

A Novel Approach for Prediction of Employee Performance and Recommended System

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ABSTRACT

Employee management system is an application-based system, having two applications advanced, one for employers to operate employee details and another for employees to mark their attendance. Every organisation whether government or private uses an information system [2.] to abundance data of their staff. However, in India it is found that many small-scale industries use pen and paper to keep a document. However, there are many advanced technology systems available that can do this work but they all are costly for these low-level industries. This paper discusses making a system for solving problems for them at a cheaper cost. This system will mark attendance of each employee and calculate the salary of them at the end of month. It also calculates overtime and total working hours of each employee. As in small scale each company has their own holidays option and variable week off for employees, so all this power is given to the employer to manage holidays and week days of each employee separately. It saves lots of time and has no error in pay calculation hence excessive clashes between HR Team and employees. So that both employer and employee can focus on their work to expand their company.

I. INTRODUCTION

Every organisation keeps a record of their faculty. Faculty records play a crucial role in faculty management. Every organisation requires these records to calculate pay, manage workforce and see performance of employees [1]. Management of all these records is a challenging task and time-consuming process for the HR team [3], which can be decreased by using EMS that is the Employee Management

System [5]. Human resources are an essential part of any organisation and responsible for the success of an organisation. Organisations invest highly on the management of employees. HRIS is a human resource information system that manage register control and accounting [6]. EMS is also an informatics system that is useful in saving hour, capacity and capital of owner, HR's and manager. All organizations both private and public [5], have necessities of employee management system. But from age they have been using an old classical method that is pen and paper to maintain record, however in the past few times there has been a large increase toward using impulsive systems [11] that can control salary calculation by their own. In many areas it's a difficult task to implement these systems as they are costly and require proper maintenance. So, to solve this problem I have this EMS, which is mobile application based. It will calculate the pay of each employee and daily attendance. This system was developed such that it can be used by small organisations also. It's cheaper than other systems and helps small scale industries to manage their employees. As in small sectors there are lots of labour as a worker, there are lots of disputes also seen, due to improper calculation of pay and overtime, this system aims to solve this issue, so that the HR team can focus on other processes rather than solving altercation. It helps an organization to simplify the process of record maintenance. To make their work more effective, organisations must implement this employee management system [4]. This paper discusses the development procedure, problems faced and benefits of using the system. This system consists of two mobile applications which one for HR team to manage employees and another for Employee to mark their attendance through QR code. Two app developed to manage the system are: 1. Employee - for the Employee to mark attendance personally. 2. Employer

- to manage employees and mark attendance for those not having smart phones.

II. OBJECTIVE: -

Objective of the employee management system is evolving a simple, cheap and reliable system to achieve the goal of making attendance and salary calculation of employees easy and genuine. We focus to develop a system that prevents escaping by employees and make sure they get each amount of their backbreaking work. This system is developed with the main objective to resolve the problem of small-scale factories and businesses that are still using pen and paper to keep staff records. These industries even face many clashes with employees [13] as most of the staff working here is from labour class and they really do backbreaking work to acquire, so our system will put an effort to cut down these clashes and will make sure that these workers get each amount of their work. This system will save a lot of time for the employer and reduce the tension of handling pay for employees. So, they can focus on other things and developing their businesses.

III. HISTORY

To develop this system, we need proper investigation of the system. It requires a proper understanding of how the industry works and makes salaries of employees. EMS requires both understanding of backend and frontend, and one must make sure that both of them sync properly. We require proper understanding of databases and designing of databases such that every need of the system can be bring about. There should be a proper graphical user interface available to users to use the app. To build application flutter is used as it provides cross platform development, means the same code can build apps for both ios and android mobile phones. To store data in the database online cloud storage of firebase is used. To make users firebase email authentication is used and to store data firebase firestore is used. Framework used in this development is android studio. The whole system has two types of users one the head of organization, may be HR head/owner as an admin, another is an employee as a user. However, an employee cannot register until he/she has been added by the admin in his/her organisation under employees list. It has been specially designed such that most of the control of data is with admin, employees can update on personal details, else everything can be done by admin only. How the data is accessed by users is shown below in figure 2.1, below –

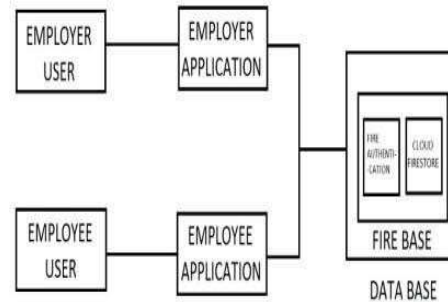


Fig 2.1 System Background Design

IV. LITERATURE REVIEW

Literature review consists of various sections that tells us about application and benefits of using this system.

A. EXISITNG SYSTEM

The existing employee management system in the organization inert uses the normal classical methods which are merely based on pen-paper to record the data of their employees [1.] [2.]. Large quantities of registers are to be maintained for this purpose which results in downright waste of time in generating reports or searching for employee's records and loss of data if any file is lost. It is also an arduous task for organizations as it is an expensive process. However, somewhere new technologies such as web-based systems, lot based systems are used but they also are costly and difficult to implement at some places. The other again a costly process and requires regular maintenance [7].

This project eliminates or reduces as much as possible the difficulties of the existing system and avoids errors while entering data. In comparison to the existing system, it is cheaper, easy to implement, easy to use, no maintenance required, on time data and saves lots of time.

Disadvantages:

- Require external device, which is costly and require heavy maintenance
- Needs an extra manual effort.
- Time consuming process.
- High risk of data got lost.
- Risk of making techniques that are in the market are dependent on facial recognition, biometric scan or card punching. But all of these require an external device to be installed in the working area, which is errors which entering data and calculation

B. PROPOSED SYSTEM

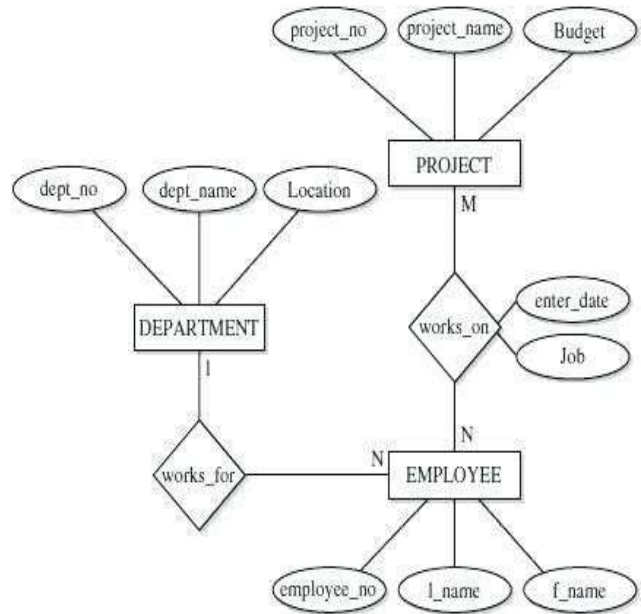
The proposed system is based on an application that runs on smartphones, and requires internet connectivity. This system provides facilities listed below:

1. Employer has to add employee and required details,
2. Employer can set public holiday of an organisation a day before
3. Employer cannot edit the holidays that have passed
4. Employer have to click get salary to get salary of every employee, he will get a salary of previous month
5. Employer can edit and delete the employee
6. The employee has to install the app and follow the described procedure to set up the app, and then he has to scan the QR code for in at a time of entering the premises. And, has to scan another QR for Out at a time of leaving the premises,
7. It provide secure and strict rule for attendance marking as employee can only mark his attendance once in a day

The only requirement to use this system is that one needs to have a smartphone which is not a big task in today's world. One more thing which is kept in mind for those who don't have smartphone that is every employee needs not have a smartphone. There is an option in the employer app through which employers can mark the attendance of his/her employees.

C. SYSTEM ARCHITECTURE

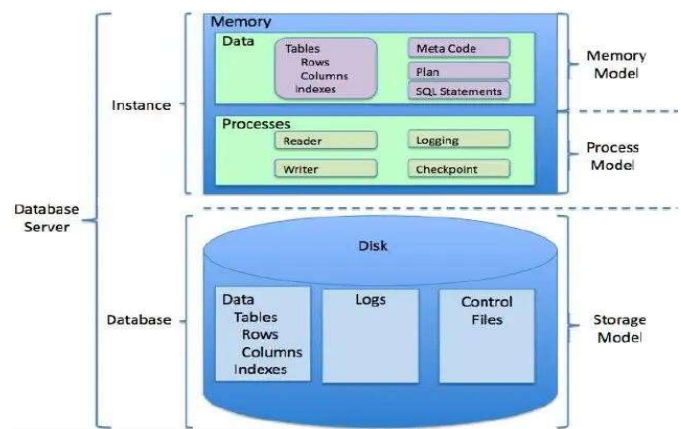
The proposed system is a mobile based application having two apps for two types of user a) Employer b) Employee. The data of a system is stored on cloud storage of firebase. Firebase handles security and provides free support for email authentication [2]. It also gives an automatic unique id to each user. It provides various other facilities such as email verification and service to restore passwords. This firebase stores data on cloud [12.] firestore which stores data in the form of collections consisting of documents and fields. The structure of the database is shown below through the ER diagram in figure 7.1 .

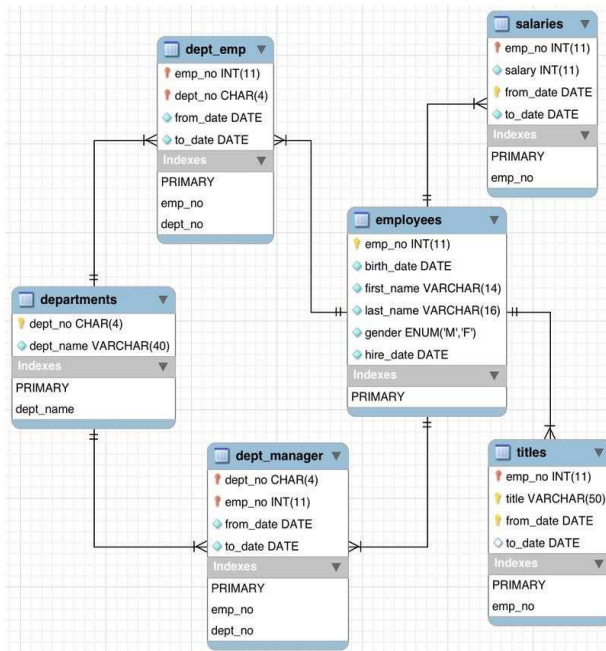


D. RDBMS ARCHITECTURE DIAGRAM

Brief introduction about RDBMS: This is an RDBMS based project which is currently using MySQL for all the transaction statements. MySQL is an open-source RDBMS system. A Relational Database Management System (RDBMS) is a database management system that is based on the relational model. Many databases currently in use are based on the relational database model.

RDBMS have become a predominant choice for the storage of information in new databases used for financial records, manufacturing and logistical information, personnel data and much more since 1980s. Relational databases have often replaced legacy hierarchical databases and network databases because they are easier to understand and use.





E. FEATURES:

Feature of EMS are as follows:

1. Compatible with both android and iOS
2. Easy to use
3. Daily in and out marking, and updating total working hours, present days.
4. Calculation of salary, overtime, leaves at just one click.
5. Reliable and easy to implement
6. Ensures one time attendance marked in a day.

F. ADVANTAGES:

As EMS itself, has lots of advantages and this proposed method of EMS using mobile application based has some extra advantages over other systems such as automatic sensor-based method or old classical pen and paper method.

1. It is cheaper and easy to use.
2. It gives errorless calculations,
3. Prevent any kind of malpractice by employees,
4. For those employees not having smart phone or don't know how to operate, there is a system provided in the employer app from which any authorised person can mark attendance of all such employees.
5. On time salary calculation in just a click, help strengthen the employer - employee relationship.
6. Flexibility with different off days for each employee.

7. Holidays can be marked a day before by the employer.

8. Shows present and absent employees on the main screen.

9. Provide working hours to employees for each day.

10. Make sure employees can only enter/leave once in a day, this feature prevents cheating by any employee.

V. TOOLS AND TECHNOLOGY USED

Programming Language used: Java

SQL - SQL (Structured Query Language) is a computer language that is used to manage data in a relational database management system (RDBMS) or for stream processing in a relational data stream management system (RDSMS). It's especially beneficial for dealing with structured data, or data that has relationships between entities and variables.

Eclipse - Eclipse is an integrated development environment (IDE) used in computer programming. It contains a base workspace and an extensible plug-in system for customizing the environment. It is the second-most-popular IDE for Java development, and, until 2016, was the most popular. Eclipse is written mostly in Java and its primary use is for developing Java applications.

JSP - JSP technology is used to create web application just like Servlet technology. It can be thought of as an extension to Servlet because it provides more functionality than servlet such as expression language, JSTL, etc.

A JSP page consists of HTML tags and JSP tags. The JSP pages are easier to maintain than Servlet because we can separate designing and development. It provides some additional features such as Expression Language, Custom Tags, etc.

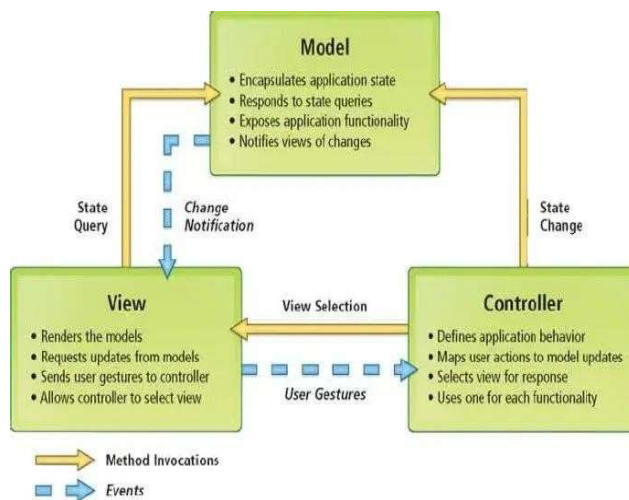
Servlet- Servlet technology is used to create a web application (resides at server side and generates a dynamic web page). Servlet technology is robust and scalable because of java language. Before Servlet, CGI (Common Gateway Interface) scripting language was common as a server-side programming language. However, there were many disadvantages to this technology. We have discussed these disadvantages below.

VI. METHODOLOGY: -

Model View Controller or MVC as it is popularly called, is a software design pattern for developing web applications. A Model View Controller pattern is made up of the following three parts:

- Model - The lowest level of the pattern which is responsible for maintaining data.
- View - This is responsible for displaying all or a portion of the data to the user.
- Controller - Software code that controls the interactions between the Model and View.

MVC is popular as it isolates the application logic from the user interface layer and supports separation of concerns. Here the controller receives all requests for the application and then works with the model to prepare any data needed by the View. The View then uses the data prepared by the Controller to generate a final presentable response.



VII. IMPLEMENTATION METHODOLOGY

Development process used in developing this system is the same as used in web-based applications. Software is developed such that it can be reused and it is impractical to develop the whole system in advance, so it is to be developed in incremental order [15]. Incremental development is a approach in which a system is developed as a series of versions

(increments), with each version having add on functionality to the previous version.

A. SYSTEM ANALYSIS

Employee management system to be developed such that it is capable of marking attendance of each employee. Data of users should be secured and must be accessed easily whenever required. Data to be structured such that it can be reused. Proper management of holidays to be done, which is an important concern in calculating salary of employees. Applications should be capable of giving salary, total working hours, overtime, present days at the end of month in just a click.

B. PLANNING

This section of development includes proper planning of steps and timeline according to that. It is necessary so that the development process goes smoothly and gets completed on time. It includes planning of the process to execute the project and make it achieve its targets and using such that it does not create any problem in future.

C. DESIGN ANALYSIS

Design analysis is a step in which each design of screen is planned and analysed whether it would be capable of giving desired results. This step is repeated whenever required. If something new or update is required that begins from here. The most challenging part here was to make design such that

It give simple user experience. It is an incremental step in which first designing is done such that it is capable of implementing all the required functionalities and later on design can be made attractive.

D. GUI CONSTRUCTION

After getting a clear image of screens and its design, the UI of the app is developed through code. Since this development took over flutter, for designing and implementing backend processes single language is used that make this technology much easier and efficient. The task is to implement it and handle the errors that arise for which we need to search over the internet. This part requires me to read official documents as well as other sources over the internet.

E. DATABASE DESIGN AND ITS IMPLEMENTATION

Designing a backend involves designing databases as well as classes according to functionality we want to provide. For databases I have used Cloud Fire store. This was really the most challenging part for me as I have to think again and again that data should be stored such that It can be accessed easily as well should not be mixed, there was a high risk of getting data stored multiple times because that is to be used at multiple places and another task was to store data so that It remain separated, another was to identifying what and where are the fields required.

F. INTEGRATING DATABASE AND GUI

Now, the most important part came into image , where we require our functions to store and retrieve data. Since data requires updating, we have to keep in mind which data is used how, so that nothing will be lost. One mistake can make your data vanish, however that happens once while developing.

G. IMPLEMENTATION

Implementation is a step in which we would be developing our working application. Here, the functionalities and data is implemented and used respectively wherever required. Implementing whole code and checking for error is done here itself. This is the part where most of the development takes place and we get our final product after this step.

VIII. CHALLENGES IN IMPLEMENTATION

Every system had to face lots of barriers before becoming successful. Challenges faced while developing and implementing system are:

1. While developing this system keeping data safe was a challenge, it was a challenge that anyone knowing company should not get registered as an employee, so this was handled by keeping a check whether that company is registered or not and then checking whether that employee is registered or not. This way before registration of employee its presence is checked.
2. Another challenge was making sure that no employee marked their attendance twice, so for that check is applied whether an employee has entered organisation today or not if not entered then only allowed.
3. Another bigger challenge was managing holidays because in small scale factories and companies it may happen that some staff is called on some day and some on another day, however, their salaries doesn't affect, but my aim was to get exact calculation and manage

this system of holidays so for that, another field named as "Days Off" is declared that set the odd days of each employee separately and accordingly calculations are done.

4. Since, labour might not be having smartphones and many of them would not be knowing usage of android system, it was a great task to make a system such that it can be used widely else it not be useful. For that I have given a system in the Employer's app from where attendance of any employee can be marked.

5. It is also difficult for this system to be used properly by companies because any type of mistake cannot be solved later, every one using this system has to make a habit of using it and remembering to in and out properly, otherwise it may create a problem for them and finally affect their pay.

IX. CONCLUSION

This system will help the organisations develop their system and will help in managing employees. The employee management system is designed to save money, time and power. In an organization to simplify the process of record maintenance it is very helpful. As employees are the backbone of any organisation so it is necessary to keep them happy. This concept will bring transparency in their wages calculation. It will also make the HR work easy so they can focus on some other work. This employee management system manages the overall performance and different aspects of an employee in an organization.

X. REFERENCES

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