the data.

The system will overcome the shortcomings of the similar systems that have been proposed in the literature. The system is proposed to have functions such as managing company assets assigned to employees, tracking the work progress of employees and broadcasting information to employees as announcements in addition to attendance and leave management whereas existing systems focus mainly on attendance and leave management only.

Even though the system is proposed to have a good set of feature the system can be further improved by developing more features to add even more functionalities. Features such as email notifications can be added. And the system can be made available for mobile devices by making the application responsive. Further research could be conducted to improve the system by identifying different kinds of employee data that should be effectively managed in the workplace and developing the system to include functions to manage them. The subject area should be further studied, and system should be further developed to address any shortcomings.

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