Human Resource Information System with Mobile Application for Hotel

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Human Resource Information System with Mobile Application for Hotel

A dissertation submitted for the Degree of Master of Information Technology

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DECLARATION

The thesis is my original work and has not been submitted previously for a degree at this or any other university/institute.

To the best of my knowledge it does not contain any material published or written by another person, except as acknowledged in the text.

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This is to certify that this thesis is based on the work of

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ABSTRACT

In this project, an attempt is made to give a biometric device based, Human Resource Information System for Human Resource Department of Bright Bravo Hotel (BBH) in Kurunegala. They already have a fingerprint biometric device but without a proper system to manage employee profiles, attendance records, leave and payroll functions. This new system can help the human resource manager to reduce manual workload and especially streamline time attendance and payroll processes in a smooth, accurate and trouble-free way just by the use of the fingerprints of their employees. Human Resource Manager can increase the employee engagement for day to day HR functions, easily by using the mobile application that is provided as one output of this project. A hotel was selected as the client because that trade has more complex attendance requirement among Small and Medium-sized Enterprises (SME) in Sri Lanka.

Human Resource (HR) is the greatest asset any organization possesses irrespective of its size, and it must make sure that the potential is utilized to the maximum to contribute towards the growth of the organization. It is not a secret that top performing organizations in any industry are the ones that pay the strongest attention to their HR development. The large organizations have sufficient resources and infrastructure to manage their HR operations which small and medium-sized enterprises lack.

When it's focused on small and medium hotels, most of them have a separate department called a human-resource department to handle their Human Resource Management (HRM) functions same as in large organizations. Unlike most of the large organizations, the HR departments of SMEs perform their daily operations manually, which causes inefficiency, poor quality, duplicate of work and finally employee dissatisfaction. Small and Medium-sized Enterprises (SMEs)s cannot afford to hire a large team of HR professionals or purchasing expensive Human Resource Management Systems (HRMS) available in the market. Most of the SMEs have tried such solutions. However; it has been understood that the problems still remain or new problems have arisen. When the local industries are considered, a larger portion is consumed by SMEs and lacking of cost-effective proper HRMS is a common problem to the majority of those SMEs. Hence, it's proven that there is a need of a cost-effective, customizable HRMS developed for local SMEs. By identifying the core HR functionalities of local SMEs and analyzing benefits and drawbacks of the available HRMS solutions in the market, it was decided to implement an automated HRIS with some value-added features to eliminate the aforementioned problems faced by SMEs. Since the system has been implemented in a modular approach, it's possible to customize as per future requirements and as well to integrate it with new functionalities. I believe the problems faced by HR departments can be eliminated more effectively using the system which has been implemented using Visual Studio 2015.

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LIST OF ABBREVIATIONS

BBH : Bright Bravo Hotel (Pvt) Ltd

BRA : Budgetary Relief Allowance

DBMS: Database Management Systems

DFD : Data Flow Diagram

ERD : Entity Relationship Diagram

HCM : Human Capital Management

HR : Human Resource

HRD : Human Resources Development

HRIS : Human Resources Information System

HRM : Human Resources Management

HRs : Human Resources

IT : Information Technology

OT : Over Time

SME : Small and Medium-sized Enterprise

SMEs : Small and Medium-sized Enterprises

SQL : Structured Query Language

Chapter 1 – Introduction

1.1 INTRODUCTION

The Human Resource (HR) department of any organization is usually responsible for creating, putting into effect and overseeing policies governing workers and the relationship of the organization with its employees. Human Resource Management (HRM) is the practice of recruiting, hiring, deploying and managing an organization's employees. The human resources department within any organization is considered to be highly critical for the entire organization. Human Resource Management (HRM) is considered crucial to success of any organization. The HR department of Bright Bravo Hotel (Pvt) ltd – Kurunegala (BBH) also has many functions to serve, as a supportive background for the company. They provide everything from skilled and talented labor to management training services such as time and attendance management, payroll management, employee enrichment opportunities and more. Since labor is the single largest expense for most organizations, human resources help companies derive the greatest value from this important asset.

In order to function optimally, human resources department of **Bright Bravo Hotel (Pvt) ltd** must have the right tools and resources in place. A human resources information system (HRIS) is a type of software program that can be utilized within the company to help employees and managers to improve their productivity and the results of their efforts. Human Resource Information System (HRIS) is essential software for any organization in this competitive environment. HR functions are generally administrative and common to many organizations. Many organizations have formalized attendance and payroll process. Efficient and effective management of human capital progressed to an increasingly imperative and complex process. The human resource functions are consisting of tracking existing employee data, which traditionally includes personal histories, skills, capabilities, accomplishments and salary. Many organizations electronically automate, many of these HR functions by introducing specialized HRIS to reduce manual workload of these administrative activities. HR Department of BBH can’t afford a large group of HR professionals or purchase costly and complex HRIS available in the market. Hence, most of the HR team members have to spend a considerable number of working hours on administrative tasks, and eventually they have to lessen the focus to be given to planning and initiative tasks; which are very important to achieve long term benefits.

Even though there are HRIS available in the market in SriLanka, most of them have been designed for large organizations. SMEs in Sri Lanka with less than 100 employees cannot afford such expensive and complex systems. The HRISs designed for SMEs also have customization issues or those systems do not cater changing HR operations. Most of the SMEs in Sri Lanka use payroll systems or attendance management systems or both which can be purchased for a lower price however, remaining HR operations are still performed manually due to aforesaid reasons.

1.2 PROBLEM DOMAIN

Bright Bravo Hotel (Pvt) ltd – Kurunegala has to face following problems without a proper system to manage their human resources.

- Since there's no proper system for manage HR data, they had to spent excessive time on manual entry and double entry which will directly affects to the productivity of HR department.
- Employee complaints are increased about attendance and payroll matters.
- HR department had to spent too much time to verifying attendance information.
- There is more possibility to happen calculation errors when calculations are done by manually.
- Difficult to access of history attendance and payroll information.
- There are many more difficulties when switching between various automated systems.
- Management of the company cannot make accurate decisions as they can't do a proper analysis on the human resources as well as their performance evaluations for promotions.
- *Buddy punching* - a coworker can sign in or out for another employee by pretending to be that employee which will directly affects to the Over Time (OT) cost of the hotel.
- Difficult to manage roster changes manually.
- Employees data are considered to be much secured. However, there is a threat to those data as more paper work is involved.
- Bad impression of other employees of the organization who get the service from the HR department due to delay of providing service, inaccurate outputs, providing out dated information and many other reasons

1.3 MOTIVATION FOR THE PROJECT

Today we are living in competitive world. **Bright Bravo Hotel (Pvt) ltd** also has to facing challenges with the increase of competitiveness. At the moment Human Resource department of **Bright Bravo Hotel** is handling their human resources without proper system (manually). This causes to several major problems and ultimately leads employee dissatisfaction. The HR department of the hotel is looking for a system that can be utilized within the department to help human resources employees and managers improve their productivity and the results of their efforts. Human resource Information system (HRIS) is essential software to the hotel in this competitive environment. The human resource functions are consisting of tracking existing employee data, which traditionally includes personal histories, skills, capabilities, accomplishments and salary. Many organizations electronically automate, many of these HR functions by introducing specialized HRIS and bio metric devices to reduce manual workload of these administrative activities. Human resource manager can reduce manual workload and specially streamline time attendance & payroll process in a smooth, accurate and trouble-free way just by keeping in the fingerprint of their employees. Then it will automatically increase the productivity and performance of the HR department and also their human resources.

1.4 AIMS AND OBJECTIVES OF THE SYSTEM.

- Human resource manager can reduce manual workload and specially streamline time attendance & payroll process in a smooth, accurate and trouble-free way just by keeping in the fingerprint of their employees.
- Prevent buddy punching practices. *Buddy punching* is illegal and has cost many employers millions in financial losses each year. It is easily prevented with biometric time clocks. Because a coworker cannot clock in or out for another employee by pretending to be that employee.
- The system will energize with capabilities of managing rosters, split shifts and overtime.
- Expedition of recurring tasks through automation.
- Not only fingerprint terminals but this system will support to **face recognition terminals** also.
- Reduction of paper and related materials and storage - often yields cost savings.
- Potential for greater employee engagement to day to day HR functions easily by motivating employees to use mobile app.
- Reduction of errors in payroll and employee information database.
- Improve time and attendance tracking abilities and accuracy of attendance and payroll data.
- Ability to make more informed decisions in real time by using analytics and integration of organizational data.
- To enhance productivity and performance of the human resources and HR department.

1.5 SCOPE OF THE PROJECT.

The scope of the project has been classified into five modules

1.5.1 Employee Profile module

1. Personnel information would be kept in the centralized database at the client location Bright bravo hotel). This enables system users to store and utilize all information easily & productively.
2. Records employee information using NIC as key, with photo
3. Record promotions and inter department transfers.
4. Graphical illustration of employee periodic attendance.
5. Enhanced employee search by EPF No, name, department, designation etc.
6. Alerts on employee birth days, employment contract renewal.
7. Builds a checklist of standard documents and certificates to collect. Keeps inventory of the collected documents, certificates from employee.

1.5.2 Leave Manager module

1. Creates standard and custom leave types (Annual, Casual, Medical, Short Leave).
2. Leave entitlement management based on employee category.
3. Enables applying leave based on absent records of each employee.

1.5.3 Attendance Manager module

1. Hotel can configure workday types and attendance rules (Poya day, Off day etc.)
2. Sets company calendar according to hotel requirements.
3. System can communicate with fingerprint/face detection machines via TCP/IP protocol to read data.
4. In-out records are generated in accordance with assigned shifts.
5. Enabled Overtime calculations.
6. Manual time adjustment features to correct missing attendance by authorized person.
7. Generates customized month end summery report as per the company requirement.

1.5.4 Payroll Manager module

1. Generates the bank transfer file according to bank format with salary data of all employees.
2. Transaction management handles, fixed, daily or monthly transactions (Salary Advance, Special Deduction, Commission Payment)
3. Handles fixed allowance & deductions
4. Loan management also possible for any number of loans without an interest.
5. Compatible with government taxes.
6. General payroll reports in government accepted format.

1.5.5 Mobile app

1. View employee's self-profile using mobile phone.
2. View pay slip of last month using mobile phone.
3. View attendance sheet of last month using mobile phone
4. Leave request can be done using mobile phone

- This system is developed as an accumulated Human Resource Infomation System. Accumulated word describes which is capable to add modules one by one later. It doesn't affect to any other modules that are running.
- This project covered **attendance module**, **payroll module**, **benefits module**, and **employee profile module** and reports.
- This system will cover only selected modules in HR functions. Because we should finish the project within limited time period by using limited resources.
- Other modules such as recruitments, performance appraisal, retirement will be done in the future.

The identified modules of the system can be present graphically as following figure 1.1.

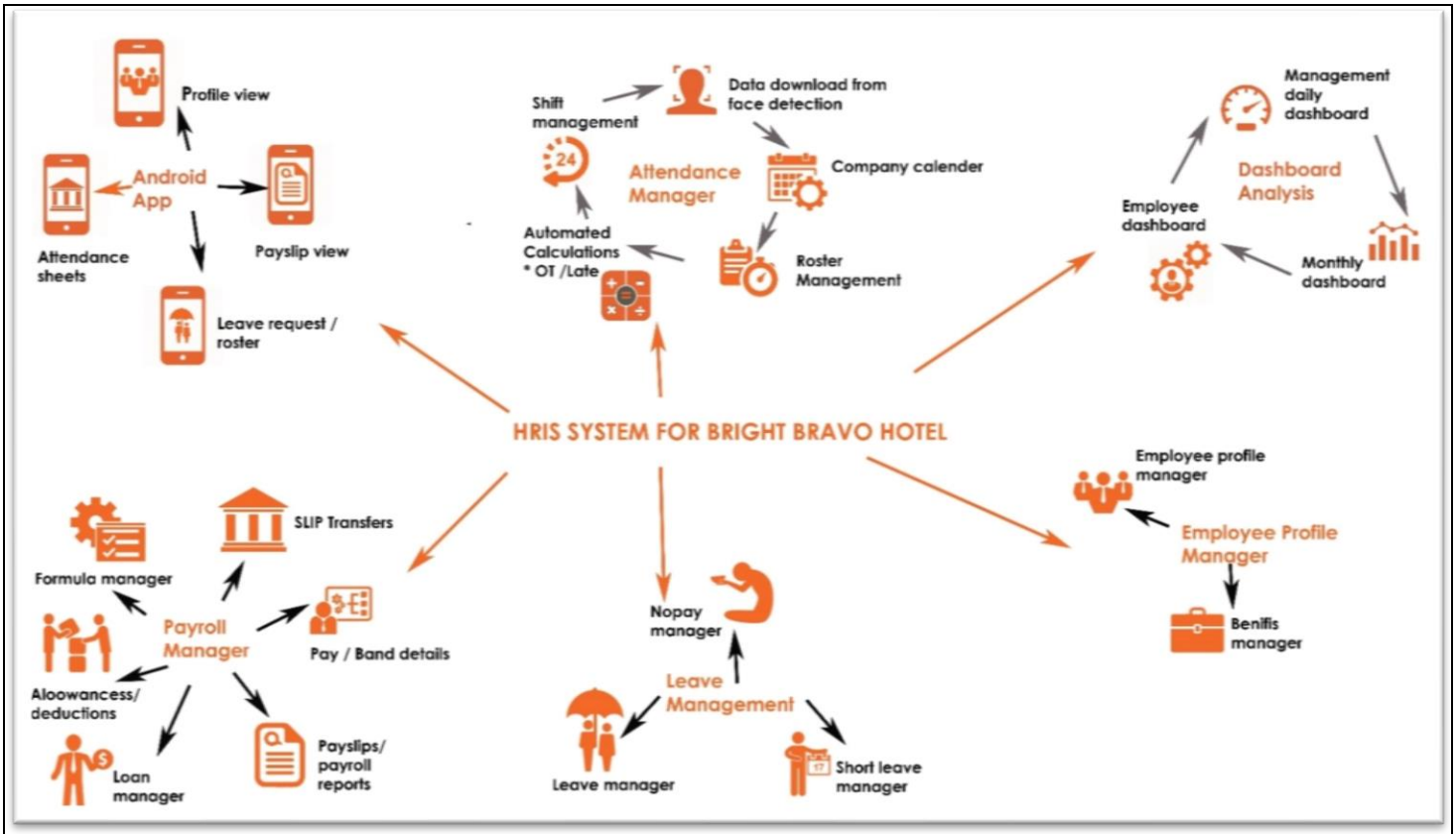


Figure 1.1: Project modules representation of graphical way

1.6 ASSUMPTION

- ✓ All the employees punch the in time and out time by putting their finger on terminal every day, to record every shift in and shift out times.
- ✓ Network coverage is good enough to sync all data.
- ✓ Mobile data limit is more than enough to this operation.
- ✓ All employees have smart phone and users are knowledgeable to use the application.

1.7 CHAPTER BREAKDOWN

The rest of this dissertation is organized as follows:

Chapter 02: Background

This chapter is written to provide an idea about background of implementing the project. Other than that, chapter provides a review of similar systems, tools and technologies which used in the system implementation.

Chapter 03: Methodology

All fact gathering techniques, functional and non-functional requirements which need to specify software requirement specification and analysis will be included in this chapter. Methodology chapter includes methodologies, tools and techniques used to design the system. Design selection is based on sound justifications and user interface, database and modules of system will be designed. The specifications were gathered are converted into executable program. Furthermore, chapter incorporates with Implementing technologies and concepts.

Chapter 04: Evaluation and Testing

This chapter describes how the system was tested by using various testing methods. It also reported errors and how to overcome those errors and how to modify the system. This chapter is to evaluate the implemented HRIS describing positive and negative aspects of it. Further, it describes the future work can be done on this project as well as the lessons learned

Chapter 05: Conclusion

This chapter include the all summarize details of the projects and also include findings and lessons learned during the project with further improvements of the project.

References

All the referred books, URL references and other materials will be included in this section.

Appendices

This include further details and supplementary parts relating to chapters.

Chapter 2 – Background

2.1 ANALYSIS

According to the SSRN [1], Human Resource Management (HRM) can be defined as "Management of people who work for an organization" in high level. This definition is more towards the management of employees to achieve organization goals. However, HRM has a more meaning beyond that. People or the employees working for an organization are different from other resources the organization possesses as they have their own ambitions, goals and desires. Hence HRM has to consider both the needs of organization and its employees.

2.1.1 The National Institute of Personnel Management (NIPM)

Personal management as [3] "that part of management which is concerned with people at work and with their relationship within an enterprise. Its aim is to bring together and develop into an effective organization of the men and women who make up enterprise and having regard for the well – being of the individuals and of working groups, to enable them to make their best contribution to its success".

2.1.2 Schermerhorn

Schermerhorn (2008) defines HRM as the [2] "Process of attracting, developing, and maintaining a talented and energetic workforce to support organizational mission, objectives, and strategies."

2.1.3 Edwin Flippo

Human Resource Management as [16] "planning, organizing, directing, controlling of procurement, development, compensation, integration, maintenance and separation of human resources to the end that individual, organizational and social objectives are achieved."

In simple words, HRM is to increase the profit of an organization by optimizing its employees while satisfying the employee needs. HRM is sometimes referred as personnel management, manpower management or human capital management.

2.1.4 Importance of HRM

As per the aforementioned definitions, HRM is to achieve a better performance of organizations. The "Performance" indicates what has been achieved and how it has been achieved. With a lot of researches, it has been proven that good HRM ensures a better performance of an organization.

2.1.5 HRM in Small and Medium-sized Enterprises (SME)

European Commission categorized SMEs as enterprises with 50 to 250 employees. With the variations applied to developing countries, enterprises with 50 to 150 employees can be considered as SMEs in the local context. SMEs in developing countries can be considered as the engine of grow and its very important to resolve the issues faced by SMEs in order to maintain a competitive and efficient market. Irrespective of the size, the greatest asset of any organization is known as its human resources since the organization survives and thrives because of the capabilities and performance of its employees. Large organizations always make sure to pay sufficient attention to proper HRM which SMEs lack. With the size, they are not willing to hire a large HR team. Even though most of the local SMEs have a separate department for operating HR functions, they face a lot of difficulties in performing those operations in a well-structured way due to the manual process carried out by a limited number of HR team members. Following is some of them in high level.

- Inefficiency in completing tasks and duplication of tasks can be occurred as there is no/ less well-defined structured HR process. The large organizations make sure to maintain a formal HR management process whereas SMEs are less formal on the same. [5]
- Poor quality of work and delay in completing work due to the limited number of HR staff Since SMEs cannot afford a large HR team, the available few HR members have to focus on all the tasks, which would provide a poor-quality output or delay in completing tasks.
- Difficulty in establishing proper HR practices as experienced HR professionals are unaffordable to SMEs. Most of the SMEs recruit school leavers or inexperienced employees to HR department so that the SMEs cannot expect them to identify the gaps in the current process and provide professional solutions for those.
- Difficulty in using complicated IT solutions since the HR team lacks the computer literacy and IT knowledge. There are many automated HRM systems available in the market. Due to the design of those systems, an expectation of the HR team is to have good computer literacy and IT knowledge. Since BBH cannot afford such professionals, they have to automatically stick into conventional manual process.

Hence, it's very important to pay sufficient attention to HRM since it

- It enhances the professionalism of the organization.
- It reduces operational cost.
- Support and advise managers to decision making.

Industry trend is more towards outsourcing the entire HR operations to outside workers who are professional on that. The issue with outsourcing is that outsourcing workers are not committed to the hiring organization and the organization loss the control over output [6]. It will be a huge issue to SMEs, who have a great impact on even with one single employee.

Since it has been proven that IT provides better solutions to most of the management processes, automating of HRM processes has been considered and lot of HRISs have been emerged accordingly.

2.2 LITERATURE REVIEW ON HRIS

HRM has been an area of interest to research for last 15-20 years. One main reason to intensify the interest is the inability of SMEs to identify and resolve the HRM problems and SMEs can gain competitive advantage solving those HRM problems at the same time. Hence, for last 20 years, an empirical work has carried on focusing on the link between HRM and organizational performance.

Understanding the value of Information Technology (IT) to industry, researches were carried out to make IT involved to most of the processes in the industry. With the revolution of information systems, area of the human resources was considered to convert to Human Resource Information System (HRIS). HRIS was initiated in the 1960s and 70s as organizations started converting their hard copies to computer storage [7]. Primary objective of HRIS was to gather, store and report employee data on a timely fashion [8]. Later, it was understood that maintaining employee data in a central location does not solve all HR-related issues, hence core HR processes to be integrated with that- the origin of HRMS. HRMS is an automated application that combines many HR processes into one package [8].

Sufficient researches have been done to define processes, which are required to categorize the HR operations.

2.2.1 Fisher, Schoenfeldt and Shaw Model

According to Fisher, [7] Schoenfeld and Shawn (1990), they have identified nine areas of HRM.

- **Planning** - It assists management to identify the future resource needs and plan for recruitment and arrange trainings.
- **Job Analysis** - Analyze job data to refine salary structures, job titles and promotion paths
- **Equal Employment Opportunity (EEO)** - Monitor workforce data in terms of gender, race and age to identify adverse effects on certain groups
- **Recruitments** - Search both internally and externally to recruit suitable employees
- **Selection** - It conducts computer-aided interviews and various other selection methods to determine the suitable candidates.
- **Training and Development** - Facilitate trainings to employees
- **Performance Appraisal** - Evaluate employees periodically based on their performance using a performance rating.
- **Compensation and Benefits** - Compute employee earnings using attendance data and performance rating data
- **Organizational Exit** - Analyze factors that influence turnover.

2.2.2 Dr. Ashuthosh N. Misal – HR Trainer

Dr. Ashuthosh (2008) has identified the below processes as the [9] components of HRM.

- **Recruitment Management** - Process of hiring new employees
- **Information Management** - Managing all up to date policies and practices are well articulated and communicated to all employees.
- **Training Management** - Identification of required trainings and arranging the same
- **Performance Management** - Identification of performance criteria which suit for the organization and evaluating employees against those criteria.
- **Reward Management** - Ensuring that employees are rewarded based on their contribution to the organization.
- **Career Management** - Charting special career paths for employees for advancement in the organization
- **Health and Safety Management** - Maintaining the health and safety system in the organization
- **Discipline Management** - Administrating discipline to improve the employee behaviors
- **Culture Management** - Maintaining good cultural values in the organization

2.2.3 McGrow Bill

McGrow Bill (2007) has mentioned as [10] HRM is made up of the following activities.

- Recruitment and Selection
- Training and Development
- Performance Appraisal and Feedback
- Pay and Benefits
- Labor Relations

There are many more models proposed by HR professionals in the field. However, those can be varied based on several factors such as;

- Government regulations

Government regulations vary from country to country and regulations on employment, welfare facilities, and employee benefits can be varied accordingly.

- Size of the organization which the HRMS is going to be used.

Depending on the size of the organization (number of employees working), the HR requirements, hence HR functions can be varied. Again, the definition of size of the organization slightly varies based on whether it's in a developed country or in a developing country.

The above-mentioned models are useful to understand the HRM processes suitable for a SME in Sri Lanka.

As per Fisher, Schoenfeld and Shaw Model, Selection‟ process should be handled using the computer aided interviews. The recruitment requirements of SMEs are comparatively low, and the qualification criteria are very dynamic. Hence, computer-aided interviews are not an ideal option since implementing such is not worth enough for recruiting few employees. When HRM processes are to be automated, we need to consider whether the processes can be automated and the processes which are worth enough to automate.

Both the Fishers model and Ashutosh's model have not discussed on attendance management and payroll systems whereas Bill has identified those as components should be in a HRMS. When the local context is analyzed, most of the SMEs are already using automated attendance management and/ or payroll systems, even though they handle other HRM processes manually. Hence, it's important to consider payroll and attendance management as well.

Dr. Ashuthosh has mentioned reward, career, Health and safety, discipline and Culture management has components of a HR management. However, these processes are merely for providing facilities and are not cost-effective for automating.

2.2.4 GR Reddy

The following list of basic [11] HR functions of a SME has been identified by Reddy (2011).

- Establish basic employee data
- Give organizational inputs to employees on joining
- List basic job responsibilities

- Assign job and measure at a frequency
- List basic policies and provide guidelines
- Identify the needs for improvement of performance and execute
- Create appreciation for good work
- Build competencies for future work

Comparing to other models, the proposed model by Reddy is better and comprehensive. This model addresses the basic HR functions to be established in a local SME more accurately.

Analyzing above-said models and taking the local SMEs operational capabilities into account, following model can be proposed to automate HRM processes in a local SME.

- Recruitment Management and Selection
- Information Management
- Performance Appraisal Management
- Training Management
- Attendance Management
- Payroll Management
- Report Generation

2.3 REVIEW OF SIMILAR SYSTEMS

There are lots of HRMSs available in the market. However; most of them have been implemented focusing on large enterprises. Hence, those are very complicated and expensive.

HRM functionalities in SMEs are very dynamic, and those may vary even among organizations within SME category. Hence HRMSs implemented for SMEs should be customizable so that it's possible to cater for the changing requirements from organization to organization. Following is a comparison of currently available HRMSs developed for SMEs, and it shows to what extent those systems fulfill the HRM needs of SMEs.

2.3.1 Orange HRM

This is [12] an open-source web-based HRMS developed for SMEs. Even though it has most of the HRM processes, the functionalities provided within each process are very limited.

E.g.: Performance module – this module only provides the performance criteria and the facility for defining the performance evaluation period for each employee. Automating the entire performance evaluation process has not been included.

Self-maintaining of employee profile data and making the up to date HR policies available to all employees which should come under information management have not been included in the system.

Even the Training module shows only the available trainings, and it does not demarcate the trainings per designation wise and the training calendar.

The overall idea of Orange HRM is that its user friendly. However; the functionalities provided are very limited and preliminary, which do not cater for the dynamically changing modern HR requirements of a hotel.

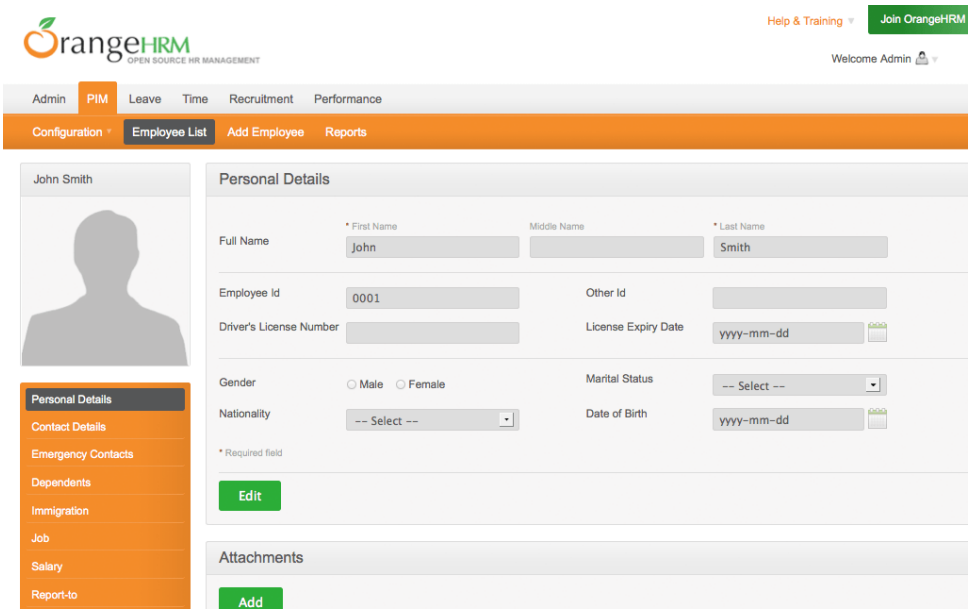


Figure 2.1: Orange HRM sample interface

2.3.2 Cemex HRM Software

Cemex Software (Pvt) Ltd is a [13] subsidiary of Cenmetrix (Pvt) Ltd incorporated in February 2014 with its primary focus being the development of Cemex HRM. Cemex HRM is a cutting-edge HR application encompassing the latest in web technologies including cloud capabilities. Cenmetrix has over 7 years of experience in developing windows-based applications ranging from time and attendance, payroll and web-based leave management to canteen management systems. HRMS developed for SMEs. Even though it has most of the HRM processes, the functionalities provided within each process are very limited Human resources, Advanced HRIS, Time and attendance, Roster and Overtime, Mobile App, Employee self-service, leave management, payroll, business Intelligence, security, organizational chart, skill management, performance management are the modules of this package. To cover the required HRM processes, SMEs have to purchase all of these solutions separately which are not cost-effective.

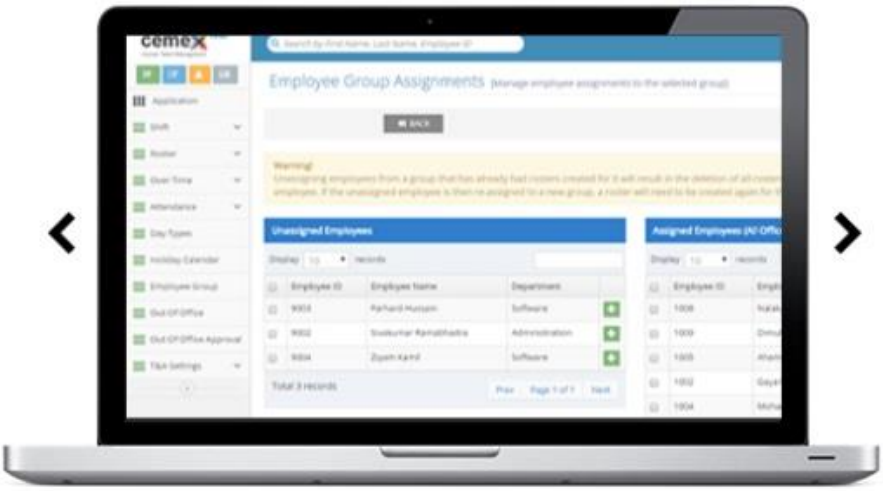


Figure 2.2: Cemex HRM Sample interface

2.3.3 MINT HRM Software

Managing the employee data is no more challenging. [14] MINT HRM provide customer an affordable, flexible Human Resources Information System (HRIS) that everyone likes to use. With Mint HRM your employees are connected to one platform regardless of the time, place and the devise of their choice. We can set you free for a joyful experience at work. I could identify some new functions from this website also. Ex: Learning and development, recruitment, performance management, admin dashboard, payroll, employee information management, self-service, absent and leave, time and attendance management. There are some problems in this solution also as follows.

- Data and information go to the outside of the organization or to the third person.
- This system is totally depending on internet connection and need high speed reliable internet connection, but BBH do not have a good internet connection.

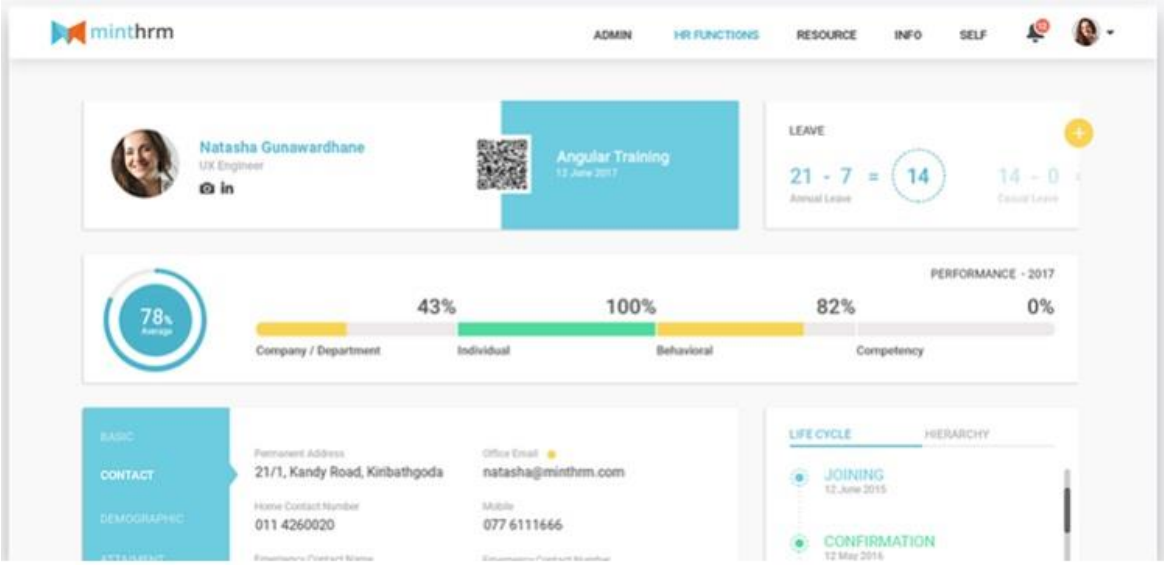


Figure 2.3: MINT HRM sample interface

2.3.4 Micro Image HRIS Software

Microimage HCM is [15] a leading Human Capital Management (HCM) software solutions provider, founded in 1995. Microimage HCM products are used by diverse client base globally. Microimage's latest digital HCM product is designed to power digital transformation of Human Resources. They are an ISO 9001:2008 certified company. Microimage maintain high standards when it comes to product quality assurance, professional services and post implementation support. Microimage also works closely with Microsoft Corp, as a **Microsoft Co-Sell Ready Partner**. With over 15 years of domain experience in human resources working closely with HR consultants and related domain experts, company continues to incorporate best HR practices with latest innovative technologies. The main disadvantages of this solution are high level price and highly depending on the internet connection.

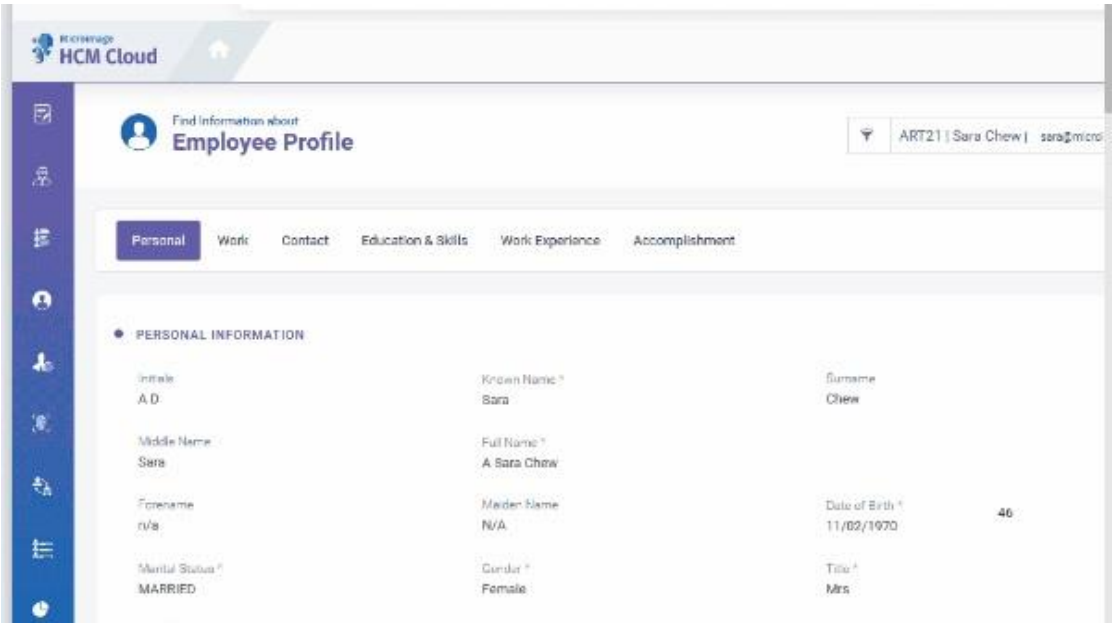


Figure 2.4: Micro image sample interface

2.3.5 hSenid HRIS Software

hSenid Software International is [4] a software development company operating from Australia, Singapore, Africa, India and Sri Lanka. It was founded 1997 with the aim of supplying high quality software products and services to its customers worldwide. hSenid is an application and service provider for the telecom, financial and enterprise markets. They specialize in human resource applications and mobile applications for the enterprise and wireless markets. hSenid is also widely recognized for its reliable offshore/outsourcing capabilities. Currently we are serving over 400,000 users globally across 18 industries in 30+ countries. We cover a wide spectrum of HR needs with core HR modules, operational HR modules, industrial relations modules, strategic HR modules and reporting and analysis modules. Our HR solutions can be easily configured to meet the

requirements of any business, be it a multi-national conglomerate or a budding start-up. To cover the required HRM processes, BBH has to purchase all of these solutions separately which are not cost-effective. And also, they do not have good solution to solve complex hotel attendance requirements such as split shift and night shift automation.

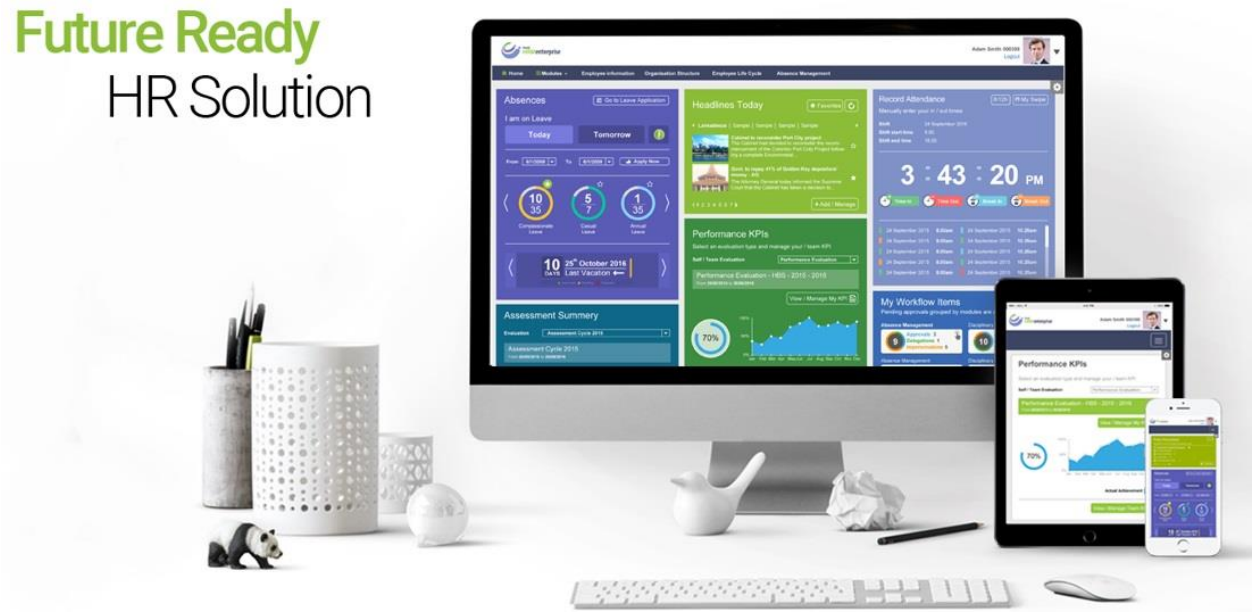


Figure 2.5: Hsenid sample interface

2.3.6 Ultimate Software's UltiPro

At Ultimate Software, [18] they have always put their people first. This idea permeates their culture to its core. For over 25 years, it has driven them to create the innovative products and services they offer today. As a result, UltiPro enable their customers to put their people first helping them build the people-centric environments they need to grow and meet their business goals. UltiPro believe software should work for people. Not the other way around. Customers choose UltiPro for their sophisticated people management technology delivered in the cloud. But they know that it's the results how well they improve the personal work experience for customer and customer's employees that matter most.

UltiPro's awarding – winning functionality includes human resources, payroll, benefits management and open enrollment, comprehensive reporting and analytics, a web portal with employee and manager self-service, recruitment and staffing, onboarding, compensation management, performance management and reviews, talent retention tools, time and attendance, workforce scheduling and more.

Ultimate software has built its web base, unified human capital management solution using an XML interface in a service-oriented architecture environment with a .Net 3.0 framework, ensuring faster performance, smoother integration and quicker development and implementation. The main disadvantages of this solution are high level price and highly depending on the internet connection.

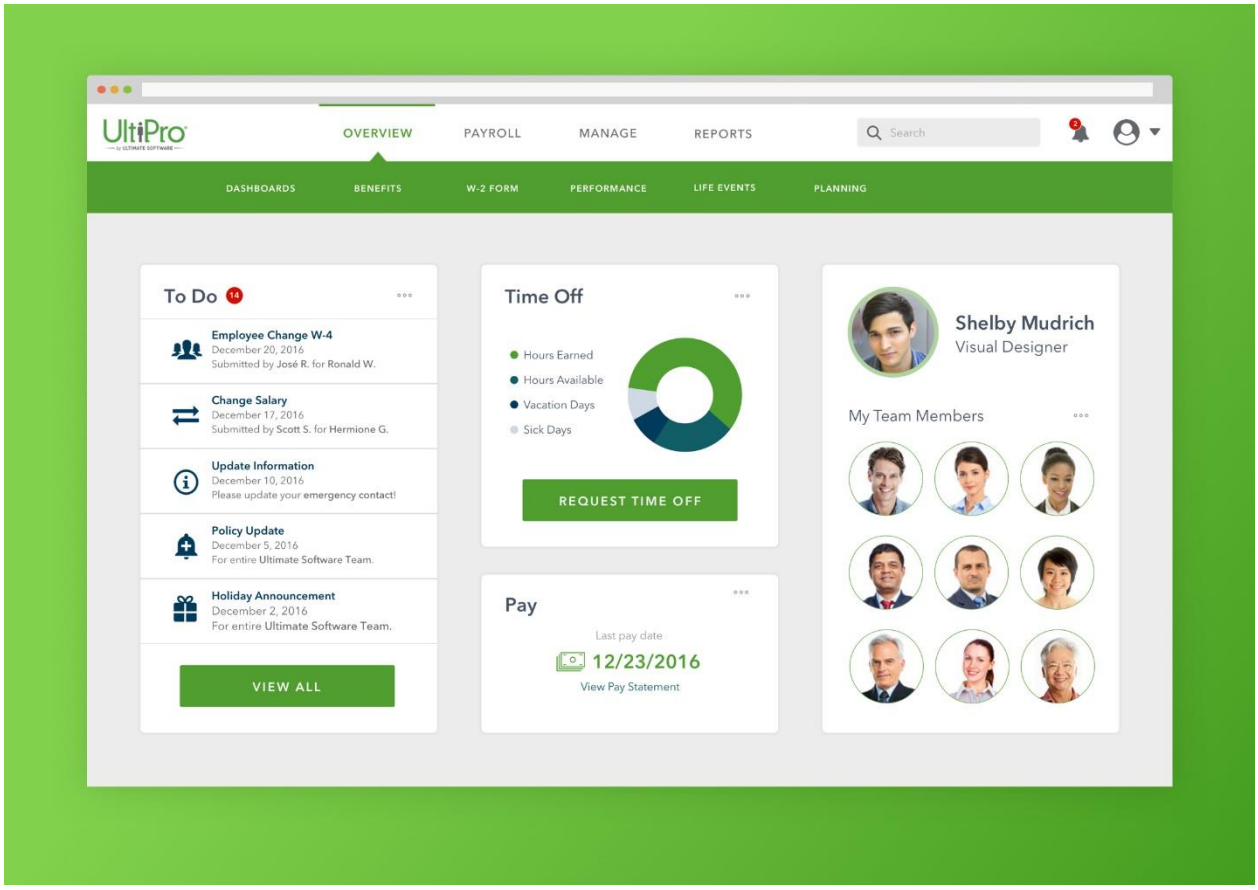


Figure 2.6: UltiPro system sample interface

2.4 CHAPTER SUMMARY

This chapter explains about human resource management, the importance of it, difficulties faced by Bright Bravo Hotel without a proper management of human resource and how important for them to have a good human resource management process. Further, this chapter reveals the core human resource management processes a hotel should have, solutions available in the market to overcome the human resource management problems and the barriers BBH face while using those solutions. Finally, this chapter describes how information technology can solve these issues using HRISs, the currently available HRISs in the market and their comparison.

Chapter 3 – Methodology

3.1 INTRODUCTION

This chapter give an overview of system analysis and system design. Requirements gathering and analysis is a significant practice for a successful project. The main processes of this phase include domain understanding, requirements collection, classification, structuring, prioritization and validation. Appropriate methods and processes were engaged to carry out the analysis phase in an effective way. Software design phase is an iterative process in which requirements gathered in analysis are translated into a “blueprint” in building the system. Afterwards this can be elaborated into detailed functional and behavioral requirements. The output of the design phase is the system specification.

3.2 ANALYZING THE CURRENT SYSTEM

To recognize main system functionalities, it is vital to analyze the current system methodologies. Domain analysis was carried out through certain fact gathering techniques such as interviews, observations and consulting domain experts in the domain's own terminology. Currently BBH has not used any HRIS in their hotel and they are currently doing lot of paper works.

Analysis phase is very important in software development since it identifies what the user exactly needs and what the system should do independent of how those would be implemented. Identifying the system requirements first and breaking down those into detailed functional and non- functional requirements are main steps of analysis phase. Further to identify the correct software and hardware requirements also detailed down under this phase.

Based on the discussions had with Bright Bravo Hotel staff and based on the identified core HRM processes should be possessed under chapter 2, the high-level requirements of the proposed HRMS have been described as follows;

3.3 FUNCTIONAL REQUIREMENTS

Following user types have been identified in the HRIS.

- Admin user
- HR Users
- Employee – This is the lowest privileged level of users. All the above user categories have employee privileges plus their specific privileges

According to analysis following system functionalities were identified

- Manage employee profile
- Manage employee attendance
- Manage company settings
- Manage employee leaves
- Manage OT and Roster
- Manage salary formula
- Manage allowances and deduction
- Manage mobile application

3.3.1 High Level Use Case Diagram for HRIS

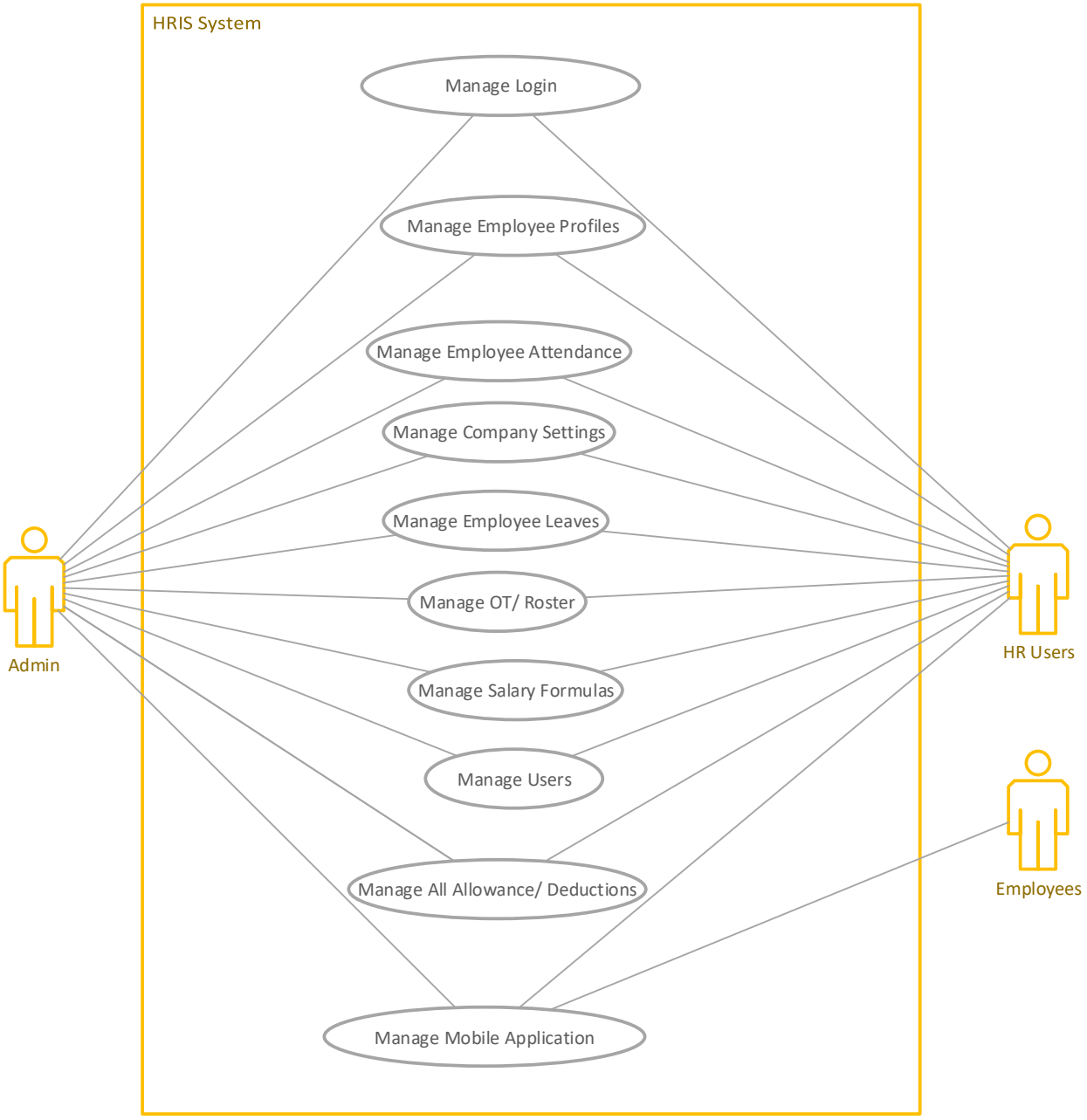


Figure 3.1: high level use case diagram

The following are the detailed functional and non-functional requirements pertaining to above-mentioned high level requirements. The detailed software functionalities of each module have been illustrated using use case diagrams. Sequence diagrams have been used to illustrate the sequence of the actions occur in some of the modules.

3.3.2.1 Use Case Diagram – Manage employee

Figure 3.2: Manage employee use case diagram

3.3.2.2 Use Case Scenario – Manage employee

Name	Manage Employee Profiles
Brief Description	Add / Edit Various Employees in the system. User can add new employee profile. And also, can change name, department, designation, employee type etc.
Actor(s)	Admin/HR Manager/Staff
Flow of Events	
Basic Flow	

This use case starts when a system user is logged in to the system and try to add new employee to the system. **Add Employee Profile** System user should select "Employee Profile" menu from main menu. If the current user's level has permission to **add** new employee profile then system will load employee profile screen. Else system will display message as access is denied. System user can fill all necessary fields and click save button to add *employee* profile data to the system. **Edit Employee Profile** System user should select "Employee Profile" menu from main menu. If the current user's level has permission to **edit** existing employee profile then system will load employee profile screen. Else system will display message as access is denied. System user can change all necessary fields and click save button to edit employee profile data of the system.\ System user can change name, address, EPF No, department, designation, category, employee type, leave entitlement, basic salary, bank information, date of join and many other basic information of any selected employee from this screen.	
Alternate Flows	
Title	**Description**
Fails Registration	If the User entered an invalid Employee details, the following occurs: The system describes the reasons why the user failed registration. If current user has not permission to add new employee profile to the system, then system will restrict the user registration by displaying message as "access is denied".
Pre-Conditions	
Title	**Description**
Active user	User should be login to the system before add / edit employee profiles.
Post-Conditions	
Title	**Description**
Success	Successfully add or edit employee profile information in the database. Registered employee should be assigned to relevant roster. Company active carder will increase by one. Registered employee later can be registered as user of the system.
Failure	Invalid data Insertion
Extension Points	
Special: The system will automatically calculate and fill Date of birth, Age, Gender, and Titles fields when user add the NIC number to the system.	

Table 3.1: Use Case Scenario – Manage employee

3.3.3.1 Use Case Diagram - Manage employee leave

Figure 3.3: Manage employee leave use case diagram

3.3.3.2 Use Case Scenario - Manage employee leave

Name	Manage Employee(s) Leave
Brief Description	Apply / Cancel leave for selected Employee. User can apply leave for absent days of employee(s). And also, can be cancelled the applied leave with remarks.
Actor(s)	Admin/HR Manager/Staff
Flow of Events	
Basic Flow	

This use case starts when a system user is logged in to the system and try to apply leave for the employee **A. Apply Leave** 1. System user should select "Apply Leave" menu from main menu. 2. If the current user's level has permission to **apply leave,** then system will load leave apply screen. 3. Else system will display message as access is denied. 4. System user can fill all necessary fields with leave type and leave day and leave amount and click "Add" button to add selected leave to the leave apply list. 5. If user wants to add another day to leave applying list, then user can select another day and do the above steps as same. 6. Finally, user should click "Save" button to apply leave for selected days. **B. Cancel Leave** 1. System user should select "Cancel Leave" menu from main menu. 2. If the current user's level has permission to **cancel leave,** then system will load leave cancelling screen. 3. Else system will display message as access is denied. 4. System user can select applied leave application by search and click "Save" button to cancel selected leave application.	
Alternate Flows	
Title	**Description**
Fails Leave Apply	1. When employee already applied leave for the specific Day 2. Employee doesn't have enough leave balance. 3. User don't have permission to apply/ cancel leave. 4. User trying to apply leave for worked day. 5. User trying to apply leave for off day.
Pre-Conditions	
Title	**Description**
Active user	User should be login to the system before apply or cancel leaves.
Post-Conditions	
Title	**Description**
Apply leave successfully	Successfully save leaves to database. Deduct leave amount from relevant leave type for leave applied employee
Cancel leave successfully	Cancel leave from database by changing status of leave. Add leave amount for relevant cancelled leave type and increase leave balance.
Extension Points	
None	

Table 3.2: Use Case Scenario - Manage employee leave

Note : The navigation to other use case diagrams and their use case scenarios have been illustrated under Appendix A.

3.4 NON -FUNCTIONAL REQUIREMENTS

Detailed software requirements can be categorized in to functional and non-functional requirements. Non –functional requirements deal with the constraints or the qualities of the software solution. Functional requirements defined "what" the system should do and non-functional requirements specifies "how" the system should do what is expected to do. Following are the identified non – functional requirements for the HRIS

3.4.1 Usability

System should be user friendly and system should have simple and clear layouts to increase user friendliness of the user. I planned most of the interface as look and feel interfaces. It will increase the understandability of the user. Final and most important thing is system should be accepted by all users.

3.4.2 Security

This system has used two main security options to provide strong security to the system. User level and user view level is used to control system users. Only the authenticated users have been allowed to perform the software operations. Some departments and branches of the company will be hidden for some user levels.

3.4.3 Availability

System should be available all the time 24*7

3.4.4 Reliability

System generated reports and outputs should be reliable. The mean time between failures for the system will be 1000 hours. The system should be available 99.9% of time for 2-4 users. The system will be used 12 hours a day. The system saves sensitive data of employees. Hence the design must consider the integrity and security of the data. The data will be backed up every day. The system will display 100% accurate data.

3.4.5 Recovery

When we discuss about recovery time scales, the response time will be less than 8 seconds for 95% requests made to the system. The backup frequencies of the HRIS will be day and it will be happened automatically on tapes every day. Because the backup is scheduled to run automatically at 10 pm every day.

3.4.6 Portability

The system will run on windows 95 /98 /2000 /NT /XP /Vista /Windows7 /Windows10

3.5 SOFTWARE AND HARDWARE REQUIREMENTS

It was decided to develop the system in windows based due to following reasons

- Windows based or thick client applications are sufficient to Bright Bravo Hotel with intranet setting since the purpose of the software to be used within the organization.
- Windows based applications have a higher processing speed over web-based applications hence it's better to increase the productivity of the users.

- Windows based applications do not have security threat like web applications as the application is not exposed to external world hence its ideal for HRIS; which process all the sensitive data of the employees and the organization
- Windows based applications can offer more robust graphical user interface (GUI) and better features which increases the employee's productivity.
- Windows applications can support more user-friendly features than web applications.
- Windows applications do not have to depend on internet facility like web applications

With the decision of implementing a windows-based HRIS application, it was decided to use VB.Net since .Net is specially made for develop windows applications as it provides better UIs.

The most commonly used programming languages in the software industry are .Net and Java. It's very important to choose a commonly used programming language as to make sure the compatibility with other software and platforms

Between Java and .Net, it was decided to use .Net due to following reasons.

- .Net is made for windows-based applications
- Provides better UIs
- Easier to refer external assemblies (Ex: Microsoft Outlook in HRIS context) using .Net
- Debugging is easier
- Deployment is very easy and simple
- Development takes less time comparing to java development (for me)

Microsoft SQL Server 2016 Express Edition was selected as the database after comparing with MySQL and the reasons are as in Table 3.1

Feature	MySQL	MS SQL 2016 Express
Cost	Free	Free
OS Support	Many	Windows
Core DB operations	Yes	Yes
Security	Low	High
Back up	Not easy	Easy

Table 3.3 Comparison between MySQL and MS SQL Express

Further the advantages of using MS SQL Express over MySQL

- Stable technology road map
- Leading development tools
- Tools for simpler migration
- Free performance enhancing features

The finalized software and hardware requirements of HRMS are listed in following table

Software	.Net Framework 4.0, SAP Crystal Reports for VS 2010, Microsoft SQL 2016 Express Edition
Operating system	Windows OS
Hardware	Core i3, 2 GHz, 4 GB RAM
Other devices	ZK K14 fingerprint device or ZK iFace 302 face detection

Table 3.4 Software and hardware requirements of HRIS

The attendance module of the system was needed to download in and out records from third party attendance recording terminal. BBH already has an attendance terminal which produced by ZK TECO company. I could download SDK file of existing ZK devices and communicate with fingerprint device and also could communicate with ZK face detection modal device as additional work. BBH has fingerprint device but I enhanced the system to communicate not only fingerprint device but also can communicate with face detection device. Because it will help to future enhancement of the system.

Digital fingerprint devices are capable to capturing employee movements and stored in digital format. There are vast varieties of machines available on market. Differences are capabilities and attractive functionalities. All those machines have similar primary functionalities. Uniquely identifies employees from their fingerprint, face detection or given proximity card and matches unique id assigned for individual employee. When the employee swipes the card, keeps the fingerprint or stand in front of face detection, the system records his id, date and time on memory. Stored memory details are converting into ASCII text file. This file format is configurable. Number of employees stored on this machine and number of records stored in memory depends on this machine's price and price depend on performance. All those devices connected to the computer directly or via network. When you install the machine there is a computer program come up with the device. It reads machine memory and generate ASCII text file or we can save those data directly to database. This generated text file can be accessed by other computer programs. I could download data directly to database through network with the help of their SDK files. This functionality and devices have illustrated on following figure 3.4 to figure 3.6

Figure 3.4: ZK-K14 Fingerprint reader device

Figure 3.5: ZK-I Face 302 Face detection device

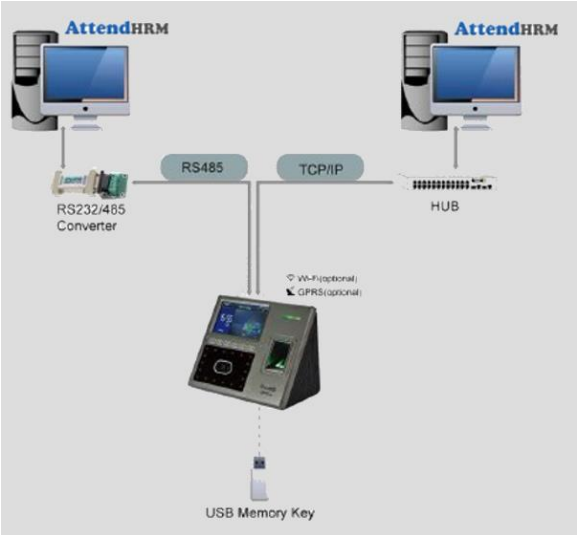


Figure 3.6: Communication functionality diagram

3.6 DATABASE DESIGN

Good designing is very important in developing a good system. To convert the analyzed requirements in to code, designing should be done in a proper way. Both database design and User Interface (UI) design of HRMS have been discussed in this chapter.

Database design illustrates the table structure of the database, the relationships among tables and how each entity joins with other entities of the database. This information has been depicted using ER Diagram.

3.6.1 Entity Relationship Diagram (ERD)

ER diagrams facilitate visualizing the database with its entities, relationships and the data flow among tables. ER diagrams are very important to understand how the database actually works with all the interactions and data flows. The ER diagram of the system is shown in figure 3.7.

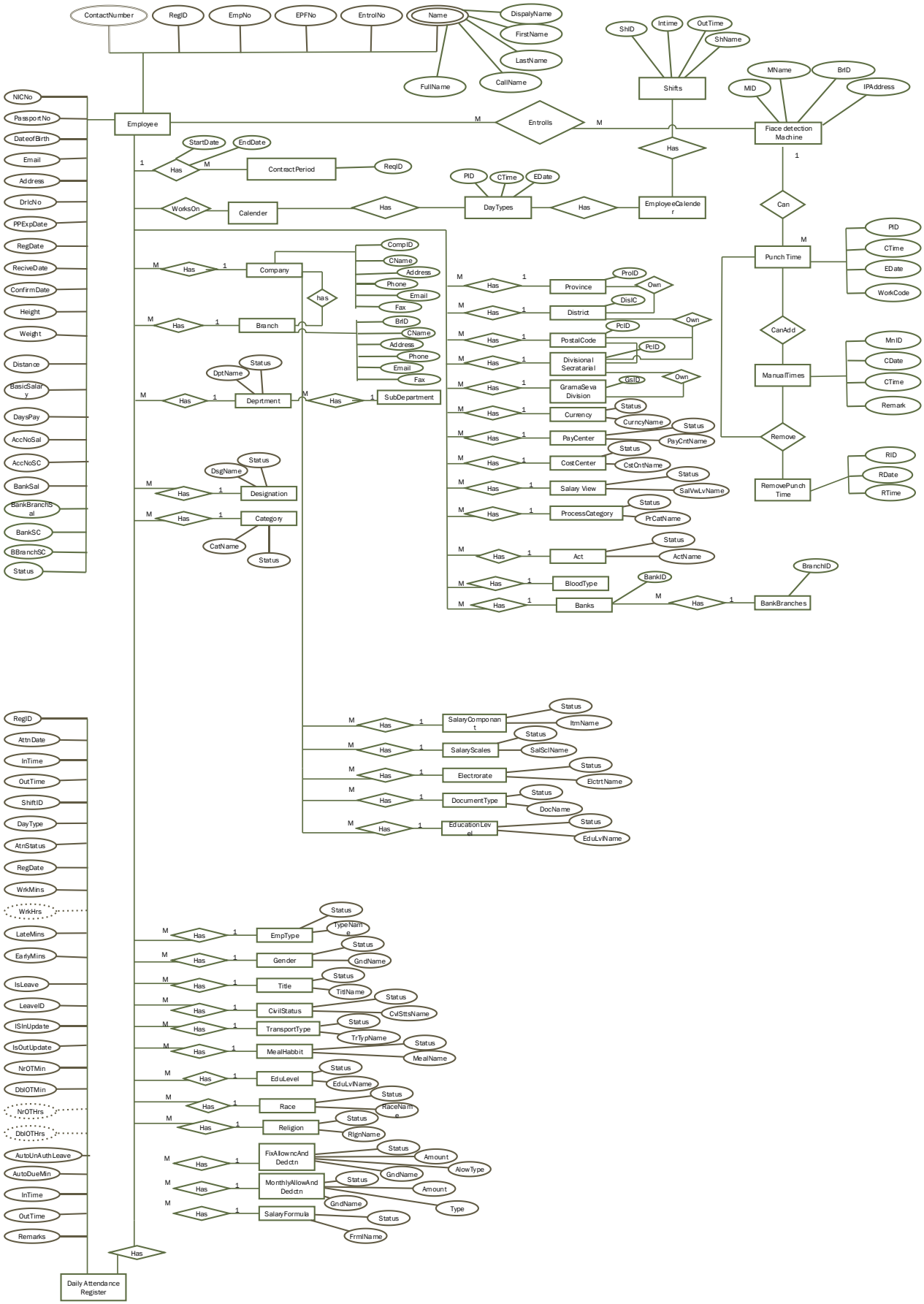


Figure 3.7: ER Diagram of HRIS System

3.6.2 Table Structure of Database

Figure 3.6.2: Table Structure of HRIS

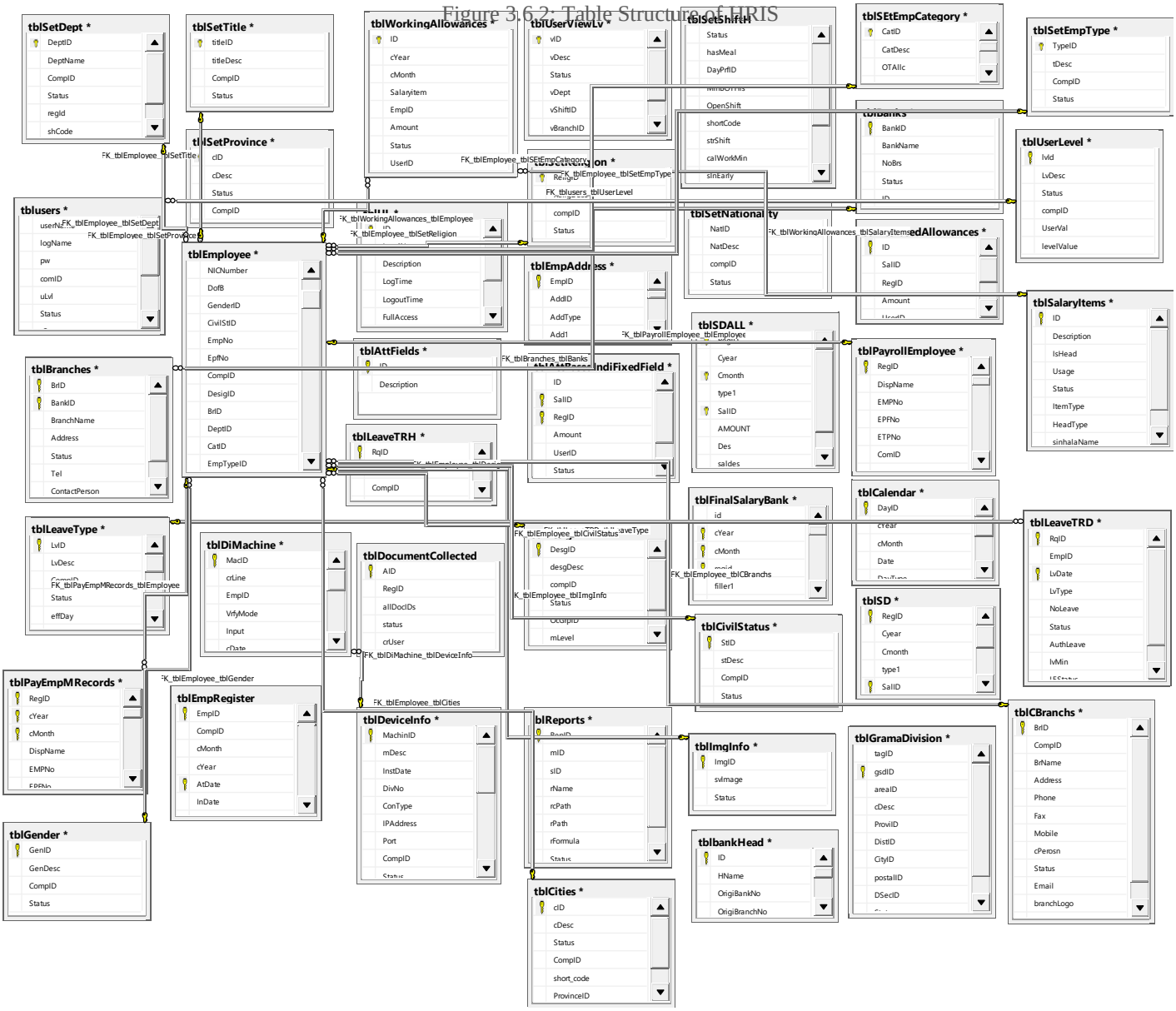


Figure 3.8: Table structure of HRIS database

3.7 UI DESIGN

End users of the system interact with the system through user interfaces or screens of the system. Hence, it's crucial to design the screens in such a way that the user can understand, simple, attractive graphical representing, and user friendly.

The UIs of the system have been designed as following;

Home screen of the system has a left navigational panel to support the navigation of each main functions of the system and summary dashboard to get idea about company'

3.7.1 Home screen of HRMS with its left navigational panel.

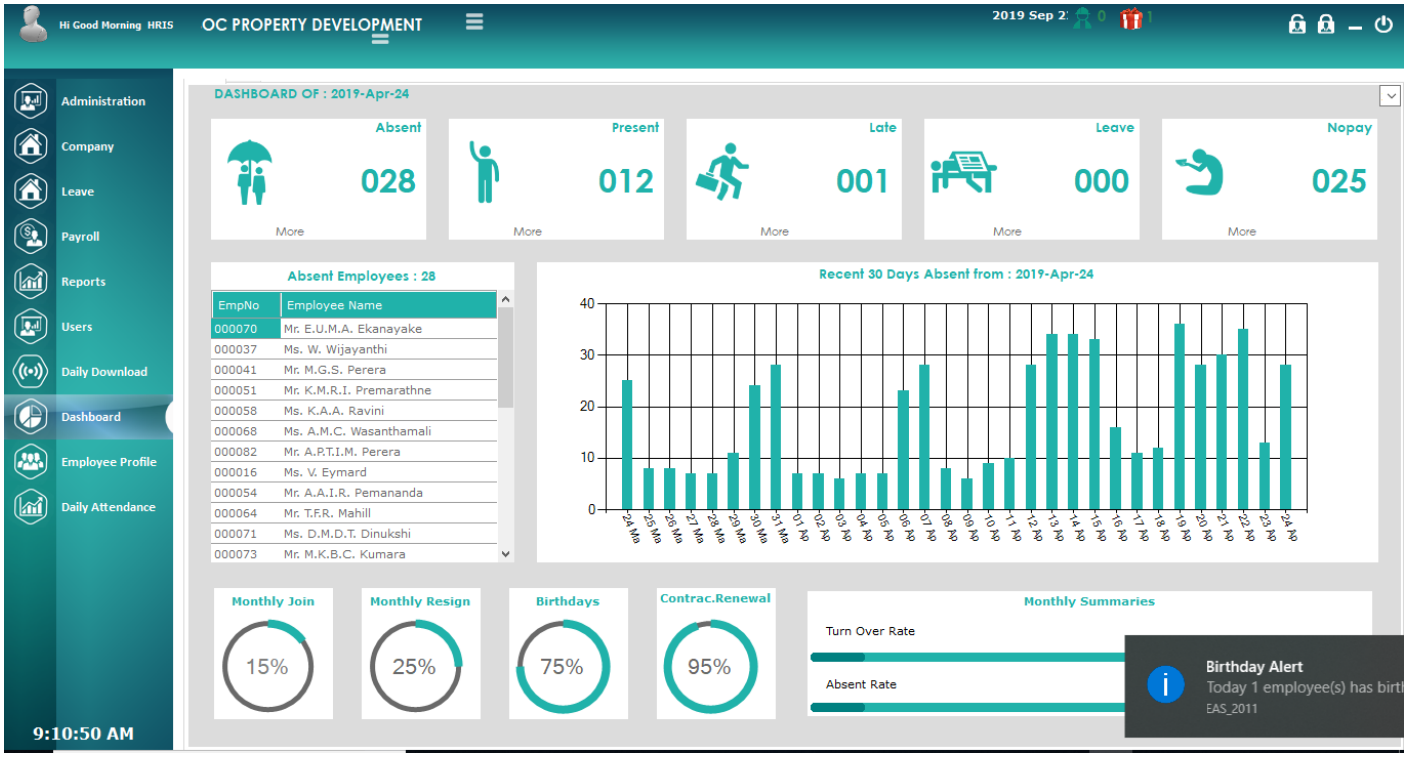


Figure 3.9: illustrates the Home screen of HRIS with its left navigational panel.

3.7.2 Employee profile screen

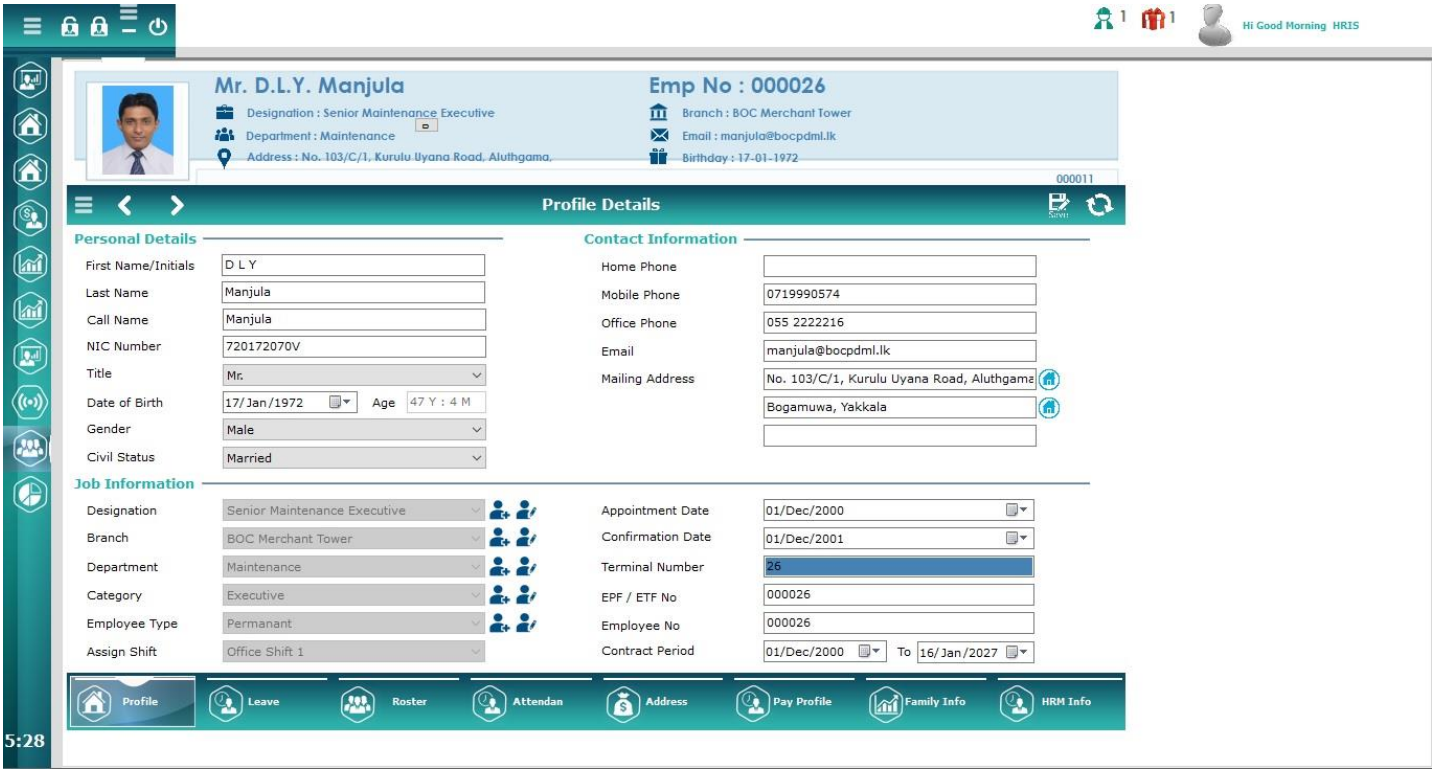


Figure 3.10: illustrates the employee profile screen

3.7.3 Navigation from main screen

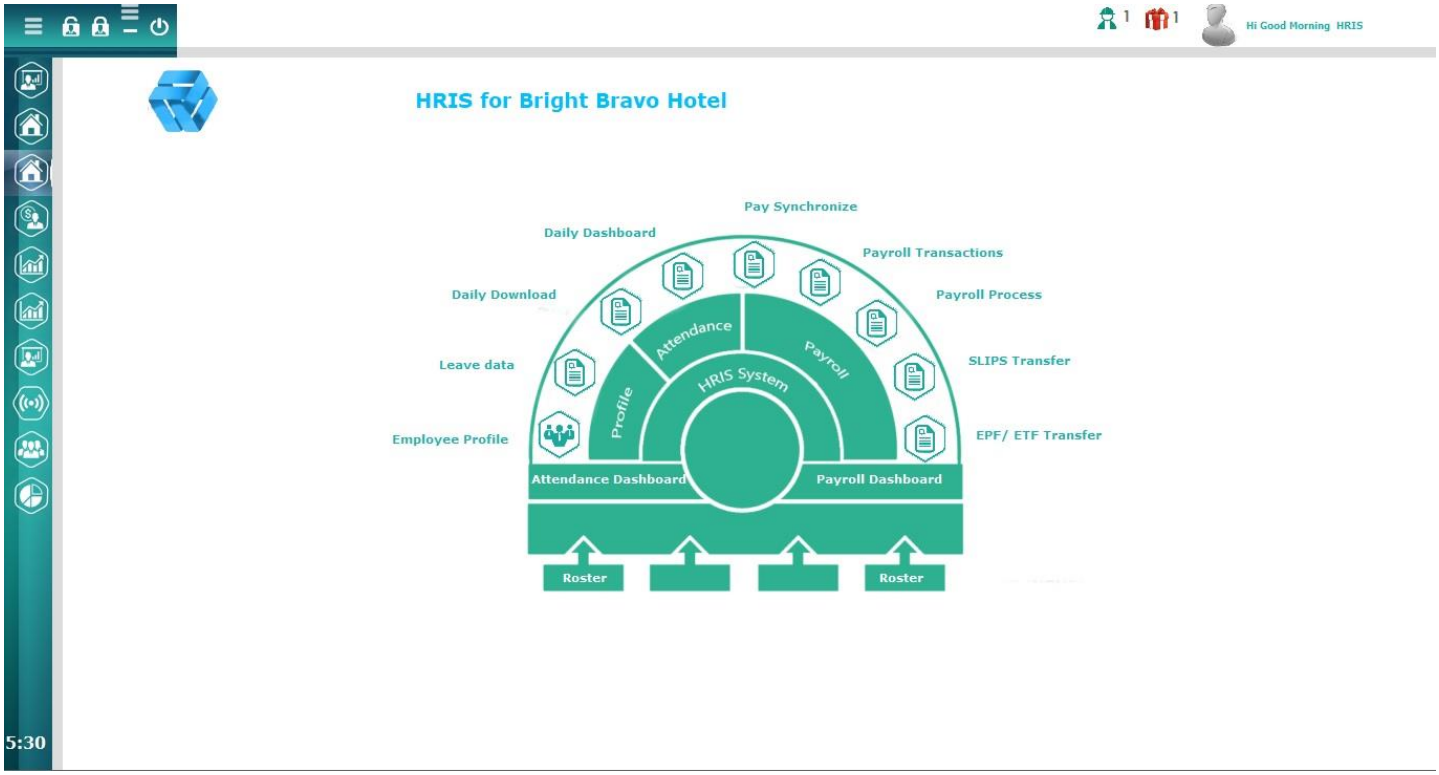


Figure 3.11: illustrates the main menu of HRIS

3.7.4 Data download from fingerprint terminal

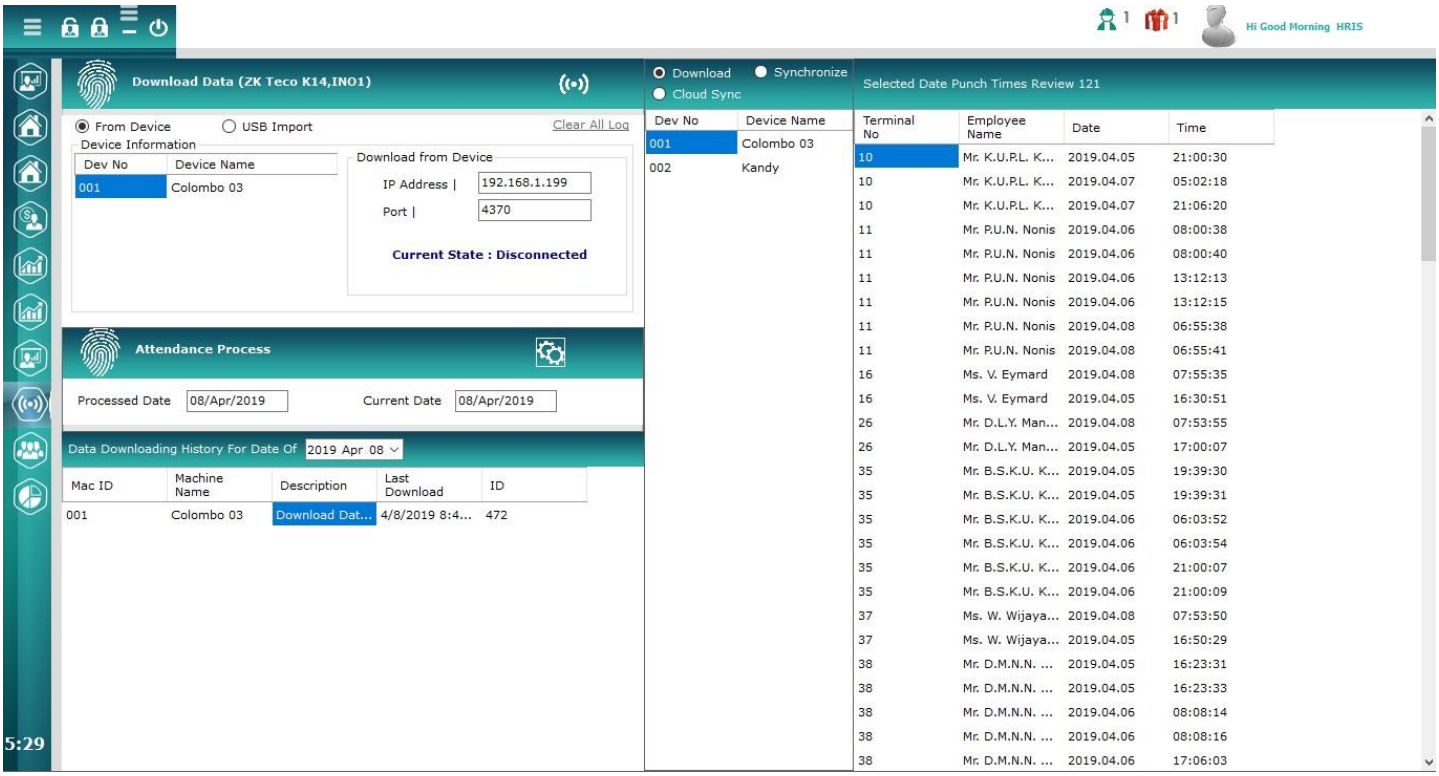


Figure 3.12: illustrates the data download screen

3.7.5 Create and configure users

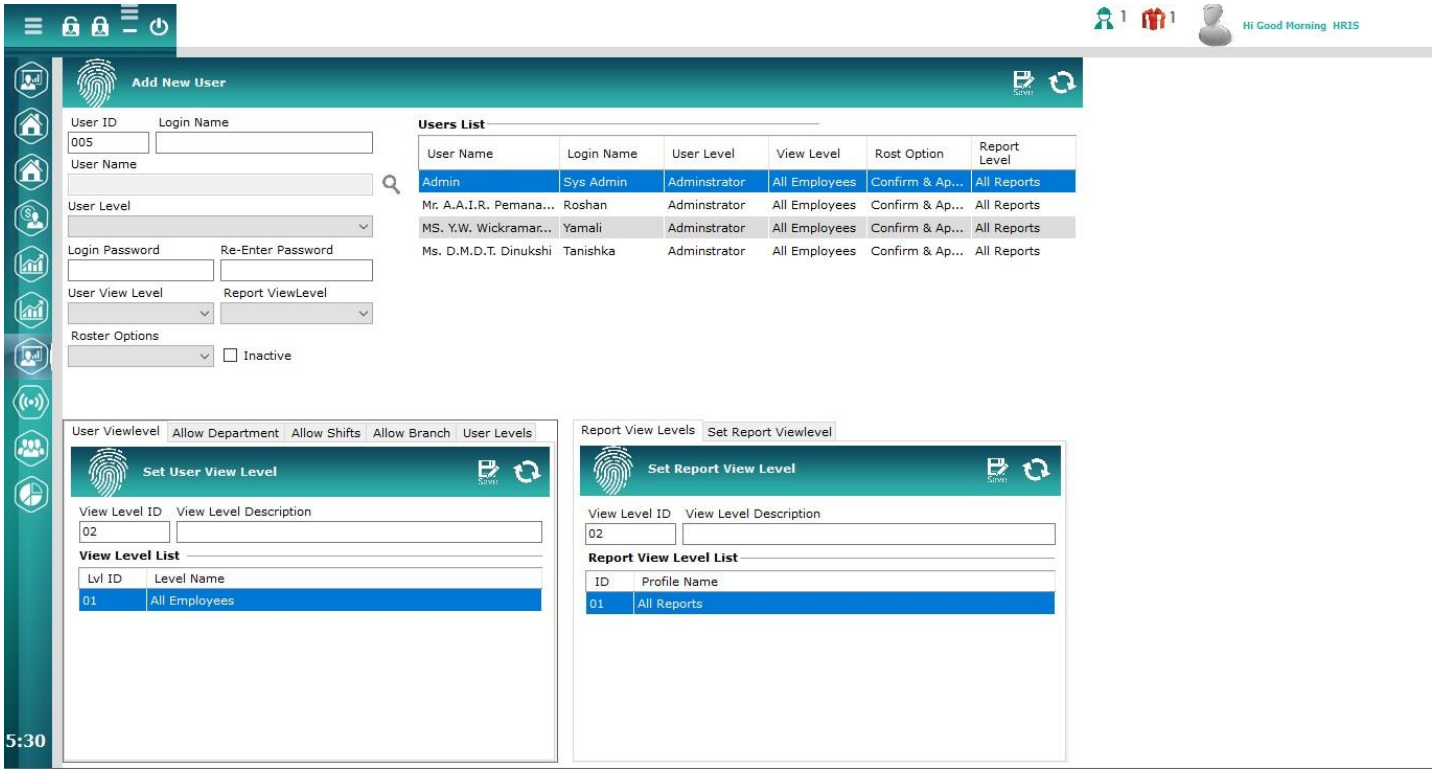


Figure 3.13: illustrates the user configuration screen

3.7.6 Company settings

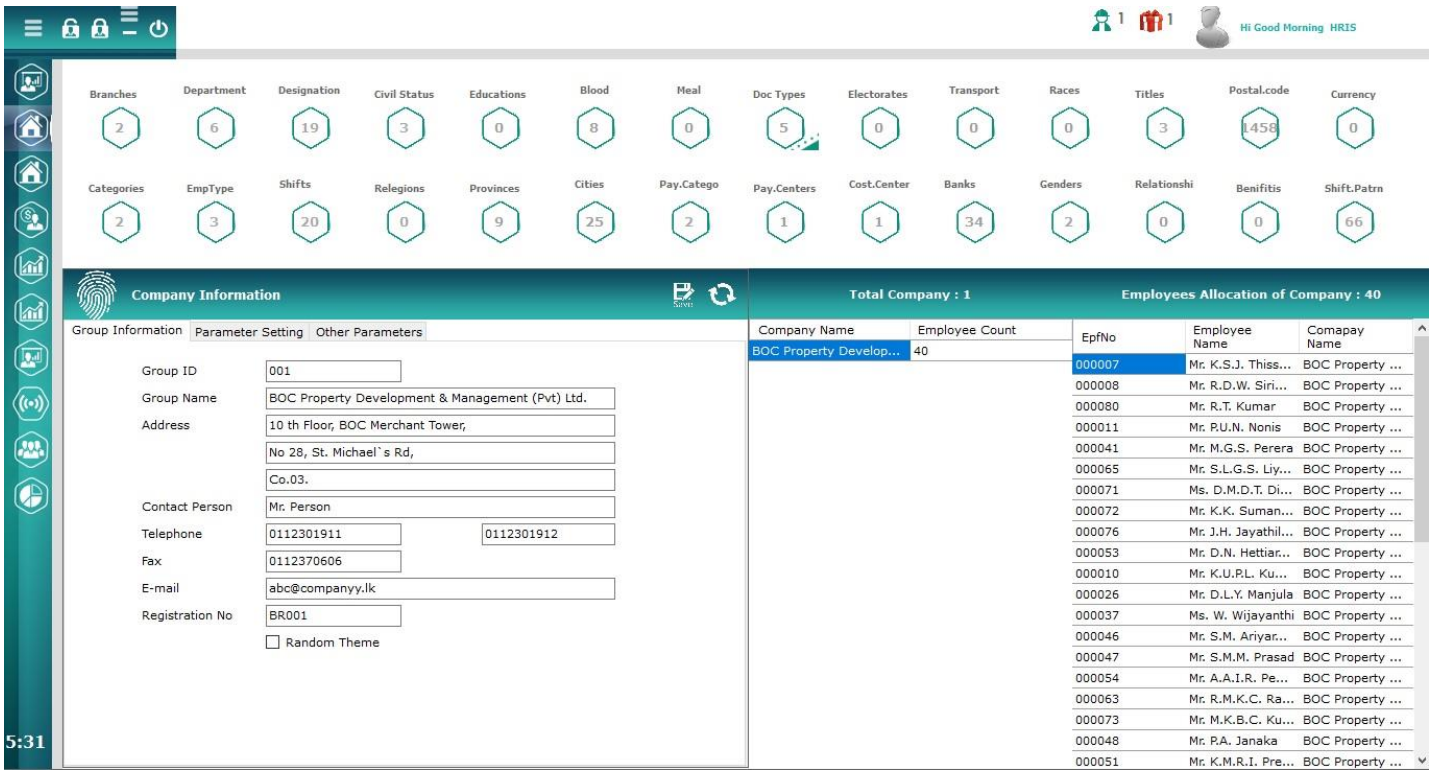


Figure 3.14: illustrates the company all settings screen

3.7.7 Annual Analysis of selected employee using charts

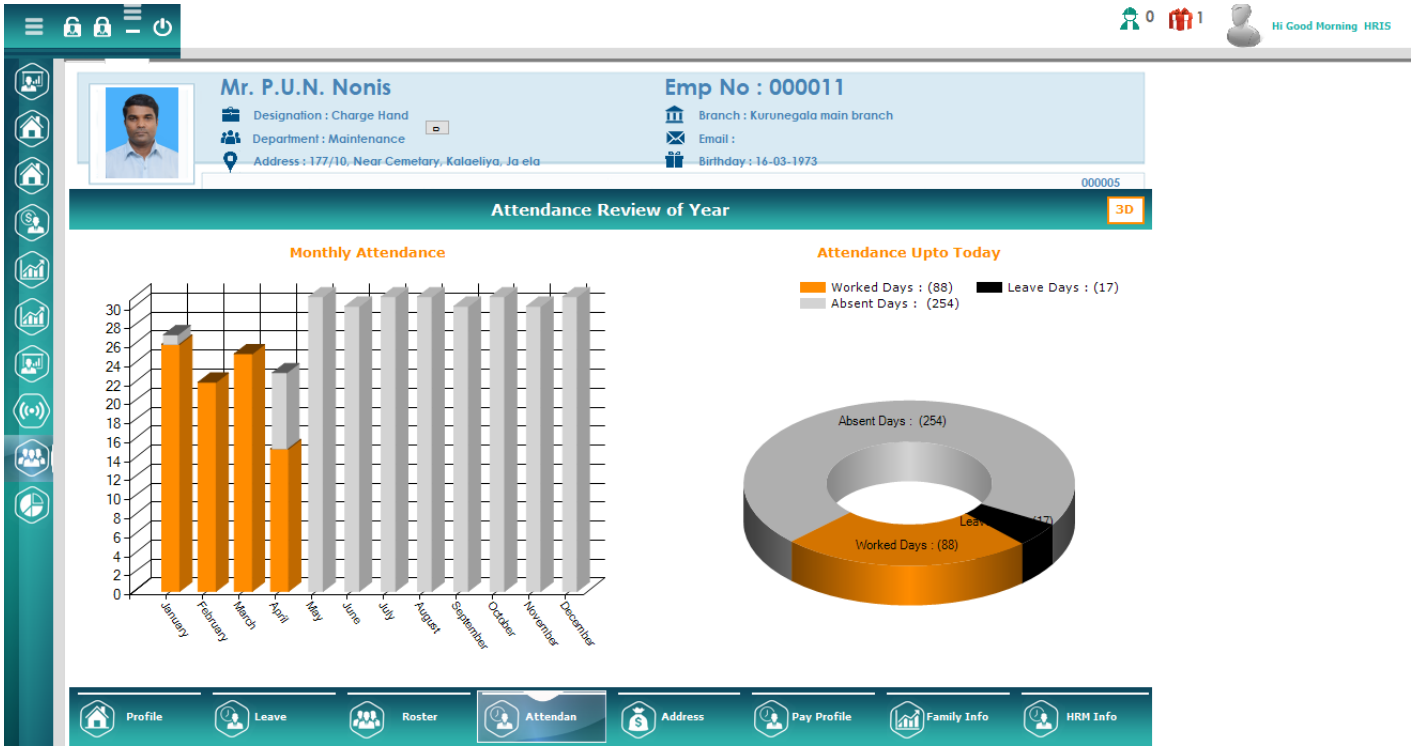


Figure 3.15: Selected employee's attendance analysis for current year

3.7.8 Add monthly allowances and deduction in Payroll module

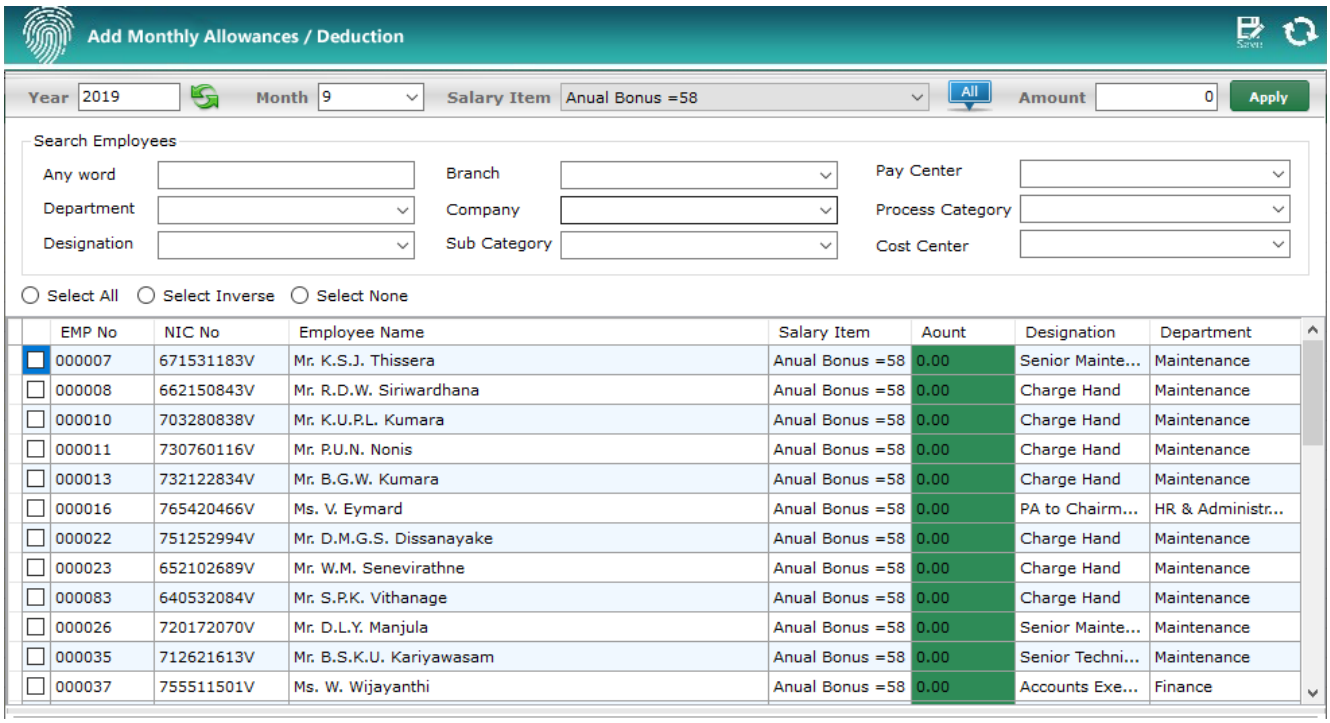


Figure 3.16: Illustrate the monthly transaction adding screen

3.7.9 Set Processing formula for all salary component

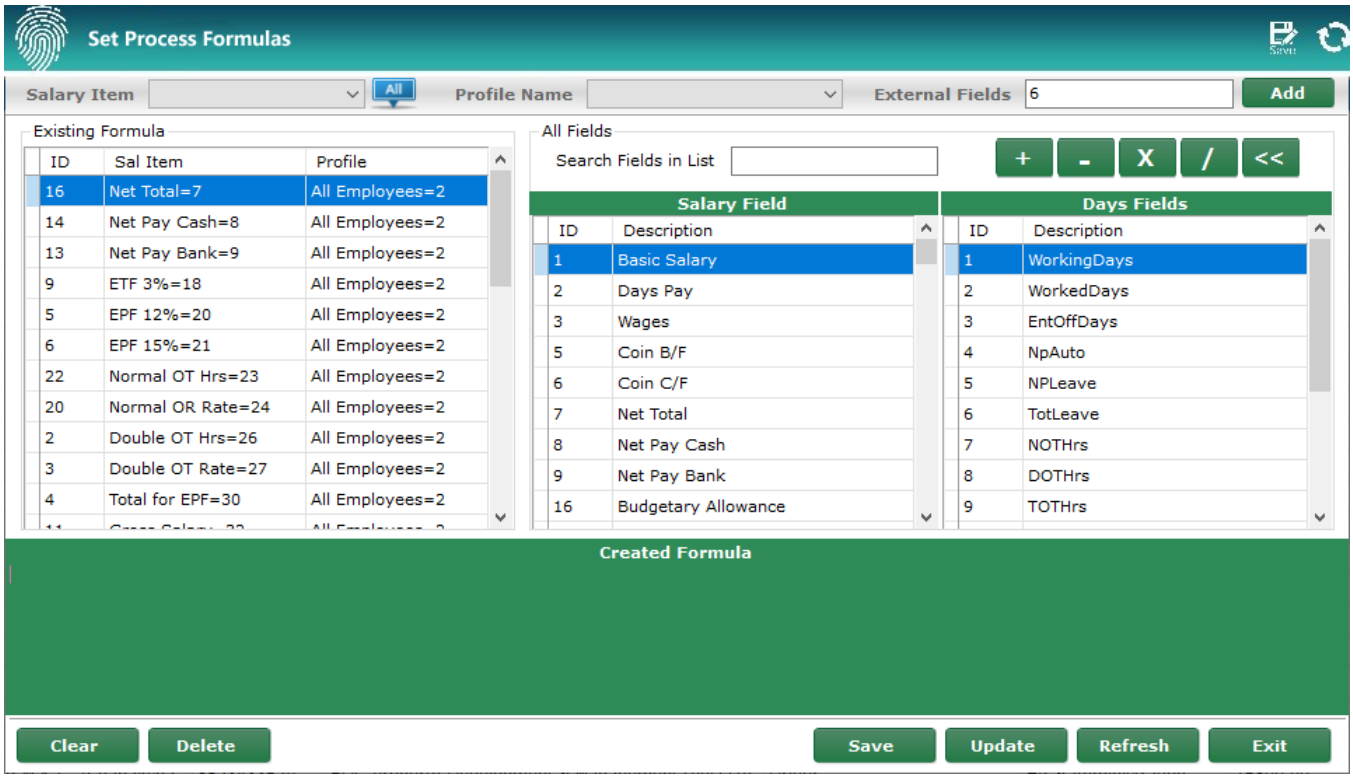


Figure 3.17 Illustrate formula editing screen of payroll module

3.7.10 Screen shots of mobile application

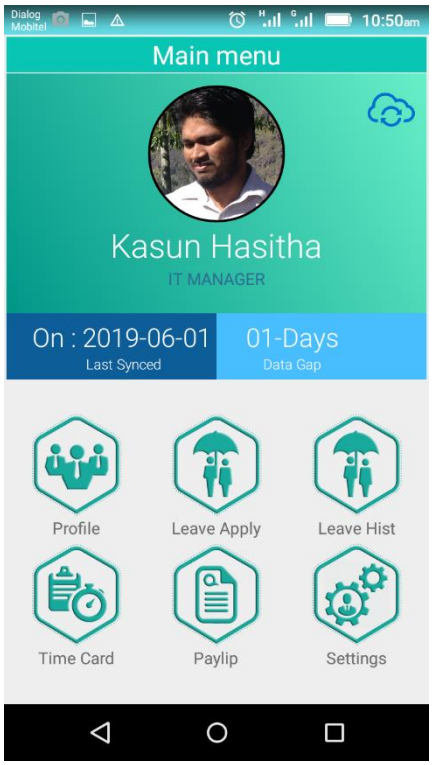


Figure 3.18: Mobile app – main menu

Figure 3.19: Mobile app – profile data

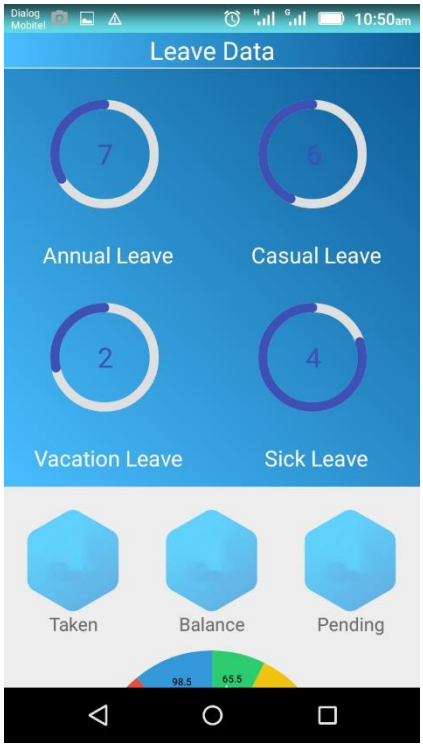


Figure 3.20: Mobile app – leave data

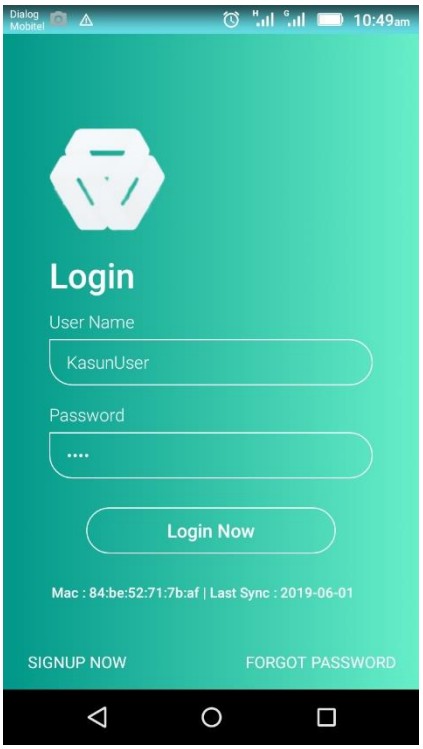


Figure 3.21: Mobile app – login

Figure 3.22: Mobile app – pay slip

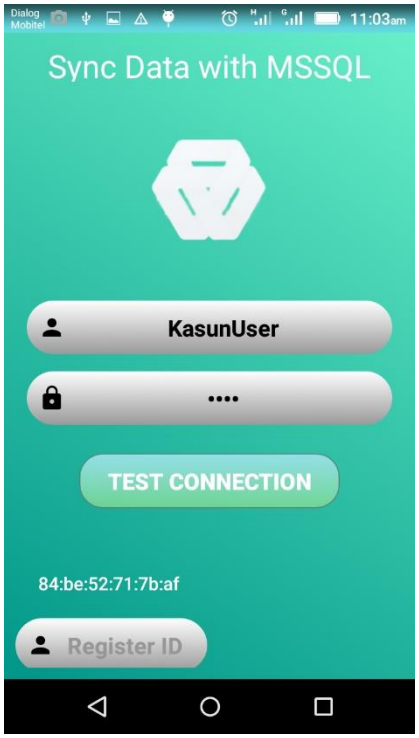


Figure 3.23: Mobile app – check connection

3.7.11 Reports generated using system

Bright Bravo Hotel (Pvt) Ltd.

Employee Time Card

Date Between 01/Mar/2019 and 31/Mar/2019

Name : Mr. B.S.K.U. Kariyawasam Department : Maintenance EPF No. 000035

Designation : Senior Technician

Emp No	Date	Day Name	Stats	Day Type	Shift	In Time	Out Date	Out Time	Worked Hrs	Ex. Hrs I	Ex. Hrs II	Ex. Hr III	WRK Day	LV Day	Start	Stop
000035	01/03/2019	Friday	PR	WD	B	10:13	01/03/201	21:00	10.78	0.00	0.00	0.00	1.00	0.00	12:00	21:00
000035	02/03/2019	Saturday	PR	SD	O1	07:18	02/03/201	17:00	9.70	9.00	0.00	0.00	0.00	0.00	00:00	**
000035	03/03/2019	Sunday	PR-OF	SD	E	06:10	03/03/201	21:03	14.88	0.00	9.00	0.00	0.50	0.00	07:00	19:00
000035	04/03/2019	Monday	PR	WD	A	05:49	04/03/201	21:01	15.20	5.00	0.00	0.00	1.00	0.00	07:00	16:00
000035	05/03/2019	Tuesday	PR	WD	A	05:51	05/03/201	19:07	13.27	3.00	0.00	0.00	1.00	0.00	07:00	16:00
000035	06/03/2019	Wednesday	PR	WD	A	05:53	06/03/201	19:23	13.50	3.00	0.00	0.00	1.00	0.00	07:00	16:00
000035	07/03/2019	Thursday	PR	WD	A	05:53	07/03/201	21:00	15.12	5.00	0.00	0.00	1.00	0.00	07:00	16:00
000035	08/03/2019	Friday	LL	WD	A	00:00	**	**	0.00	0.00	0.00	0.00	0.00	1.00	07:00	16:00
000035	09/03/2019	Saturday	PR	SD	E	06:35	09/03/201	21:01	14.43	9.00	0.00	0.00	0.50	0.00	07:00	19:00
000035	10/03/2019	Sunday	PR-OF	SD	O2	07:18	10/03/201	17:19	10.02	0.00	9.00	0.00	0.00	0.00	00:00	**
000035	11/03/2019	Monday	PR - SH	WD	B	05:52	11/03/201	19:30	13.63	5.00	0.00	0.00	1.00	0.00	12:00	21:00
000035	12/03/2019	Tuesday	PR	WD	B	10:08	12/03/201	21:00	10.87	0.00	0.00	0.00	1.00	0.00	12:00	21:00
000035	13/03/2019	Wednesday	LL	WD	B	00:00	**	**	0.00	0.00	0.00	0.00	0.00	1.00	12:00	21:00
000035	14/03/2019	Thursday	PR	WD	B	06:54	14/03/201	21:00	14.10	5.00	0.00	0.00	1.00	0.00	12:00	21:00
000035	15/03/2019	Friday	PR	WD	B	11:13	15/03/201	21:00	9.78	0.00	0.00	0.00	1.00	0.00	12:00	21:00
000035	16/03/2019	Saturday	PR	SD	O1	07:35	16/03/201	17:02	9.45	9.00	0.00	0.00	0.00	0.00	00:00	**

Figure 3.24: Time card report

Main Report

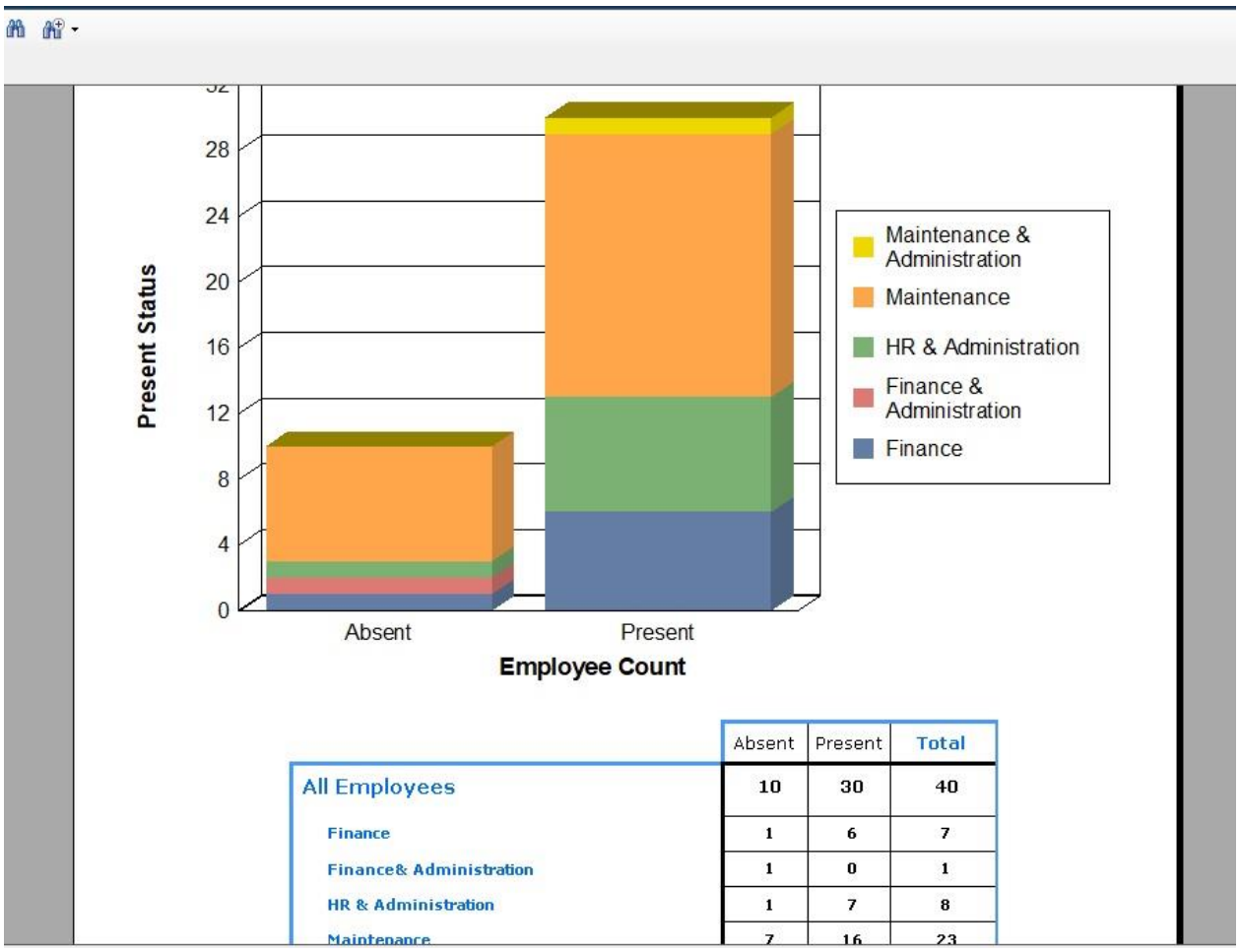
Bright Bravo Hotel (Pvt) Ltd.

Monthly Overtime Report

Report Periodfrom 01/Mar/2019 to 31/Mar/2019

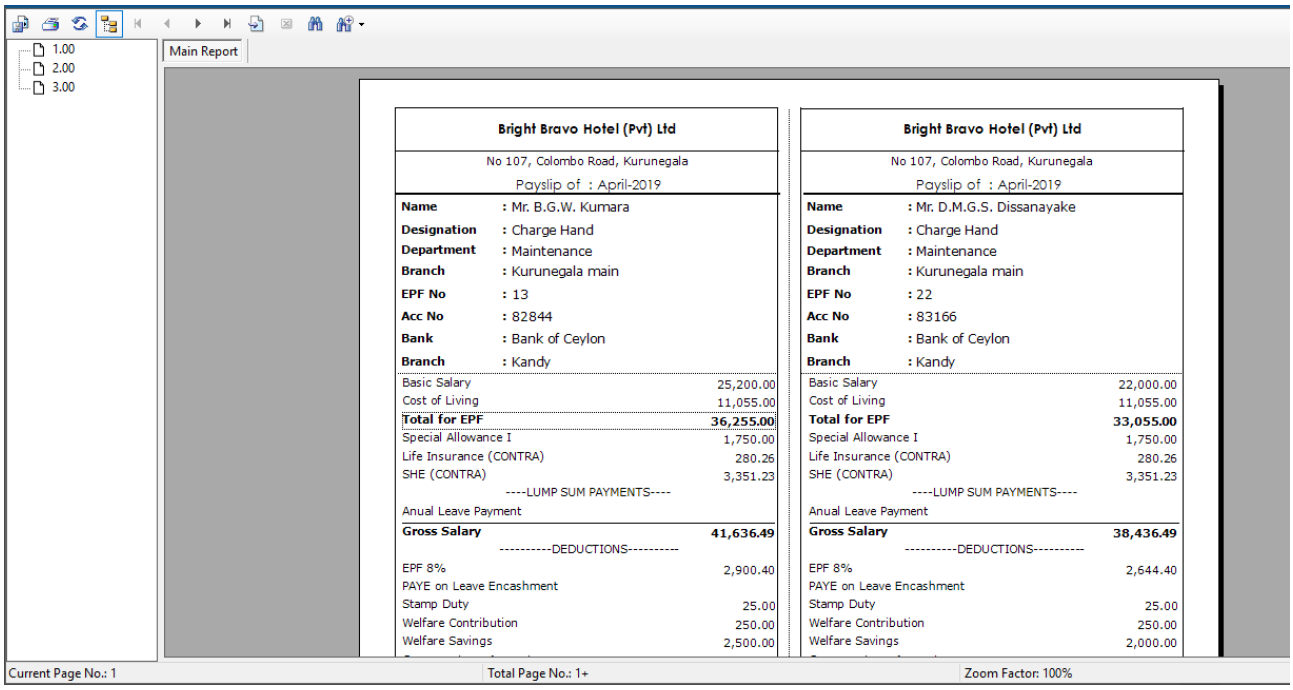
EmpNo	Employee Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
Finance																											
000037	Ms. W. Wijayanthi	0.00 08:25 16:30	OFF	OFF	0.00 07:54 16:40	0.50 07:50 16:52	0.50 08:14 16:48	0.50 08:17 16:46	0.00 08:20 16:30	OFF	OFF	0.50 08:17 16:54	0.00 08:07 16:30	0.50 08:25 16:51	0.00 08:17 16:30	0.50 07:46 16:47	OFF	OFF	0.50 08:42 16:52 SH	0.50 08:06 16:52	PD	0.50 08:10 16:53	0.00 08:05 16:40	OFF	OFF	0.50 08:29 16:54	0.50 08:01 16:52	0. 08 16
000041	Mr. M.G.S. Perera	1.00 08:06 16:52	OFF	OFF	0.00 08:03 16:06	0.00 08:14 16:13	CL	1.00 08:03 16:46	0.00 07:59 16:04	OFF	OFF	0.00 07:56 16:03	1.00 09:13 16:55 SH	1.00 08:21 16:57	1.00 07:52 16:57	1.00 08:04 16:31	OFF	OFF	1.00 08:00 16:35	0.00 08:05 16:05	PD	0.00 07:49 16:05	0.00 07:53 16:08	OFF	OFF	1.50 07:56 17:02	0.50 07:45 16:23	0. 07 16
000051	Mr. K.M.R.I. Premarathne	0.00 08:23 16:32	OFF	OFF	0.50 08:18 16:47	0.00 08:20 16:39	0.00 08:26 16:30	0.00 08:26 16:43	0.00 08:29 16:34	OFF	OFF	0.00 08:22 16:33	0.00 08:24 16:40	AL	0.00 08:17 16:36	0.00 08:17 16:39	OFF	OFF	0.00 09:45 16:39 SH	0.00 08:21 16:39	PD	CL	AL	OFF	OFF	0.50 08:27 16:46	0.50 08:29 16:46	0. 08 15: S
000058	Ms. K.A.A. Ravini	0.00 08:13 16:34	OFF	OFF	0.50 09:19 16:57 SH	0.50 08:18 16:47	0.00 06:54 16:36	0.00 07:41 16:42	0.00 08:16 16:31	OFF	OFF	PAL	0.00 08:15 16:37	0.00 07:50 16:36	0.50 08:19 16:57	0.00 08:10 16:37	OFF	OFF	0.50 08:30 16:45	0.00 08:16 16:44	PD	0.00 07:56 16:38	0.00 08:15 16:34	OFF	OFF	0.00 08:08 16:38	0.00 08:03 16:41	0. 07 16
000065	Mr. S.L.G.S. Liyanage	0.00 07:46 16:30	OFF	OFF	0.00 07:27 16:44	0.00 07:13 16:31	0.00 07:03 16:30	0.00 06:59 16:34	0.00 07:02 16:30	OFF	OFF	0.00 07:01 16:31	AL	0.00 07:01 16:30	0.00 07:00 16:33	0.00 07:03 16:39	OFF	OFF	0.00 07:55 16:33	0.00 07:01 16:34	PD	0.00 07:01 16:31	0.00 07:47 15:00 SH	OFF	OFF	0.00 07:04 16:31	0.00 07:39 16:30	0. 07 16
000068	Ms. A.M.C. Wasanthamali	AL	OFF	OFF	0.00 08:30 16:30	0.00 08:05 16:30	0.00 08:30 16:30	0.00 08:08 16:30	0.00 08:10 16:30	OFF	OFF	0.00 08:07 16:30	0.00 08:07 16:32	0.00 08:15 16:30	0.00 08:01 16:30	0.00 08:07 15:00 SH	OFF	OFF	0.00 08:14 16:30	CL	PD	0.00 08:08 16:30	0.00 08:05 16:30	OFF	OFF	0.00 08:27 16:30	0.00 08:05 16:30	0. 08 16
000082	Mr. A.P.T.I.M. Perera	0.00 07:30 16:30	OFF	SD	0.00 07:37 12:32 CL	0.00 07:27 16:32	0.00 07:41 16:30	0.00 07:28 16:31	0.00 07:24 16:30	OFF	SD	CL	0.50 07:25 16:48	0.00 07:42 16:31	0.00 07:23 16:31	0.00 07:30 16:35	OFF	SD	0.50 07:25 16:46	0.00 07:22 16:34	PD	0.00 07:30 16:32	0.00 07:22 16:30	OFF	SD	0.00 07:25 16:30	0.00 07:32 16:30	0. 07 16
HR & Administration																											
000016	Ms. V. Eymard	0.50 08:05 16:46	OFF	OFF	0.00 07:57 16:35	0.00 08:01 16:37	0.00 08:07 16:36	0.00 08:02 16:34	0.00 07:53 16:39	OFF	OFF	0.00 08:07 16:38	0.00 08:04 16:30	0.00 08:02 16:33	0.00 07:56 16:31	0.00 08:03 16:37	OFF	OFF	0.00 07:50 16:36	0.00 08:06 16:32	PD	0.50 07:54 17:00	0.00 07:54 16:36	OFF	OFF	0.00 08:05 16:44	0.00 07:50 16:30	0. 07 16
000054	Mr. A.A.I.R. Pemananda	0.00	OFF	OFF	0.00	0.00	0.00	0.00	0.00	OFF	OFF	0.00	0.00	0.00	0.00	0.00	OFF	OFF	0.00	0.00	PD	0.00	0.00	OFF	OFF	0.00	0.00	0.

Figure 3.25: Monthly attendance report



	Absent	Present	Total
All Employees	10	30	40
Finance	1	6	7
Finance& Administration	1	0	1
HR & Administration	1	7	8
Maintenance	7	16	23

Figure 3.26: Daily present report with chart



1.00
2.00
3.00

Main Report

Bright Bravo Hotel (Pvt) Ltd

No 107, Colombo Road, Kurunegala

Payslip of : April-2019

Name	: Mr. B.G.W. Kumara
Designation	: Charge Hand
Department	: Maintenance
Branch	: Kurunegala main
EPF No	: 13
Acc No	: 82844
Bank	: Bank of Ceylon
Branch	: Kandy

Basic Salary	25,200.00
Cost of Living	11,055.00
Total for EPF	**36,255.00**
Special Allowance I	1,750.00
Life Insurance (CONTRA)	280.26
SHE (CONTRA)	3,351.23
----LUMP SUM PAYMENTS----	
Anual Leave Payment	
Gross Salary	**41,636.49**
----------DEDUCTIONS----------	
EPF 8%	2,900.40
PAYE on Leave Encashment	
Stamp Duty	25.00
Welfare Contribution	250.00
Welfare Savings	2,500.00

Bright Bravo Hotel (Pvt) Ltd

No 107, Colombo Road, Kurunegala

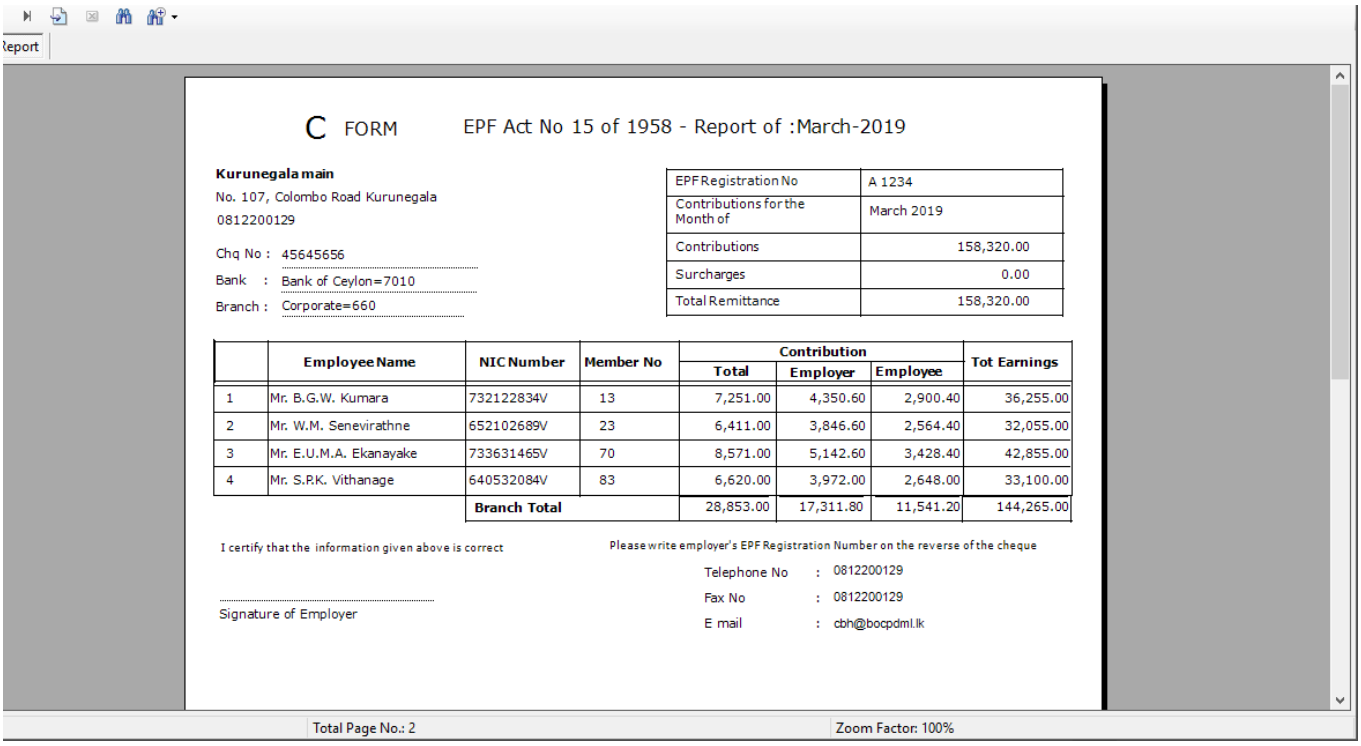
Payslip of : April-2019

Name	: Mr. D.M.G.S. Dissanayake
Designation	: Charge Hand
Department	: Maintenance
Branch	: Kurunegala main
EPF No	: 22
Acc No	: 83166
Bank	: Bank of Ceylon
Branch	: Kandy

Basic Salary	22,000.00
Cost of Living	11,055.00
Total for EPF	**33,055.00**
Special Allowance I	1,750.00
Life Insurance (CONTRA)	280.26
SHE (CONTRA)	3,351.23
----LUMP SUM PAYMENTS----	
Anual Leave Payment	
Gross Salary	**38,436.49**
----------DEDUCTIONS----------	
EPF 8%	2,644.40
PAYE on Leave Encashment	
Stamp Duty	25.00
Welfare Contribution	250.00
Welfare Savings	2,000.00

Current Page No.: 1 | Total Page No.: 1+ | Zoom Factor: 100%

Figure 3.27: Pay slip



Report

C FORM EPF Act No 15 of 1958 - Report of :March-2019

Kurunegala main
No. 107, Colombo Road Kurunegala
0812200129

Chq No : 45645656
Bank : Bank of Ceylon=7010
Branch : Corporate=660

EPF Registration No	A 1234
Contributions for the Month of	March 2019
Contributions	158,320.00
Surcharges	0.00
Total Remittance	158,320.00

	Employee Name	NIC Number	Member No	Contribution			Tot Earnings
				Total	Employer	Employee	
1	Mr. B.G.W. Kumara	732122834V	13	7,251.00	4,350.60	2,900.40	36,255.00
2	Mr. W.M. Senevirathne	652102689V	23	6,411.00	3,846.60	2,564.40	32,055.00
3	Mr. E.U.M.A. Ekanayake	733631465V	70	8,571.00	5,142.60	3,428.40	42,855.00
4	Mr. S.P.K. Vithanage	640532084V	83	6,620.00	3,972.00	2,648.00	33,100.00
		Branch Total		28,853.00	17,311.80	11,541.20	144,265.00

I certify that the information given above is correct

Signature of Employer

Please write employer's EPF Registration Number on the reverse of the cheque

Telephone No : 0812200129
Fax No : 0812200129
E mail : cbh@bocpdml.lk

Total Page No.: 2 | Zoom Factor: 100%

Figure 3.28: C Form report

3.8 CHAPTER SUMMARY

Methodology chapter discussed about the database design of HRIS using table structures and ER diagrams. Further, the UI design of HRMS has been described highlighting some main points which were considered while designing the system and the same has been shown using the print screen images of HRIS.

Chapter 4 – Evaluation and Testing

4.1 INTRODUCTION

Evaluation is the stage in which the finalized requirements are converted to a solution based on the decided design. The architecture of the code and some major code segments used in the system development have been discussed in this chapter. The software has to be verified and validated to ensure the quality of the software, this process of verifying and validating also has included in this chapter.

4.2 ARCHITECTURE OF THE CODE

The architecture of the code has been divided mainly in to three tiers as follows [17]

Database Layer
SQL queries which have been used to manage data in database are stored and executed under database layer. This layer is receiving the data from the business layer and performs the necessary operation into the database.

Business Logic Layer
Entire set of business logic has been stored under business logic layer. The function of the business layer is, accepts the data from the application layer and passes it to the data layer. Business logic acts as an interface between Client layer and Data Access Layer. All business logics like validation of data, calculations, data insertion/modification are written under business logic layer. It makes communication faster and easier between the client and data layer. This layer defines a proper workflow activity that is necessary to complete a task.

Presentation Layer
The coding required to design the UIs has been stored under this layer. The images, themes, UIs and report templates have been managed by this layer. This layer includes basic designing of a front-end view of applications as well as calling of the functions of other layers so that they can be integrated with each other.

A diagrammatic representation of an n-tier system depicts here

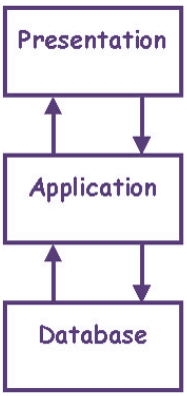


Figure 4.1: Three-tier architecture

4.3 SOFTWARE TESTING

Software testing is a very important activity to be performed in any software-development project. It ensures that the correct requirement has been implemented, and it has been implemented correctly. In other words, it conforms to the validation and verification. Validation refers to testing whether the system satisfies the requirements while verification refers to whether the system implements the specified functions properly. Basic goals of test evaluation are determining whether the promises about the invention by the supplier and the requirements of the customer are met on an acceptable level. For success of the project, it should be bugs free. If it is not, it might be rejected by customer. As well as, additional resources would be allocated to redevelop the system. So, Software testing methodologies are used to identify bugs of the system and they help to fix those errors.

Software testing and implementation are iterative processes. Most of the time both stages work as simultaneous system components. The proposed system was tested while the development was ongoing. Structural testing techniques were followed in this phase including “white box” testing which tests “how a program/system does something”. Functional testing techniques were used, which includes “black box” testing which tests the behavior of a system or program. These techniques were exploited in different testing levels like unit testing.

The system followed the object-oriented methodology, so object-oriented testing was also carried out in this phase. Individual operations associated with objects were tested initially, followed by testing individual classes and clusters of objects, and finally test the system as a whole. User acceptance testing was completed in client site, the participation of few staff members.

I have done following type of testing according to the V model.

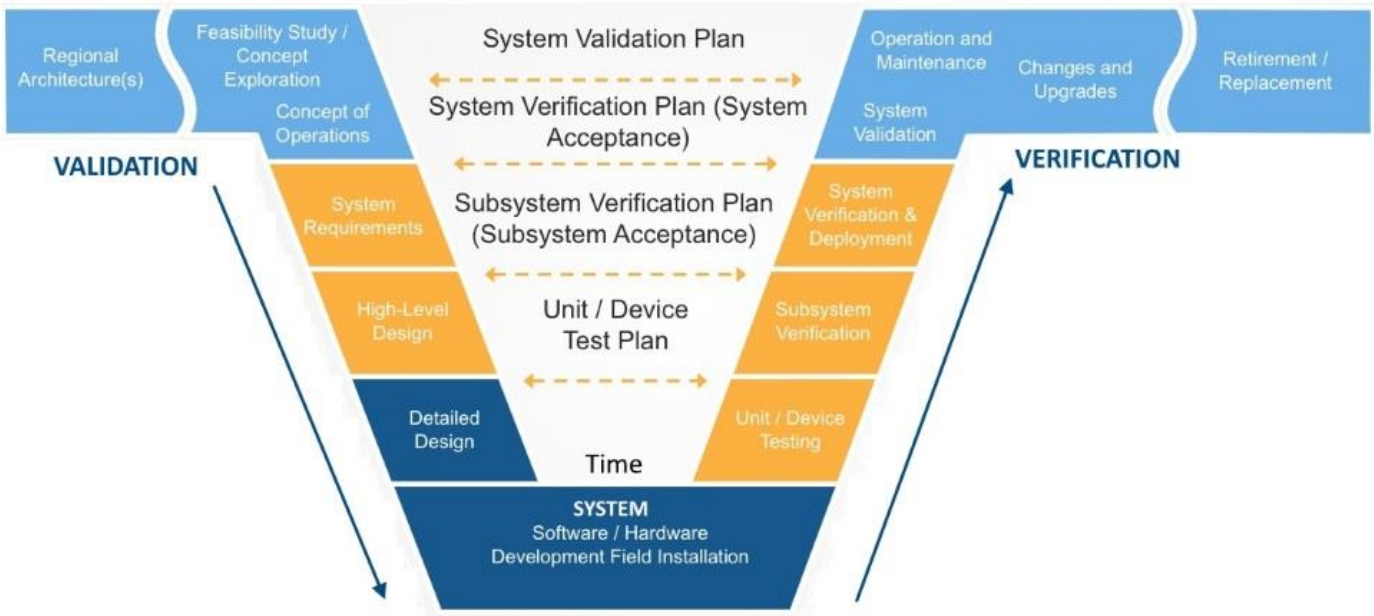


Figure 4.2: V model

4.3.1.1 Validation

This process makes sure that the development team develops the right product with capturing customer's needs. The final solution should be satisfied the customer's given requirements. The next challenge was the client base has not friendly with mobile HRIS. They have not any HRIS experience with mobile environment. So, I had to develop the user interfaces of the mobile application as very user-friendly way.

4.3.1.2 Verification

This process makes sure that the development team develops the product correctly. That would be realized product achieved the conditions which are identified the beginning of the implementing phase. I had to meet HR Manager several times to get feedback about the system functions. I had to change some interfaces according to their requests. After user testing of prepared project, the questionnaires were submitted to client and get feedback for checking of project success verify.

To make sure the HRMS meeting the acceptance criteria, system was tested under below mentioned testing levels.

4.3.2.1 Unit Testing

This testing has been performed to verify whether the individual software components were working fine independently from each other.

4.3.2.2 Integration Testing

Few integrated units have been tested considering as one module to verify whether the units were functioning properly once integrated.

4.3.2.3 System Testing

Complete system has been tested once integrated with all the modules to verify whether the entire system was working fine as expected. This testing was performed as using black box testing.

4.3.2.4 Black Box Testing

This testing was performed by giving various input data to the system and verifying the output, whether the expected was received irrespective of the internal structure of the system. It's crucial to select the test data to cover all the possible paths of the system. I.e. Test data were selected to cover all positive and negative scenarios to make sure that everything works as expected. For this testing, a test plan was created as Table 6.1 to cover all processes within the system.

4.3.2.5 Regression Testing

While doing the aforementioned testing, there were defects identified. Once those defects have been fixed, regression testing was performed to make sure that there was no impact for the other modules based on the defect fix.

4.4 TEST PLANS

Test plans were designed focusing on different processes within the system and the system has been tested based on the test plans. Testing begins with the implementation; the code is reviewed while developing stage for testing. Test plan included all phases of testing and also used as a guide for the overall testing process. Before the system implementation, the test plan was designed. A test plan includes test objectives, schedule and logistics, test strategies and especially test cases.

Test cases were created according to the designed test plan. That contains data, procedure, and expected result and represents which use to system or part of the system run. To reduce the complexity of the testing process test cases were designed for each module independently. The following tables specify some test cases.

Manual testing method and procedures used for testing rather than automation tools and technologies. Below table tabulates some test cases for test basic functions.

4.4.1 Test plan for login screen

ID	Actor	Module	Event	Expected Result	Actual Result
1	Registered user	Login	Validate the successful login with correct user name and password	User should be able to login successfully	Login is successful
2	Registered user	Login/Create user	Validate user name allows maximum 10 characters	User name should not allow more than 10 characters	More than 10 characters are not allowed
3	Registered user	Login/Create user	Validate Password should not allow less than 4 characters for successful login	Password should not allow less than 4 characters	Less than 4 characters are not allowed for password
4	Registered user	Login	Validate both Username and Password combination is correct to successful login Ex: Select Correct username and add incorrect Password	Both Username and Password should be match and correct to success the login.	Incorrect combination of username and Password is not allowed
5	Unregistered user	Login	Validate unregistered user cannot login to system	Unregistered user should not be allowed to login	Not allowed
6	Any User	Login	Test with empty username and empty password and check if login fails	Proper error must be displayed and prompt to enter login again	Propper error message has displayed

Table 4.1: Test plan for login screen

4.4.2 Test plan for employee profile

ID	Actor	Module	Event	Expected Result	Actual Result
1.	HR Assistant/ HR Manager Manager	Profile	Validate user privileges Ex: enable/ disable or display/ hidden behavior based on user type	Field behaviors should be changed as per user type	Fields are behaved as expected per user types
2.	HR Assistant/ HR Manager Manager	Profile	Validate mandatory fields are filled while saving and expected error messages are popped up for the same	All mandatory fields should be filled before saving	Expected error messages are popped up for blanked mandatory fields

			Ex: Employee name is left blank on Save Applicant screen.		
3.	HR Assistant/ HR Manager Manager	Profile	Validate invalid characters are not allowed Ex: special / numeric characters are on Applicant Name field	Invalid characters should not be enterable	Invalid characters are not enterable
4.	HR Assistant/ HR Manager Manager	Profile	Validate the valid data are properly saved in relevant tables on database	Valid data should be saved properly on database	Valid data are saved in database
5.	HR Assistant/ HR Manager	Profile	Validate only the matching records are populated based on the text typed in searching text box. Ex: “000005” value should filter only relevant employee	Records should be populated based on the text typed in searching text box.	Records on the searching grid are filtering based on the text typed in searching text box
6.	HR Assistant/ HR Manager Manager	Profile	Validate characters cannot be entered exceeding the maximum length of fields Ex: 151 characters on Employee First Name field	Characters exceeding the maximum length of fields should not be enterable	Characters are not enterable once reached to maximum length of field
7.	HR Assistant/ HR Manager Manager	Profile	Validate the Email address field Ex: Type on **Email** text field as “name@gmail"	Message should display as Enter valid Email ID	Propper error message has displayed
8.	HR Assistant/ HR Manager Manager	Profile	Validate the Email address field Ex: Type on **Email** text field as “abc.com” (without @ symbol)	Message should display as Enter valid Email ID	Propper error message has displayed
9.	HR Assistant/ HR Manager Manager	Profile	Validate the Email address field Ex: Type on **Email** text field as “kasun@gmailcom” (without dot)	Message should display as Enter valid Email ID	Propper error message has displayed
10.	HR Assistant/ HR Manager Manager	Profile	Validate auto generated birthday by adding more various real world NIC numbers to NIC Number field. Ex: I enter **NIC number** as “893663150V” to the **NIC number** field.	Auto generated birth day should be match to the actual birthday of each NIC number holder. In this case system should display **Birthday** as “1989-12-31”.	System auto generated birthday has matched with the real birthday. System has displayed **Birthday** as “1989-12-31”.
11.	HR Assistant/ HR Manager Manager	Profile	Validate auto generated employee display name. Ex: I added **First name** as “Dissanayaka Mudiyanselage” And **Last name** as “Kasun Hasitha”.	System should generate the Display Name automatically. In this example, Display name should be displayed as “Mr. D.M Kasun Hasitha”	System has generated the Display Name correctly as “Mr. D.M Kasun Hasitha”

Table 4.2: Test plan for employee profile

4.4.3 Test plan for apply leave

ID	Actor	Module	Event	Expected Result	Actual Result
1.	Registered user	Leave apply	Validate only the matching records are populated based on the text typed in searching text box. Ex: “000004” value should filter only relevant employee who has registered under this EPF No.	Records should be populated based on the text typed in searching text box.	Records on the searching grid are filtering based on the text typed in searching text box
2.	Registered user	Leave apply	Filter employees using date range Ex: Last day option is selected.	System should filter the records relevant to only for last processed date.	System has filtered data only relevant to last processed date.
3.	Registered user	Leave apply	Filter employees using date range Ex: Last week option is selected.	System should filter the records relevant to only for last week.	System has filtered data only relevant to last week.
4.	Registered user	Leave apply	Validate the valid data are properly saved in relevant tables on database	Valid data should be saved properly on database	Valid data are saved in database
5.	Registered user	Leave apply	Validate mandatory fields are filled while saving and expected error messages are popped up for the same Ex: Leave type has not selected in leave apply screen.	All mandatory fields should be filled before saving.	Expected error messages are popped up for blanked mandatory fields
6.	Registered user	Leave apply	Apply a leave for present date	System should not allow to apply full day leave for present date. But system will allow to apply a half day leave for employees who has worked only half day on that day.	System has blocked apply leave for employees who has worked full day and allowed to apply a half day for half day worked employees.
7.	Registered user	Leave apply	Apply a leave for already leave applied date	System should not allow to apply leave for leave applied date.	System has blocked apply leave for employees who has already applied leave.

Table 4.3: Test plan for apply leave

4.4.4 Test plan for data download from terminals

ID	Actor	Module	Event	Expected Result	Actual Result
1.	HR Assistant/ HR Manager Manager	Data download	Validate only download the relevant data from relevant terminal. That means it should not be able to download data from the device with different machine ID.	When we download data by selecting device 001, it should download data from device 001. Not from the other devices.	It was download data only from relevant, selected device.
2.	HR Assistant/ HR Manager Manager	Data download	Check connection status text is changed or not according to connection status.	When we click on connect button it should be changed the connection status displaying text as 'Connected', if there is no any connection problem.	The connection text has changed as 'Connected' when we click the connect button.
3.	HR Assistant/ HR Manager Manager	Data download	Filter in and out times using date time picker.	When user select a date, the system should display all records downloaded from the terminal on that selected day.	System has displayed data only relevant to selected date.
4.	HR Assistant/ HR Manager Manager	Data download	Validate the valid data are properly saved in relevant tables on database	Valid data should be saved properly on database	Valid data are saved in relevant tables of the database
5.	HR Assistant/ HR Manager Manager	Data download	Validate whether the buttons and text boxes hide and unhide according to the user selections. Ex: If user select download method as TCP/IP, then relevant text boxes and buttons should be appeared and, if the user select download method as USB, then relevant buttons should be appeared by hiding irrelevant buttons and textboxes.	Form controls must hide and unhide according to user selection.	Form controls has hidden and unhidden has happened according to user selection.

Table 4.4: Test plan for data download from terminal

Note: For more information of verification, please refer Appendix C

4.5 CHAPTER SUMMARY

This chapter discusses the different testing types used under different levels of the system development, and the test plans used to test every single module of the system. Few of the test plans have been included under the chapter itself and remaining test plans have been embedded under Appendix.

Chapter 5 – Conclusion

5.1 INTRODUCTION

Finally, we have come to the end of this long process. Initially at the beginning the requirements and how it can be implemented and many other factors related with that were presented. Here we Summarize what we have done, what we can learn from this and what can be done in the future to improve this. This chapter is presented here as the author's reflection on the whole project work including a critical appraisal on the successes and limitations and the development of system itself.

5.2 FINAL ACHIEVEMENT

The developed HRMS meets all the pre-defined requirements. It caters for latest HR requirements which most of the existing systems lack. However, there were some processes such as recruitments, performance appraisal and training modules were omitted initially since BBH's basic HR requirement was attendance and payroll management modules. It would have become better if those processes were also be included to the system to make the HRMS a complete system. Due to the time lines given, those processes were considered as out of scope for phase 1. However, those can be implemented in next phases of the HRMS.

Further, the purpose of the attendance module is to analyze employee attendance automatically by using punch times at attendance terminals. HRM of BBH has been appreciated very much for the daily dashboard and monthly attendance analyzer which has been offered as a feature of this system. It is pleasure to mention that the variety of reports have the quality that was expected, which would be beneficial to the top management for future decision making. Payroll module also has an easy step by step process.

As per the current implementation, HR department of BBH can manage their day to day attendance and payroll relevant functions, analysis, report generations and decision making using the implemented system. Every employees of the company can view his/her attendance sheet and pay slip using the mobile application. Due to the limited time, leave applying part was dragged to Phase 2 of the project. Furthermore, the number of managerial reports provided in Phase 1 of the project has been limited to five. However; it would become more beneficial if few more reports could be included. This was omitted in Phase 1 since it was not possible to find more report types during the analysis phase.

5.3 FUTURE WORK

This project can be considered as the Phase 1 of implementing HRMS. For next phases, following features can be implemented as future work.

- Integrating recruitment management, employee performance appraisal and training management modules to this system as parts of the HRMS
- Increase the number of reports generated.

5.4 LESSONS LEARNT

Implementing this HRMS can be considered as one of the major achievements in my life. All the theories I learned during MIT degree program were used practically in real world for developing this project and lessons learned are immense. This project gave me lots of experience in developing a whole new IT System from problem definition, feasibility studies to the system implementation. This project was a little challenge for me since it is a blend of a research and implementation type project. I learned a lot about HR field and HR processes while doing the research.

Further, I could understand the practical issues that arose while implementing due to tight schedules and some other limitations even with the solid requirements. When a normal development project is considered, there are many resources playing different roles hence experiencing and learning different things. In this project, it was only me who had to play all the roles hence the experience I gained and lessons learned are very much. The skills gained will help me to work with any type of client and to collect requirements, to deliver the system modules in timely manner and to use best practices such as reuse, prototype etc. This project implementation was not a full-time work as I had to focus on my career and personal life as well. Hence, one of the best things I learned is time management.

5.5 CHAPTER SUMMARY

This chapter evaluated the implemented HRMS from both positive and negative perspectives and it describes the future work that can be carried out to extend the existing functionalities and to introduce new functionalities to make the system more useful. Further, the lessons learnt and how valuable this project assignment was described in detail.

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Appendix A – Use case diagrams

A.1.1 Use Case Diagram - Manage employee over time

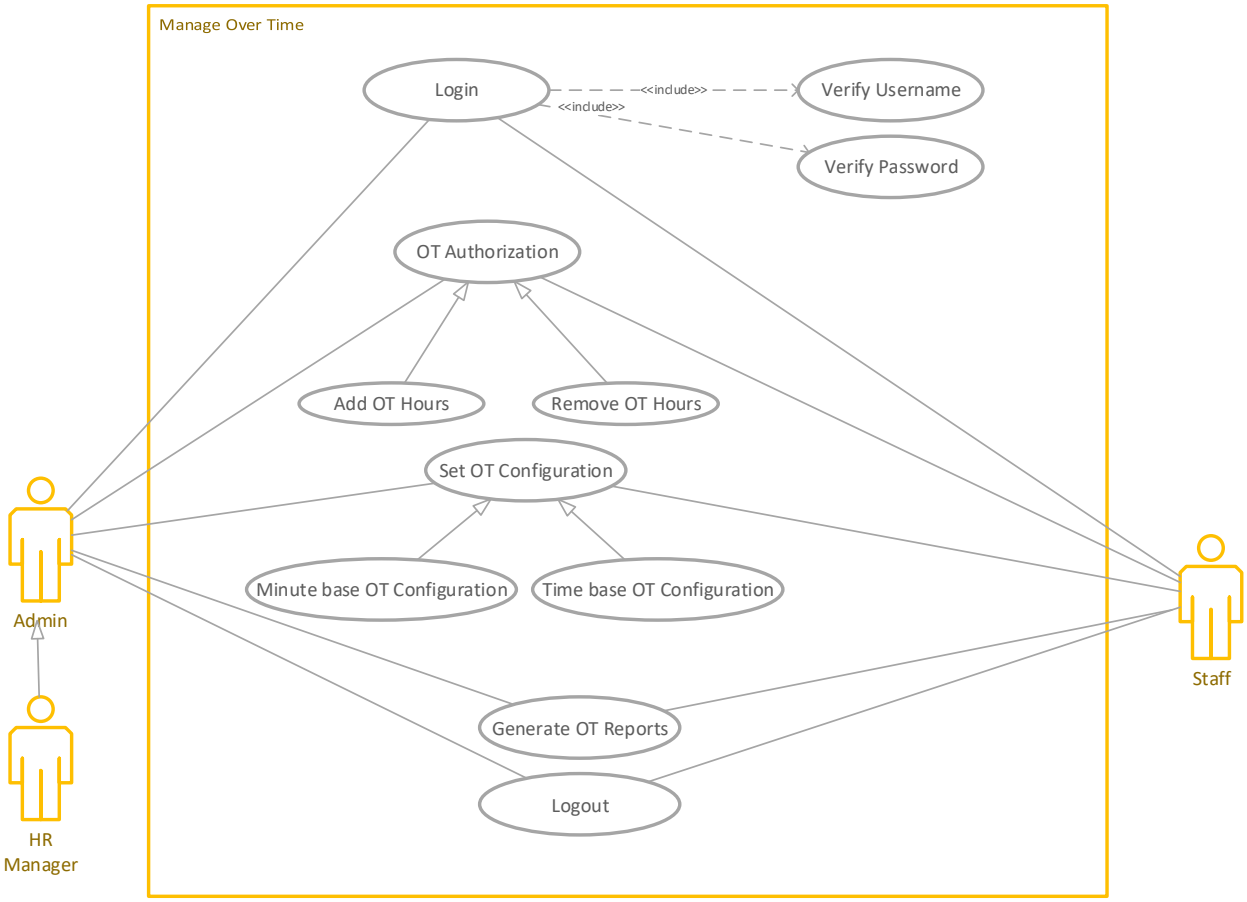

Figure 5.5: Manage employee OT use case diagram

A.1.2 Use Case Scenario - Manage employee over time

Name	Manage Employee Over Time
Brief Description	Authorize Selected Employee(s) OT. User can add OT hours for selected employee(s) and selected day(s). And also, user can remove auto calculated OT hours from selected employee(s).
Actor(s)	Admin/HR Manager/Staff
Flow of Events	
Basic Flow	

A. Add OT Hours to Selected Employee(s)

1. System user should select “Authorize OT” menu from main menu.
2. If the current user’s level has permission to **authorize OT,** then system will load OT authorizing screen.
3. Else system will display message as access is denied.
4. System user can select date and employee from the displaying list and set number of OT hours and click “Save” button to add OT hours to selected employee.

B. Remove OT Hours from Selected Employee(s)

1. System user should select “Authorize OT” menu from main menu.
2. If the current user’s level has permission to authorize OT, then system will load OT authorizing screen.
3. Else system will display message as access is denied.
4. System user can select date and employee from the displaying list and set number of OT hours as 0 and click “Save” button to remove OT hours to selected employee.

Alternate Flows	
Title	**Description**
Fails OT authorization	1. User is trying to add OT for employee(s) who are not in OT allowed employee category. 2. User is trying to add OT hours for absent day od employee.
Pre-Conditions	
Title	**Description**
Active user	User should be login to the system before apply or cancel leaves.
Setup OT configurations	System should be set OT configurations for relevant shifts.
Enable OT calculations	System should be enabled the OT calculation process from menu.
Configure OT category	System should be configured to allow to calculate OT for selected employee category(s).
Post-Conditions	
Title	**Description**
Success	Successful OT Authorization 1. Each approved OT hours will be added for month end summary calculation 2. Each approved OT hours will display in approved OT report
Failure	Failed OT Authorization
Extension Points	
None	

Table 5.1: Use Case Scenario - Manage employee over time

A.2.1 Use Case Diagram - Manage employee user level

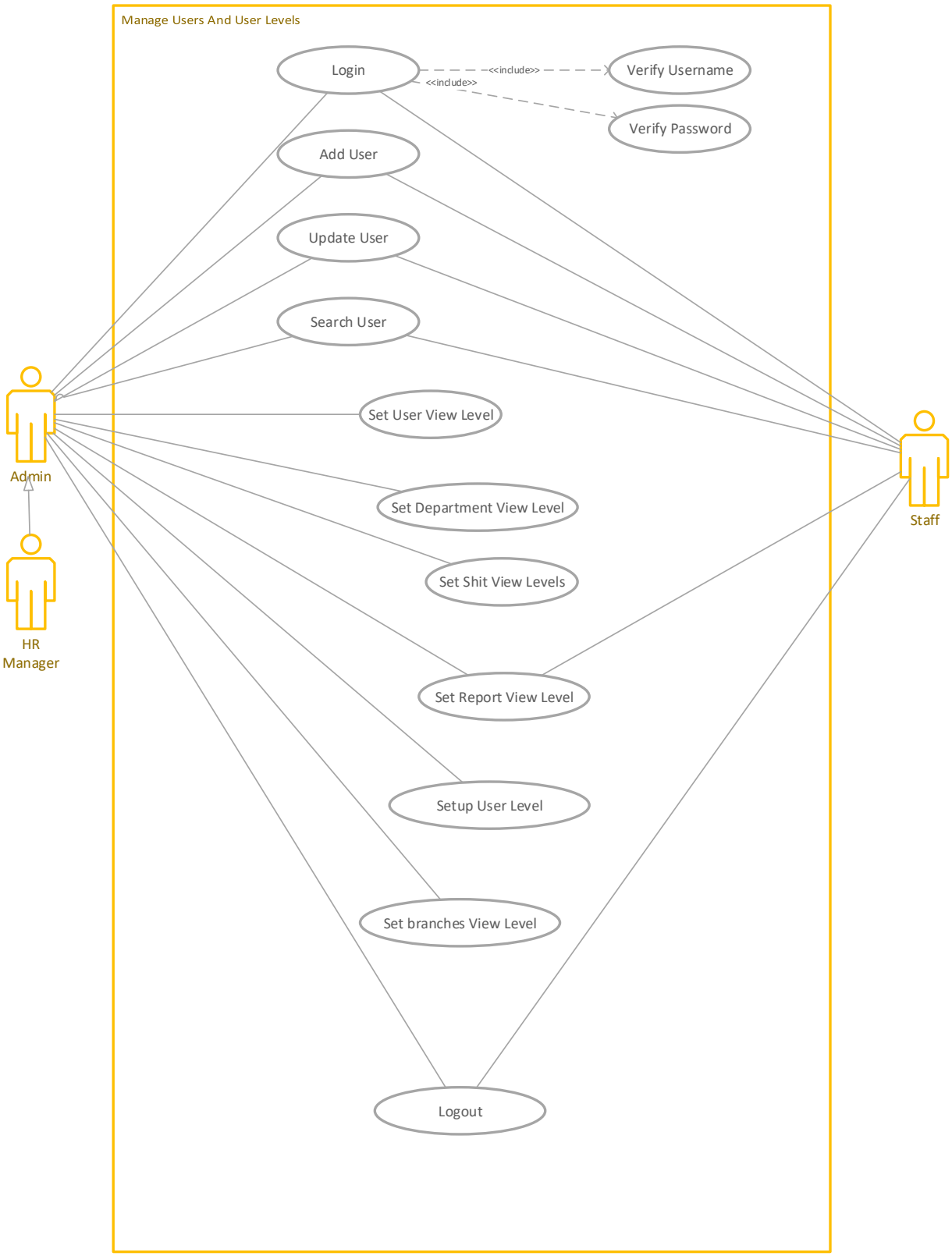

Figure 5.6: Manage users and user levels use case diagram

A.2.2 Use Case Scenario – Manage user and user level

Name	Manage System users & user levels
Brief Description	User can add or edit system users and also admin user can add or edit user levels using this module. Admin user can create user view levels for each user level by configuring view level for branch view level and department view level separately.
Actor(s)	Admin/HR Manager/Staff

Flow of Events

Basic Flow

This use case starts when an admin user is logged in to the system and try to add new users who already register as Employee.

A. Add/ edit system user to the system database

1. System user should select "User" menu from main menu.
2. If the current user's level has permission to **configure user,** then system will load user adding screen.

   Alternate flows

   A.1. Display access denied message
3. If the current user level has not permission to configure user, then system will display message as access is denied.
4. System user can add user name, user level and other necessary criteria and click "Save" button to add new user to the system.

B. Add/ edit user levels by the admin user when needed.

1. System user should select "User" menu from main menu.
2. If the current user's level has permission to **configure user level,** then system will load user level adding screen.

   Alternate flows

   B.1. Display access denied message
3. If the current user level has not permission to configure user level, then system will display message as access is denied.
4. System user can add user level name, user level value and other necessary criteria and click "Save" button to add new user level to the system.

C. Add/ edit user view levels to the system

1. System user should select "User" menu from main menu.
2. If the current user's level has permission to **configure user view level,** then system will load user view level adding screen.

   Alternate flows

   C.1. Display access denied message
3. If the current user level has not permission to configure user view level, then system will display message as access is denied.
4. System user can add user view level name, user view level value and other necessary criteria and click "Save" by defining accessible departments, branches and shifts for each user level.

Alternate Flows

Title	**Description**

A.1 Display access denied message	User do not have permission to add another user to the system
B.1 Display access denied message	User do not have permission to add another user to the system
C.1 Display access denied message	User do not have permission to add another user to the system
Pre-Conditions	
Title	**Description**
B. Must be a registered system user	It is necessary to be an already registered employee to be a system user.
C. Must be define departments, branches and shifts to be assigned each view level	It is necessary to finish the creating departments, branches and shifts to be assigned through the user view level screen.
Post-Conditions	
Title	**Description**
Success	Successful user configuration 1. Registered user will be added to active users list of the system and user can login to system by using the relevant password. 2. Registered user must be configured by adding user levels and user view level.
Failure	Failed user configuration
Extension Points	
None	

Table 5.2: Use Case Scenario – Manage user and user level

A.3.1 Use Case Diagram - Manage shifts and rosters

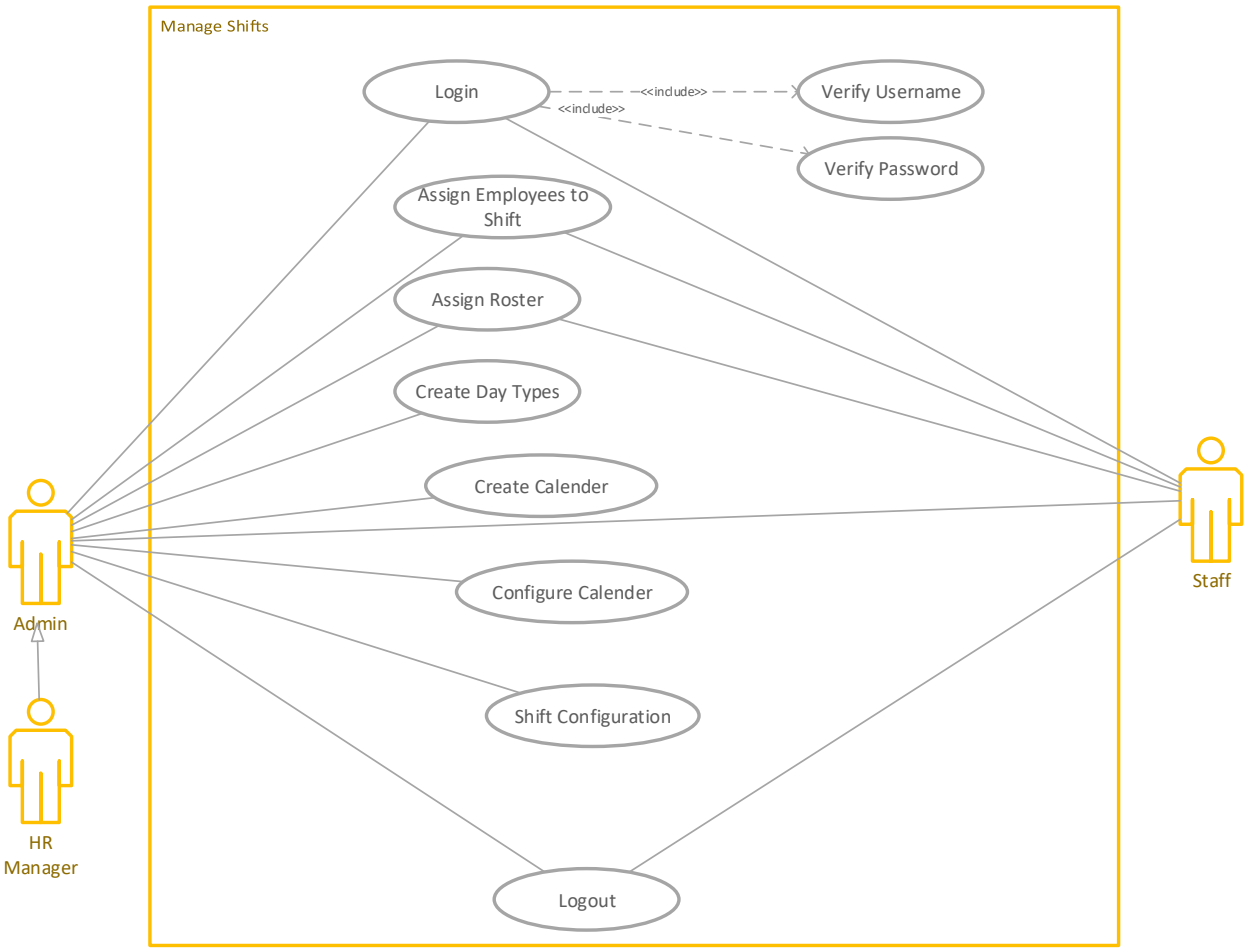

Figure 5.7: Manage users and user levels use case diagram

A.3.2 Use Case Scenario - Manage shifts and rosters

Name	Manage System users & user levels
Brief Description	System user can create calendar and day types for company and configure each day types with shifts. User can change employee's rosters before the start month calendar.
Actor(s)	Admin/HR Manager/Staff
Flow of Events	
Basic Flow	

This use case starts when a user is logged in to the system and try to create calendar for company, change day type and roster configuration **D. Add/ edit company calendar to the system database** 1. System user should select "Administration" menu from main menu. 2. If the current user's level has permission to **configure user,** then system will load user adding screen. **Alternate flows** **A.1. Display access denied message** 3. If the current user level has not permission to create **company calendar**, then system will display message as access is denied. 4. Authorized system user can create calendar by selecting each day type of the company and other necessary criteria and click "Save" button.	
Alternate Flows	
Title	**Description**
A.1. Display access denied message	User do not have permission to create company calendar of the system
Pre-Conditions	
Title	**Description**
(none)	
Post-Conditions	
Title	**Description**
Success	Successful shift configuration 1. Created shift will add to shifts list and authorized users can be seen the new shift. 2. Every created shift should be configured with data types and company calendar.
Failure	Failed shift configuration
Extension Points	
None	

Table 5.3: Use Case Scenario – Manage shifts and rosters

A.4.1 Use Case Diagram - Manage mobile application

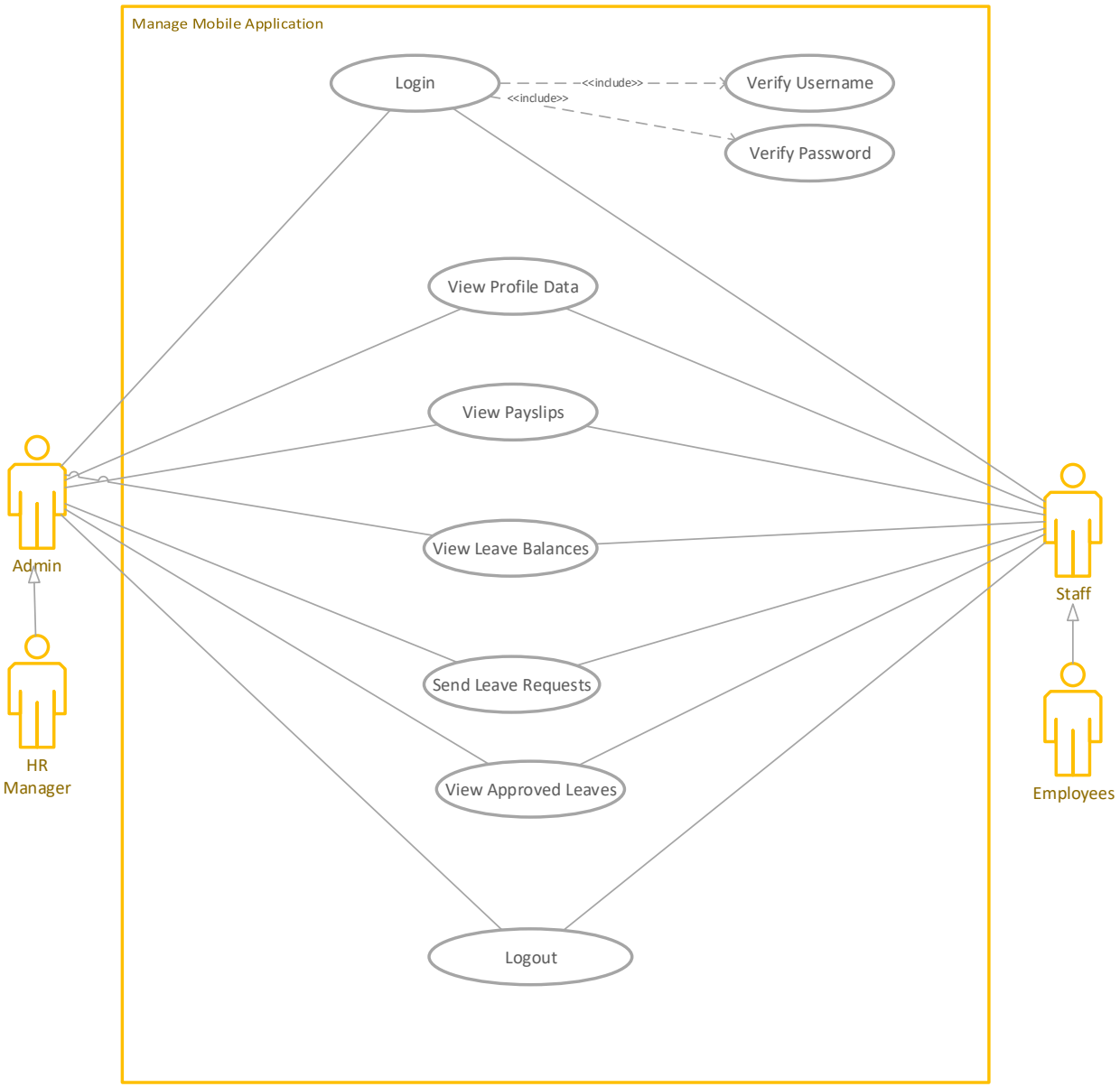

Figure 5.8: Manage users and user levels use case diagram

A.4.2 Use Case Scenario - Manage mobile application

Name	Manage Mobile Application
Brief Description	All employees use mobile application for view profile, view leave balances, send leave requests, view attendance data and payslips etc.
Actor(s)	Admin/HR Manager/Staff/Employees
Flow of Events	
Basic Flow	

Main Flow:

Employees login to the system via mobile application by entering username/password

1. **View employee profile**
   User can see the employee profile information with main menu from the main screen which appeared after successful login.

2. **View leave balances**
   2.1.1 Select leave balance button
   2.1.2 System validate user and display the selected balances

3. **Apply leave from mobile application**
   3.1.1 Select apply leave button
   3.1.2 Select leave type and leave date
   3.1.3 Add leave amount (half day or full day)
   3.1.4 System validate user request and send leave request to main database.
   3.1.5 If HR department accept the leave request then system will send email to user and deduct leave amount from balance leave.
   3.1.6 Else system will send the email with rejected reason.

4. **View attendance sheet of selected month**
   4.1.1 Select attendance sheet button
   4.1.2 System validate user and display the attendance sheet

5. **View last month pay slip**
   5.1.1 Select pay slip button
   5.1.2 Select month to view pay slip
   5.1.3 System validate user and display the pay slip.

Alternate Flows	
Title	**Description**
Fails application login	User is trying to logging to the mobile app by adding incorrect user name or password.
Pre-Conditions	
Title	**Description**
Active user	User should be login to the system before apply or cancel leaves.
Post-Conditions	
Title	**Description**
Success	Successfully do the selected task from mobile application
Failure	Fail selected task on mobile application
Extension Points	
None	

Table 5.4: Use case scenario – manage mobile application

Appendix B - Letter of certification

Bright bravo hotel (Pvt) Ltd

Colombo Road,

Kurunegala.

PV 119767

2019/05/20

Project evaluation board,

University of Colombo School of Computing,

No. 35 Reid Avenue,

Colombo 07.

Dear Sir/ Madam,

LETTER OF CERTIFICATION

This is the certify that Mr. D.K.H.K Weerasinghe has successfully developed Human Resource Information System for Bright Bravo Hotel (Pvt) Ltd as his master's degree project. He gathered data and information from our company for development of this project.

Bright Bravo Hotel (Pvt) Ltd management has decided to accept and use his HRIS system, since it is satisfying our requirement.

Thank you,

Yours Sincerely,

…….

W. M. D. B. Wanninayake

Human Resource Manager

(Bright Bravo Hotel (Pvt) Ltd)

Appendix C - User satisfaction feedback form

Job Title : ……..

Ratings:

1 – Strongly disagree 2 – Disagree 3 – Possibly

4 – Agree 5 – Strongly agree

What do you think about the following features of the system? Rate them according the scale given above.

	Option	**Rate**
1.	Usability of the system is good	
2.	User friendliness of the system is high	
3.	Look and feel of the system throughout all the forms is consistent	
4.	Instructions given in the system are understandable	
5.	Error messages are informative and understandable	
6.	Menus, forms and navigation methods are uniform and consistent	
7.	Navigation through the system is intuitive and easily understandable	
8.	Entering data in to forms can be carried out easily	
9.	Finding the needed information can be done without difficulty	
10.	Reports, attendance reviews and other transactions can be done easily	
11.	Adequate information is provided in the reports	
12.	The required functionalities have been implemented in the system	
13.	There is a marked improvement in the system compared to the old manual system	
14.	The new system is beneficial to the company	

Figure C.1: User satisfaction feedback list

Remarks: