

Human Resource Management on Cloud

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Abstract— iHRMS is a diligent method to replace the traditional employee management system used by small and mid-scale companies and businesses for managing the employee attendance and payroll. Most traditional methods for managing employee lack the capability to capture employee attendance in real time, hence unable to track employees' punctuality. In another point of view, the problem may affect the overall performance of the employees in an organisation. iHRMS has been introduced not only to cater the said problem but to assist in delivering a more accurate payroll system, therefore, enabling an organisation to better manage their finance.

Keywords— human resources management, employee management, software as a service.

I. INTRODUCTION

In many organisation, punctuality is considered as an important factor which translates into the discipline and dedication of an employee. By having a punctual and dedicated employee, an organisation is believed to be able to strive and achieve more in the dynamic, challenging business world. Many government-linked companies (GLC) and multinational companies (MNC) utilise a human resources management system (HRMS) to manage many aspects in their businesses.

According to Dalton and Enz [1], absence is a problem faced many industries. Management of companies, therefore, are pressured to find a simpler yet and more effective way to manage their employees, enabling them to focus on the productivity and providing a better quality products and services hence to stay competitive.

As a case study for problems-based learning and development, Munie Kitchen Cafeteria (a local cafeteria in the university) has been selected as a stakeholder. Previously, Munie Kitchen Cafeteria practices a manual system for recording attendance by using attendance cards and payrolls is manually calculated through the attendance card. Often, a long time is taken to manually calculate the employees' salary and it is difficult to manage different working hours of multiple employees (full-time, part-timer, and runners) with different work schedules.

Therefore, here, we present a web-based HRMS on the cloud, known as the iHRMS. The system is developed and provided as Software as a Service (SaaS), and its capability is demonstrated by Munie Kitchen Cafeteria management.

iHRMS is developed to organise and semi-automates employees management in various ways; including capabilities to handle manpower allocation, scheduling, capturing employees attendance, and automation of payroll calculation.

This paper is organised as follows: Section 2 presents the literature review and comparisons of existing similar systems. In Section 3, the adapted development methodology and procedures is explained and in Section 4, the result is presented. Section 5 concludes and summarises the work.

II. LITERATURE REVIEW

This section discusses several topics related to employee management, including: work scheduling, current system used by Munie Kitchen Cafeteria, and examples of several similar systems. Extensive study have been conducted on two equivalent systems (versus the proposed system) to identify problems and generate ideas from the lack of capabilities existing in the two equivalent systems.

A. Work Schedule

Work scheduling is an important aspect in businesses. It ensures the work is completed by the capable staff within the allocated time frame. Good working scheduling must be able to allow an organisation to achieve its goals within the set time frame, with possible performance enhancement. The American Heritage Dictionary explains that scheduling is a plan to execute the work and achieve objectives by specifying the order and time allocated for each section (of task). In addition, scheduling is also used to ensure that the

working environment is safe and suitable. In Malaysia, the rules of employment have been invoked by the Work Act 1955, whereby an employee cannot work more than eight hours per day (or 48 hours a week).

B. Existing System

Studies have been conducted on two systems that have several procedures or processes which are almost similar to the proposed system in order to provide ideas for improvements towards the proposed system. Table 1 summarised the comparisons of the existing systems with the proposed system.

1) *Employee Attendance System*: This system is used to record employee attendance and generate employee reports. Developed using C # in the Microsoft Visual Studio.net 2008 environment, this system uses RFID technology to record employee attendance. Registered users are able to view and update their information. Employees can also view, update and manage their employee salary. A daily report is sent to the employers via SMS, and at the end of the month, the payroll slip prints out the particulars for their pay and including their paid/unpaid leave. Fig. 1 visualises the Employee Attendance System user interface.



Fig. 1 The front page of Employee Management System [2]

2) *When I Work System*: Registered users are able to access a scheduling system for free at <https://wheniwork.com/>. When I Work is web-based employee management system with an attractive and user-friendly look. Therefore, new users are able to quickly adapt and understand the system. While the menu is designed using drop down to make it easy for users to make selections and do tasks. When I Work system offers various distinctive features such as to facilitating managers in making worker schedules, shifting employees working schedules, generate/export employee work schedule into PDF file format, and management of employee leave application. When I Work system keeps a minimalistic features, but is powerful enough for management of a various scale organisations. Other additional features includes schedule changes alerts via email, text messages, social networks, and mobile applications. Fig. 2 shows the When I Work system interface.

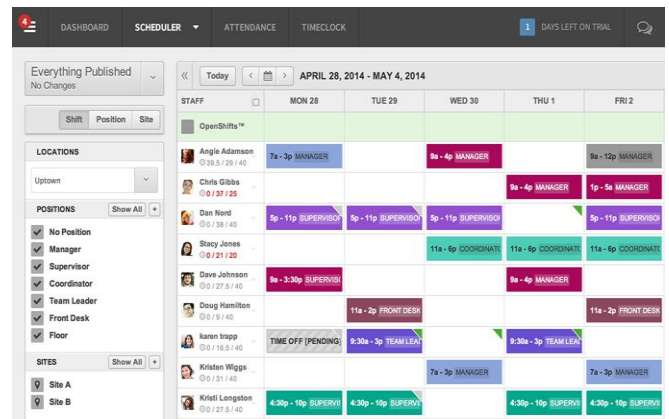


Fig. 2 Internal interface of the When I Work system (<https://wheniwork.com/>)

3) *Proposed System (iHRMS)*: The system to be developed is aimed to facilitate the management of attendance of employees. It has several modules including registration, create event/activity, attendance tracker, and reporting modules.

Munie Kitchen Cafeteria employers need to first register an account to be used within the system. Depending on the job role, the system differently provides view to the user for work/event scheduling. A notification of work registration will be sent to employees' E-mail address. Employers may create several new tasks (also referred as jobs) and employee can choose either to participate in the job. Job participants will then needs to check-in themselves online at a specified terminal on the day of event. At the end of every month, a payroll report is generated automatically and accessible to its corresponding owner.

TABLE I
COMPARISON OF SIMILAR SYSTEMS CAPABILITIES

Criteria	Existing Systems		Proposed System iHRMS
	Employee Attendance System	When I Work System	
Attendance Record	Recorded online	Manually recorded (online) by employers	Recorded online at a terminal
Employee scheduling	Set by employer	Set by employer	Booked by employees
Has E-mail notification?	Yes	Yes	Yes
Registration procedure	By employee (unique ID provided by employer)	Handled by employer	By employee (unique ID provided by employer)
Payment calculation	Automated	None	Automated

III. METHODOLOGY

To build a fully working, simple yet powerful human resource management system, we have selected the prototype modelling development methodology. Methodology is also defined as a sequence of step-by-step approaches that assist in the development of an end product

(information system) [3]. The work flow process for the prototype model is shown in Fig. 3

iHRMS were developed in stages, beginning with database and system design, followed by the implementation of the design into an actual system.

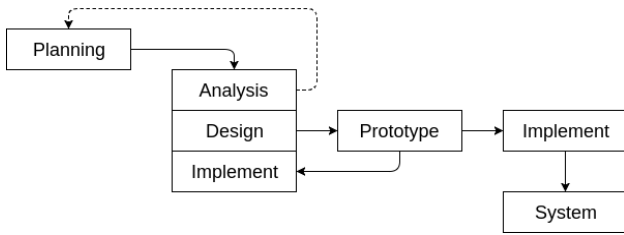


Fig. 3 Prototype Model Methodology [4]

A. Database Design

Database design is a crucial procedure and is handled before system interface and servlet pages is created [5]. Fig. 4 visualises the entity relationship diagram (ERD) for the designed system database.

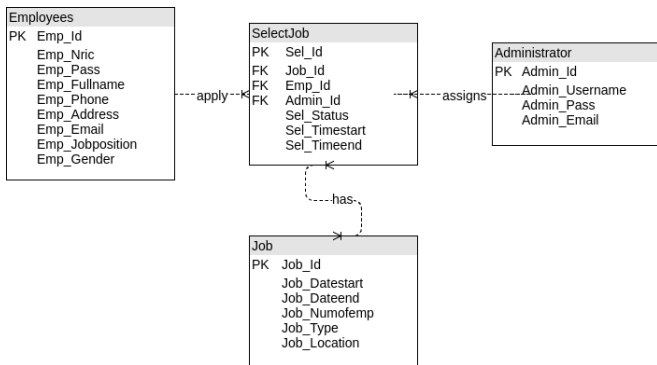


Fig. 4 Entity Relationship Diagram between data tables

B. System Design

The system is designed using a bootstrap template, therefore allowing a fast prototyping and development procedure. To further enhance the system appearance, an appealing colour theme has been selected and simple back-end processing has been utilised for speed improvement. Fig. 5 visualises the page used to create a new event; Fig. 6 shows the page used to record employee attendance; Fig. 7 shows the sample E-mail notification received through Gmail; and Fig. 8 shows the payroll slip page which is auto-generated by the system at the end of every month,

Algorithm 1 shows the pseudocode for the process of capturing employee attendance, while Algorithm shows the pseudocode for generating monthly payslip for employees.

Algorithm 1 Attendance Capture Function

```

Input: systemTimeDate, employeeId, jobId
Read time stamp from systemTimeDate
if employee checks in within buffer time then
    | Store the input values into database
    | Display success message
else
    | Display 'Late attendance' message
    | Read input value ReasonLate
    | Store input reason into the database
end
  
```

Algorithm 2 Generate Monthly Payroll Slip

Read list of jobs taken by employees with check-in and check-out time from the database

Compute the total time of working

Compute total wage based on total time of working

Display list of jobs done by employees with pay amount for each job

Display the total wage for all jobs for the month

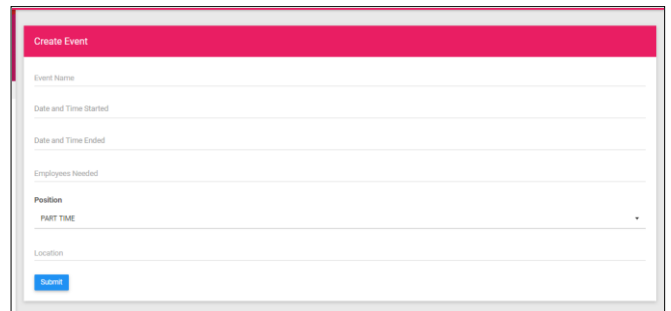


Fig. 5 Create new event page

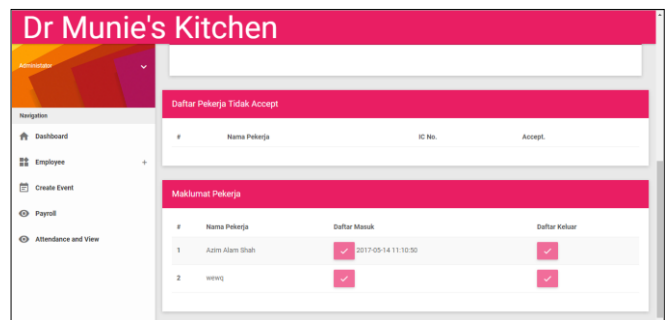


Fig. 6 Employees attendance record page



Fig. 7 E-mail notification sent to employees' inbox

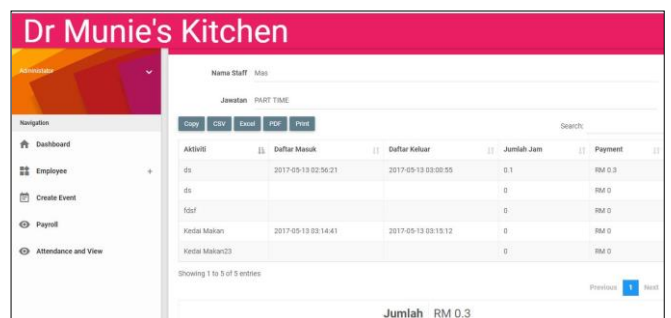


Fig. 8 Payroll slip page (auto-generated)

C. Prototype Implementation

The system design is then integrated to the prepared database design. The output of the integration procedure creates a system prototype which is tested internally before released for User Assessment Test (UAT).

D. Actual System Implementation

After the prototype system has been completed and tested, feedback were gathered and is used for improving the faulty existing in the prototype system. The production system is released after passes another few rounds of internal testing.

IV. RESULTS AND DISCUSSION

Based on the test result summarised in Table 2, it is found that overall 88% of the users are satisfied with the developed human resource management system, while 12% of the respondents thought the system was developed at a moderate level. The test has covered system functionality and design.

TABLE II
SYSTEM TESTING RESULTS

Functionality/Criteria of Scoring	Test Score	Result
User registration	100%	Pass
Log in process	100%	Pass
Employees management	90%	Pass
Activity Manager Module	85%	Pass
Attendance Module	90%	Pass
Payroll Module	80%	Pass
Colour scheme design	80%	Pass
Suitability of font size and family used	80%	Pass

V. CONCLUSIONS

iHRMS has provided an exemplary of a systematic, single-repository staff management system on the cloud. The system allows employers to track their employees' attendances and manage their payroll in a single environment. Future enhancements includes management of several iHRMS instances and database hot-backups.

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