Employee Management System for Enterprise Company

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Abstract—**During this revolutionizing global market, enterprise companies of today must respond dynamically to changes in order to survive the future. The changes compel all business owners to adjust themselves and adapt to new strategies in managing their businesses. Previously, employee management was done manually by most of the company or organization and it requires a huge effort in internal management to ensure an optimum level of their business productivity. In recent years, there has been a significant advancement in technology that allows the company to transform the manual process of employee management into a digitized process through the development of software or web application. Employee management has been undergoing considerable change over the past few decades, as most industries have realized the potential of technology to improve employee management and information. Therefore, an Employee Management System is proposed to solve the problems. The methodology used to develop this system is Agile methodology. Agile methodology focuses on the iteration cycle that splits the development process into different phases which are known as sprints. The phases of Agile methodology consists of requirements, analysis, design, implementation and testing. The system requirements are gathered by using the elicitation techniques such as interview, survey, literature reviews and prototyping. These requirements are represented using Unified Modeling Language (UML) including use case diagram, sequence diagram and activity diagram and then documented into Software Requirement Specification (SRS). A complete and overall design of the system which includes system architecture design, database design, interface design and test case design are conducted and documented into Software Design Document (SDD) and Software Testing Documentation (STD). At the end of this project, an intuitive Employee Management System is developed and could be fully functional to improve the effectiveness of the employee management in the company.**

Keywords—**Employee management, employee management system, management system, employee**

I. INTRODUCTION

During this revolutionizing global market, companies of today must respond dynamically to changes in order to survive the future. The changes compel all business owners to adjust themselves and adapt to new strategies in managing their businesses. By focusing on the new ways of managing a business, a company can revitalize their business to a higher level and rebuild a new vision of productivity.

At the same time, there has been a desire in many public agencies around the world to increase efficiency, reduce costs, save space, improve service delivery and enhance transparency and accountability. Computerization will not only improve the employee management process but will also provide more accurate, consistent and usable information [1]. The adoption of technology saves the time and effort needed to handle the manual procedure of managing a company. Therefore, an automated management system is needed to reduce the hassle of manual operations in organizing and controlling the whole company's employees, especially in this digital evolution era.

Employee Management System (EMS) is an easy-to-use automated system developed to ease the management process of an organization's employees. It provides a lot of functionalities and features to transform the manual operations of an organization's employee management into an automated digital system. EMS is split into separate but integrated modules, each covering a different aspect of employee management. The user-friendly graphical user interfaces (GUIs) presented by the system are easy to understand and can be used by anyone who is not even familiar with simple management software. EMS also has a multi-user approach in which different authorized access will be given to the different levels of users. Another key objective of EMS is to support transparency and organizational

accountability and to enable accurate audits by creating and protecting EMS records as reliable evidence [1]. It also maintains a database on employment status, educational background, staff information, service records and leave credit such as sick and vacation leave [2].

II. PROBLEM BACKGROUND

The case study for this research development project was to solve the current problem of manually managing the employees in an enterprise company. Hence, enterprise companies would require people to use physical skills and energy to work by hand without a computerized system. The manual management system can be considered as the process of utilizing non-technological tools, which include paper, writing utensils and physical filing cabinets for data processing. Manual handling of the company's employee information poses a number of challenges [3]. In the case of software technology, this company only utilizes Microsoft Word and Microsoft Excel to manage some of the employees' information, which is not effective to organize all the information in a systematic and orderly manner.

First, the manual filing of the employee profiles occupies a lot of space as they need to store the files in cabinets. All the data are kept in files without any arrangement according to staff name alphabet or year of entry. The retrieval of employee profiles is time-consuming and cumbersome as the admin needs to search the employee profiles by going through each file one by one in order to search for some information [4]. Moreover, the employee profiles may get misplaced by the admin during manual filing and this may lead to inconsistency in data entry and data update. In the case of data security, the manual file system has no backup and if the files with the important and confidential information are lost or damaged, the company will lose all its valuable information [4]. The current system lacks employee self-service which means that the employees are not able to access and manage their personal information directly without having to go through the human resource department, administrator or managers of the company [5].

Besides, the procedures of manual leave management are slow and not effective, where an employee is required to fill in a leave application form and submit it to the file tray on the admin's table. The application form is then presented to the approving authority who will grant or reject the request. However, this manual leave management procedure is not capable to make efficient employee-based decisions because it is prone to delays and unnecessary paperwork [4]. The use of paperwork in handling some of these processes could lead to human error, papers may end up in the wrong hands and it is a time-consuming procedure to resubmit the papers [5]. Consequently, the leave application may take several days, weeks or even months to be approved by the admin due to several problems caused by the manual leave management.

III. PROJECT AIM

The aim of this project is to develop an efficient solution that will allow the company to transform the manual employee management process into a computerized system.

IV. PROJECT OBJECTIVE

i. To elicit specific requirements for an enterprise company.
ii. To design and develop the related architectural models for the Employee Management System (EMS) based on the elicited requirements.
iii. To test and evaluate the developed Employee Management System (EMS) using suitable testing techniques for accuracy and effectiveness.
iv.

V. PROJECT IMPORTANCE

The project will significantly enhance the company or organization's manpower management and increase business productivity. The proposed automated system will be developed to give access and provide information about employees and many other functionalities and features with a click of a button. The business company employees' information and resources will be included and stored in the system for further management and maintenance. Consequently, the company or organization can easily manage and organize the employees and related resources using the EMS while minimizing the troubles and difficulties in the manual management process

VI. LITERATURE REVIEW

Based on the analysis of multiple employee management systems, there are many similar employee management systems available in the current market which may benefit the company and organization. In this section, the selected similar existing systems to be researched are Connecteam, Lanteria and Intoweb. These systems will be studied thoroughly to ensure that the proposed system will be developed with the standard and appropriate functionalities and features instead of based on the stakeholder's requirements.

VII. CURRENT SYSTEM ANALYSIS

Based on the studies of several similar equivalent systems, each system has its advantages and disadvantages in terms of required functionalities and features. First, the Connecteam application is more focusing on how to conduct and organize a working team among the employees. Second, the Lanteria software is developed based on Microsoft SharePoint and Office 365. Therefore, it is only suitable for those companies that fully utilize Microsoft software and Microsoft Office as their main tools or resources because Microsoft products are usually expensive and will become a burden for the start-up companies. Next, the Intoweb software is a simple employee management system that does not provide a lot of functionalities to manage employees effectively. To access the whole package of features, the company needs to purchase other human resource software modules to integrate within each separate system, which is costly for a start-up business or small and medium-sized company [6].

VIII. COMPARISON BETWEEN SYSTEM

TABLE I. COMPARISON BETWEEN EXISTING SYSTEM [7-9]

System	Connecteam	Lanteria	Intoweb	EMS
Platform	Windows, Mac, Android	Windows, Mac, Android	Windows, Mac, Android	Web
Database Record	Yes	Yes	Yes	Yes
Account Registration	Yes	No	Yes	Yes
Leave Management	No	Yes	Yes	Yes
Overtime Management	No	No	No	Yes
Schedule Management	Yes	Yes	No	Yes
Attendance Management	No	Yes	Yes	Yes

IX. METHODOLOGY

In this project, the software development methodology used to develop the EMS is the Agile methodology. Agile methodology is an iterative and incremental approach to software development that is performed in a highly collaborative manner by self-organizing teams within an effective governance framework that produces high-quality solutions in a cost-effective and timely manner that meets the changing needs of its stakeholders [10]. Agile methodology saves the time and money of an organization as there is less documentation required to verify and validate the requirements [11]. Agile methodology focuses on the iteration cycle that splits the development process into different phases which are known as sprints. Each sprint will have a certain period of time to complete the assigned features and modules. Hence, the development cycle will become more organized and easier to manage without having to finish all the tasks in a single phase [12].

X. TECHNOLOGY USED

TABLE II. COMPARISON BETWEEN EXISTING SYSTEM

Technology	Description
PHP	Programming language to develop the system
Slim Framework	PHP micro framework to develop the system
Visual Studio Code	Source code editor to develop the system
Laragon	Local web server to test the system
Sparx System Enterprise Architect	Graphical tool to create UML diagrams and models
Adobe XD	Prototyping tool to create mock-up user interfaces
MySQL Workbench	Database management system to organize the collection of data

XI. REQUIREMENT ANALYSIS

An analysis of requirements is crucial during system design because it establishes a complete and accurate set of requirements for the system. In addition, it also helps to reduce the risk of system development failure without spending a lot of time and cost. Functional requirements describe what features the proposed EMS should have and how they should be performed. Non-functional requirements state what the system must accomplish instead of explaining how the system works.

A. Functional Requirements

Define abbreviations and acronyms the first time they are used in the text, even after they have been defined in the abstract. Abbreviations such as IEEE and SI do not have to be defined. Do not use abbreviations in the title or heads unless they are unavoidable.

TABLE III. FUNCTIONAL REQUIREMENTS OF EMS

Functional	Description
FR001	The system shall allow the administrator and manager to register employee and update or delete employee records.
FR002	The system shall allow the employee to update personal information on the profile page.
FR003	The system shall allow the employee to record daily attendance.
FR004	The system shall allow the employee, administrator and manager to view attendance records on the attendance page.
FR005	The system shall allow the administrator and manager to view, edit or delete the attendance records.
FR006	The system shall allow the employee to view the schedule.
FR007	The system shall allow the administrator and manager to view, edit or delete the schedule records.
FR008	The system shall allow the employee to apply for leave.
FR009	The system shall allow the administrator and manager to view and update the status of the leave applications.
FR010	The system shall allow the employee to apply for overtime allowance.
FR011	The system shall allow the administrator and manager to view and update the status of the overtime allowance applications.
FR012	The system shall allow the employee to view the history of leave and overtime allowance application.

B. Non-functional Requirements

TABLE IV. NON-FUNCTIONAL REQUIREMENTS OF EMS

Non-functional	Description
NF001: Reliability	The system must never go down or hang suddenly.
NF002: Usability	The system shall be easy to use and easy to understand.
NF003: Portability	The user shall be able to access the system using any working web browser with a stable internet connection.
NF004: Availability	The system should be available 24 hours per day and 365 days per year. The user shall be able to access the system at any time and anywhere.
NF005: Maintainability	The system shall be maintained by system developers to discover possible defects and fix them by making changes to the particular module.
NF006: Security	The system shall only allow different levels of authorized users with different authorized access to perform specific tasks.

C. Design

The architecture model used for this system is the Model-View-Controller (MVC) architecture model.
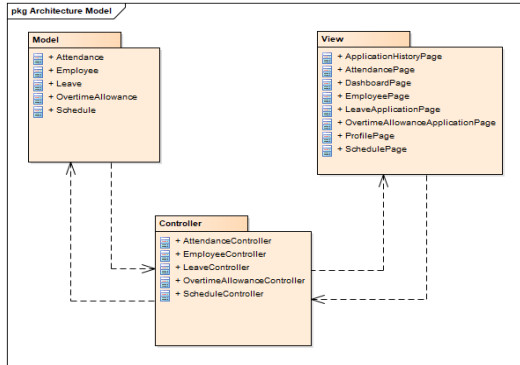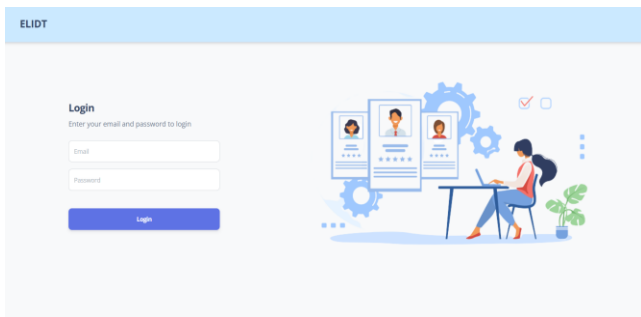

Fig. 1. MVC Framework of EMS
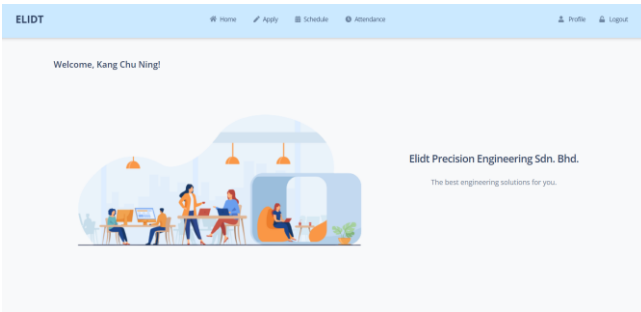

Fig. 2. Login Page of EMS
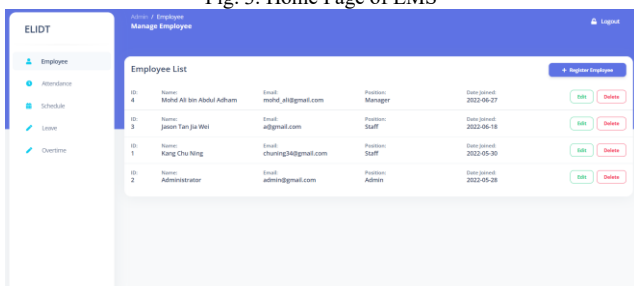

Fig. 3. Home Page of EMS

Fig. 4. Admin Dashboard of EMS

XII. TESTING

System testing is defined as a process of validating the functionalities and features of the system to ensure that the system fulfilled the end-to-end system specification with the agreement between the developers and stakeholders. Black Box Testing is a software testing approach for testing and validating the system features and functionalities without referring to the code structure of the system.

TABLE V. BLACK BOX TESTING FOR EMS

Test Cases	Status
TC001: Manage Employee Account - Account Module	Pass
TC002: Manage Account - Account Module	Pass
TC003: Record Attendance - Attendance Module	Pass
TC004: View Attendance- Attendance Module	Pass
TC005: Manage Employee Attendance- Attendance Module	Pass
TC006: View Schedule - Schedule Module	Pass
TC007: Manage Schedule - Schedule Module	Pass
TC008: Apply Leave - Welfare Module	Pass
TC009: Manage Leave Application - Welfare Module	Pass
TC010: Apply Overtime Allowance - Welfare Module	Pass
TC011: Manage Overtime Allowance Application - Welfare Module	Pass
TC012: View Application History - Welfare Module	Pass

XIII. CONCLUSION

In conclusion, the main purpose of the project paper is to elicit the user requirements for the development of a complete system that fulfils the functional and non-functional requirements. The Employee Management System can help companies to manage their employees in an automated manner and more efficient.

However, there are still some limitations and constraints that exist in the system that may bring negative impacts on the user experience and satisfaction. Firstly, the system does not include an instant messaging function to enable communication between the employees. Secondly, the password reset function is not included in the system. Furthermore, the system does not provide a mobile application for the users which reduces the convenience of use, as the users can only access the web-based system through a computer device.

Generally, most of the users agreed that the system is functioning efficiently and met the criteria. Besides, a lot of constructive suggestions are received from the users in which the recommended modules are kept for future improvement

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