

## Application for Travel and Overtime Allowance Management in Western Railways

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**Abstract :** *The management of allowances in Western Railways is a common and critical operation, as it has an effect on the payment of salaries of employees. Currently, the manual calculation of allowances is too complex and takes a lot of time efforts. If these processes are automated, it would be of great benefit as it would require less amount of time to calculate the salary of the employees. So, a mobile application that has a system to facilitate the above cause is considered as a solution here. We are going to digitize an existing system of periodic calculation of Travel Allowance and Overtime Allowance, which currently involves considerable amount of paperwork. This existing methodology consumes an incredibly huge amount of time, considering the verification procedures and transportation of the voucher forms from the various railway stations to the Western Railway Headquarters and vice versa. The proposed application will be capable to automatically calculate the allowances according to the inputs fed in by the employees, thereby simplifying the existing system and reducing the time consumed.*

**Keywords :** *Android Application, Overtime Allowance, Travel Allowance,*

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### I. Introduction

The Mumbai Suburban Railway is a public transit system serving Mumbai Metropolitan Region of Western Railways, Maharashtra. It consists of thirty seven stations from Dahanu Road to Churchgate Station. It is operated by Western Railways (WR) and serves to approximately 3.52 million commuters daily. The employees of the Western Railways are entitled to a number of allowances, most commonly being Travel Allowance (TA) and Over-time Allowance (OTA). In the existing scenario, these allowances are paid accordingly upon the filling and verification of voucher forms, which is a long and tedious process. The entire process is dependent on paper work and manual calculation which makes it error prone. Thus, we have taken an initiative to develop an android application in order to digitize the existing system and thereby contribute towards the Digital India mission. The proposed application will have separate modules for filing travel and overtime allowances. The app will facilitate addition of new users through registration, which will only be permitted if approved by a higher authority (in our case, the station manager). The technologies that we will be using for app development are Android, PHP and MySQL. The user interface will be designed with the help of Adobe Photoshop CC.

### II. Background

This android application has been developed with an aim to facilitate the process of claiming overtime and travel allowances. According to the current scenario, the process of claiming these allowances is totally a manual one, wherein, all the eligible employees fill in their voucher forms (if applicable) on completion of the cycle. Each cycle has 14 days. These vouchers are submitted to the station manager who then verifies them and forwards the bunch to the railway headquarters, where the allowances are sanctioned. After sanctioning, these vouchers are transported back to the respective stations and the allowance updating task for the employees is performed. This entire process is very much time consuming and requires expenditure. Moreover, it is also error prone due to the manual calculations. Thus, we have digitized this entire process in the form of android application which helps in minimizing the human interventions and presents a sustainable digital alternative to the existing procedure.

### III. Literature Review

The system developed by Poonamdeep Kaur, Dr. Dinesh Grover is a web based software developed using PHP, HTML, CSS, JavaScript, AJAX, MySQL. The main features of this software are calculation of allowances, taxes and other deductions, printing individual pay slips and deduction vouchers [1]. The software system developed by Arjun V. Singh, Siddesh V. Chaphekar and Yogesh S. Sawant is developed using VB.net as frontend and Microsoft Access 2007 SQL server 2008 as backend. The planned system has a database that

stores all information related to personnel allowances, deductions, taxes and net pay of the employees. The features of the system include importing attendance from Biometric machine, sending details regarding salary and attendance before finalizing salary, Faculty Management, Overtime Calculation, through mail sending salary slips, HRD programs like offer letter, appointment letter, promotion letter etc[2]. The software implemented by Kritika Mahajan, Shilpa Shukla, and Nitasha Soni is also a desktop based system, which is developed in HTML, CSS and JQuery as frontend, C#, ASP.net is used for backend. For data parsing, JSON and Ajax is used. The system tracks the number of hours worked and a record of employee data including their pay, allowances, deductions and taxes on monthly bases. The fresh definitions are reflected from the current month onwards [3]. The application developed by Manish Singh, Prachi Singh, Rohil Singh, Shubham Singh, and Shiwani Gupta is a web based portal. The features of the application includes applying for leave, viewing leave history, viewing leave stats and granting/rejecting leave applications. The Payroll Management module deals with viewing payroll & tax deductions and automatic tax calculation [4].

The allowances in the Western Railways are calculated using the grade pay. The general formula is:

$$\text{OTA} = \text{Grade Pay} * \text{Principal Amount} * \text{Work hours}$$

where,

$$\text{Work Hours} = \text{Actual Duty Hours} - \text{Roster Duty Hours}$$

Similarly, the travel allowance can also be calculated as follows:

$$\text{TA} = \text{Grade Pay} * \text{Principal Amount} * \text{M.F}$$

where,

$$\text{M.F (Multiplying factor)} = \begin{cases} 30\% & \text{time} < 06 \text{ Hrs.} \\ 70\% & \text{time} < 12 \text{ Hrs.} \\ 100\% & \text{time} > 12 \text{ Hrs.} \end{cases}$$

#### IV. Problem Identification

According to the current scenario, each western railway employee who is entitled to and wants to claim OT has to fill up the vouchers on daily basis against their Roster duty timings and manually calculate the extra duty hours done by him/her, either extra duty was done in day or night shift and their grades (on which the amount to be multiplied varies). This process is carried out for 14 days(cycle of 14 days is fixed throughout the year).Now this filled voucher of 14 days of all the employees are then submitted to Station in charge who will then verify all the entries and send it to Headquarters for final authentication. There these vouchers are authenticated and bought back to the station and final entry is made in salary database.

Here, the major problems are:

- Duration of the whole procedure is immense as it involves manual transportation.
- Transportation cost increases only for the sake of carrying vouchers
- Fully paper based procedure where employee can only fill up the vouchers when they are present at their workplace.
- No proper verification can be done as Station in charge gets the information at the end of 14 days not on the basis of what is happening on a daily basis.
- If due to any reasons, the paper voucher get destroyed or misplaced, there is no way the employee can claim the allowance and may have to go through a long and complex process which is time consuming.

Similarly with TA, only the data types are getting changed and rest of the things remain the same, thus having similar problems as OT voucher.

#### V. Proposed Work

This android application aims to radically transform the existing manual system. The basic steps that will be performed by the system are as follows:

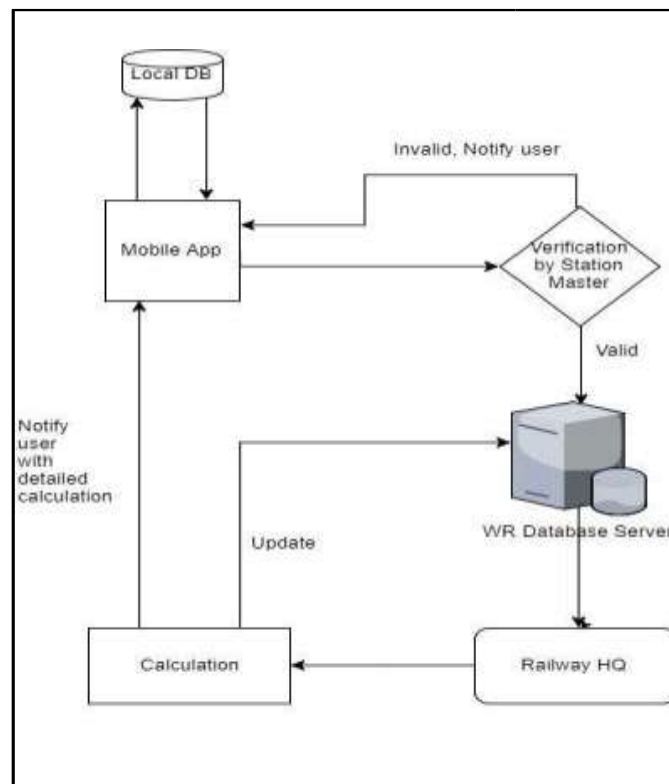
1. Accept the OT and TA data from the user and store them over a central remote database.
2. Create a real time database to help the station manager keep track on each and every employee's progress.
3. Make calculations using the prescribed formulae.
4. Reflect the results of the calculations to the user and to the higher authorities for verification and validation.

5. Generate cycle-wise reports (in PDF/Word Document format) periodically and forward the same for verification to the verifying authority.

6. Prompt the user to make changes as and when required upon the notification triggered by the station manager during validation.

The android application is based on Overtime (OT) and Travelling Allowance (TA) for Western railway employees. So following are the categories of employees present at each station who can access the application for their procedure of applying and calculation of OT and TA:

- **Operating:**  
This category includes number of station masters, point's men and station porters. The station managers are not eligible for OT allowances.
- **Commercial:**  
This category includes booking clerks.
- **Signaling and Telecommunication:**  
This category includes signal inspector, electronic signal maintainer (Khalsi).
- **Overhead equipment:**  
It includes all of the technicians and workers.



The application will provide an interface to the employees to login their OT and TA Voucher details, which will essentially be an e-Voucher form. These two forms will be available as two different modules.

### Module 1: Overtime Allowance

The overtime allowance module allows the user to select the form, fill in the form and review them later. This module includes the various employee working categories which are namely Intensive working hours and Normal working hours. It displays a calendar of current cycle which displays a summary of previously filled vouchers. It also gives the user option to edit past vouchers if they contain any errors. The employees in Intensive working hour category include a total work time of 6 hours, above which the work hours spent by the workers fall under allowances for which they are paid extra based on the formula specified earlier.

### Module 2: Travel Allowance

If the employee leaves his/her designated work station or headquarters for official duty then this travel is sponsored by the Western Railways, meaning he/she is given extra monetary benefit which is calculated and included in their salary. The allowance awarded to travelling employees depend upon various factors such as time spent in travelling, total distance covered by the employee, etc. The TA section allows automation of this calculation and makes the process faster. This software module also displays the calendar to choose the

day on which he/she travelled to claim the allowances from their organization. Unlike Overtime allowance, here all the employees are entitled for the Travel allowances.

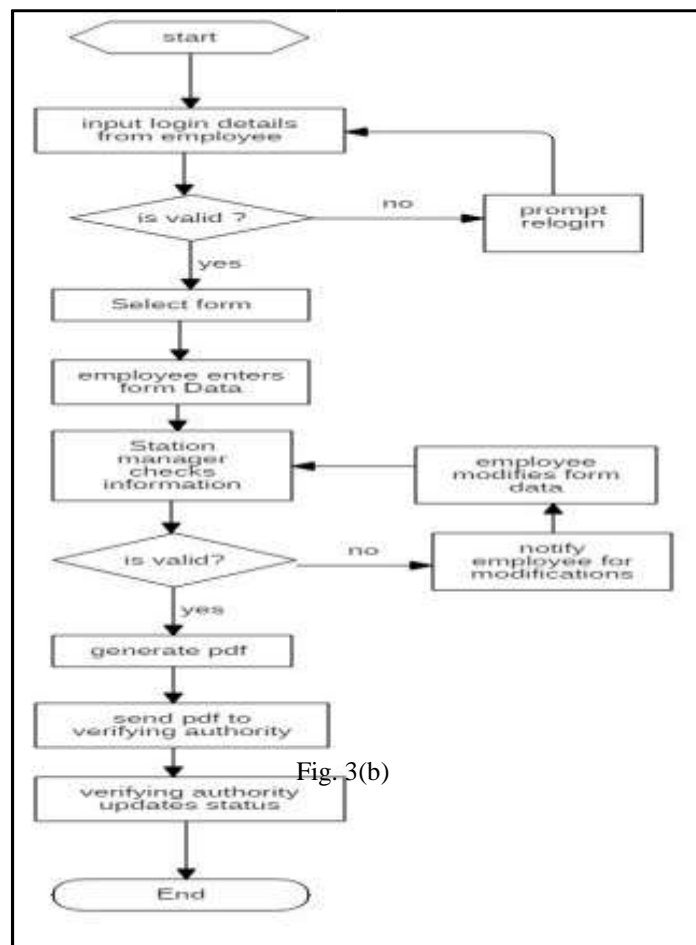


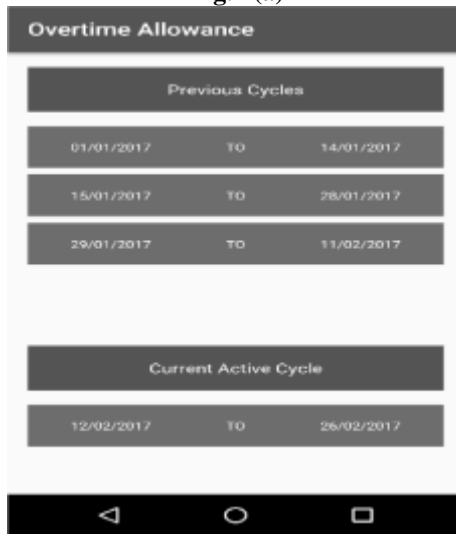
Fig. 3(b)

On the completion of the periodic cycle all the forms of a particular station will be converted into a report and will be forwarded to the validating authority, i.e. station master. The station master may accept or reject the report based on the correctness and authenticity of the report. If correct then the report will be forwarded to the verifying authority i.e. the Railway headquarters, if not the user will be notified to identify and correct the errors. The Railway headquarters upon receiving the report will verify and release the allowances and reflect in the database.

## VI. Expected Outcome

The application will present the user the choice to select which type of allowance form he wishes to fill. The travel allowance module and overtime allowance modules will get presented once the user makes the decision. For example, suppose the user selects overtime allowance module. The application will present the list of cycles comprising of both the previously filled ones and the current cycle. The user will be permitted to make changes for a few previous cycles and the current cycle only.

Fig.4 (a)



After the selection of cycle, a calendar will be displayed as shown in fig 4(b). The dates will be color coded as per the status of the forms belonging to those dates.



Fig.4 (b)

The user will select the date on which he wishes to fill in the allowance form. The form for that particular date will get loaded as shown in fig 4(c). The user may then fill in the details as per requirements.



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