



Managing Critical Work System for Bus Depot

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ABSTRACT: This paper introduces a system design about bus depot management system based on their daily manual work of staff, which implemented the basic functions of the intelligent public transport management system, such as monitoring the time of bus arrival, departing from the bus station and timetable of the buses, payment method of staff, duty allocation to drivers, daily operation report of depot. This system can ensure punctuality of vehicles to run, improve quality of public transport service and the management of bus depot. The management system has low cost and thus it is more feasible.

KEYWORDS: Bus depot management system, MSRTC India, bus management, T2A.

I. INTRODUCTION

Bus based public transport remained the backbone of movement in our areas until the mid - 1980s. Post this time, with the inclusion and growth of the motor industry, buses fastly lost ground to private vehicles. Meanwhile, new cities emerged, administrations of most of which overlooked the need to assist in any form of public mobility, giving rise to privately organised shared forms of transport, such as shared jeeps and automatic rickshaws. Central government grants next to the Jawaharlal Nehru National Urban Renewal Mission (JnNURM), thousands of buses were made accessible to many Indian cities, leading to a rapid increase in the fleet size of a number of State Urban Transport Undertakings (STUs), up to 2015.

Management of action of buses is the primary operation in a bus depot. It combines managing the transfer of buses between various activities/locations in the depot. All bus depots heedless of size involve management activities in addition to the bus-based operations. These include the following activities, among others (The World Bank Group and PPIAF, 2006):

- locating buses and their crew for each duty/trip
- Expedition buses according to schedule
- Processing ticket sales, and cash accumulated by conductors (or drivers)
- Limiting the activities of drivers, conductors, operating crew, and visitors to their relatively area

All depot activities must be identified and appropriately segregated integrated as per their role in overall depot operations. Furthermore, the scope of work for each individual category of personnel accessing the depot (drivers, conductors, depot officials and visitors) must be clear-cut.

Now days there are manually work done by depot. This software will be useful for the depot to diminish there manually work and critical calculation part. Every section can easily operate there system so that the time exhaustion will occur.

This software will be useful for all the depot for easy working and for fast-moving result. This type of different software we can make for the different areas where the calculation part is so belittling.

A bus depot's planning and invention process involves a detailed consideration of its operations. Any bus depot, inattentive of its size small, medium, or larger must host specific operational tasks inside and outside its establishment.



How these activities are planned is critical to the efficiency and performance levels of the depot. These operations vary according to the type of activities performed in the depot such as administrative, driver and crew activity.

So many intricacies are present in the today's existing system so we can develop this system. To cut down the efforts of the employees and giving the fast service. This software is advantageous for the all depot.

II. RELATED WORK

Literature on expulsion models is well classical. Various researches in this transportation field have focused on evacuation planning from various comprehension. Due to the ramification and dynamic nature of transportation network attributes during a debacle, one of the challenges of expulsion modelling is accurately approximation evacuation time. Lindell et al (2002) presented experimental Based Large-scale Evacuation expected duration Model (EMBLEM2) which is an Evacuation Time Estimate (ETE) model. Their research chronicled various improvement in the methodology for ETE. However, they concede its circumscription not accounting for transit dependent users. Wilmot and Mei (2004) compared the correctness of ETE models. They view coordination regression and neural network models as more superior in prognosticate evacuation more accurately than the participation rate model.

Research studies on route choices and transportation network user demeanor during a disaster have seen considerable advances in recent years. In origin-destination (OD) trip estimations (Murray-Tuite and Mahmassani 2003; Fu and Wilmot 2004 and Jha and Okonkwo 2010), demeanor analysis (Helbing et al. 2000; Fraser-Mitchell 2001) and path arrangement (Kang et al 2004) are among the important works in these areas of research. They are infrequently concerned with transportation cost which affects the overall adaptability of routes to effectively agreeable or acceptable to the sudden loads introduced to the network during emptying. Familiarity of the dynamic changes within the network in real time is beneficial to decision-makers in allocating the resources or advising better travel routes. However, due to the distinguishable features of different types of debacle, specific planning models have been developed for various evacuation scheme, including nuclear plant crisis, cyclone, inundation, and blaze, etc. Southworth (1991), Urbina and Wolshon (2003), and Alsnih and Stopher (2004) presented detailed agitation on evacuation planning exemplary. Rice et al (2011) exemplary time-based evacuation to determine choke points and shortest path to safe centrality from conflagration areas.

III. PROPOSED ALGORITHM

A. Design Considerations:

- Create duty
- Calculate Km, steering time, spending time.
- Create Control chat
- Allocate Duty
- Calculate payment
- Maintain daily record of profit and loss of buses
- Send report to main depot.

B. Description of the Proposed Algorithm:

Today in bus depot management all work done by manually no software system is used for the compute. The representative which are work in depot require to do so many computes. The employee computes the day wise stipend of the conductors and the drivers and at the consummation they add all to calculate the monthly payment.

The representative requires to do the compromise of the duties of the conductor and driver manually. This system is so calamitous to work. In this system the daily operational report department compute the all the daily profit and loss of the bus and this report is send to the principal depot, so by doing strenuously they face many problems.

The T2A face many confrontations during the calculating payments according to the work down. The extra overtime charges calculation is also done in this department. In the Timetable there are routes and kilometre of that route is already mentioned, by the help of kilo meter, starting time and ending time of trip we are calculating the steering time, spending time and total kilometres. but it is confrontation to employees to do the calculations.



We can study all the challenges we face during the working process of the bus depot. So, we make the application for the efficient working. We build the application in which in Timetable department do easily calculation of the spend time, so we can easily change our timetable without extra efforts. In the daily operational report, we make daily report of whole one day information of the depot management and from that we calculate the total day profit and loss, so this task is also made easy. We can do the calculations of the total day wise payment of the conductor and drivers according to their work done in the day. So, by using this software all work should done easily.

Calculation part:

In this system we first collect all the information of the bus depot and their operations. There are various sections are worked in bus depot. allocation, T2A, daily operational report, timetable.

In the Timetable section, the actual timetable comes from the principle depot .if there will be any claiming situation the employee can do changes in the timetable .we can change the timing of buses according to that the spade and the starting time is changed. We can add and delete the duties in the timetable according their requirement. When we add or delete the duty all the calculations of spade, starting and the kilometres are changed automatically. This route and the timing of buses are saved in control chart.

Duty No :01, Trip No:67.

Steering time =		Spending time=		Total Km=	
Route	KM	Starting Time	Ending Time	Code NO	Trip No
Vita to Sangli	35	12.00pm	02.00pm	---	---
Sangli To Vita	35	02.15pm	03.15pm	---	---

Fig 1. Timetable

Formulae:

- $T1 = \text{Starting time} - 0.30 \text{ hour}$
- $T2 = \text{Ending time} + 0.15 \text{ hour}$
- $\text{Spending Time} = T2 - T1$
- $\text{Steering Time} = \text{Spending Time} - \text{Extra Time.}$
- $\text{Steering time} = \text{while (! end of trip)}$
 $A = (\text{nth trip steering time}) - (\text{n-1 trip ending time})$
 If $\text{sub} > 10$.
 $\text{Steering time} = \text{spending time} - A + 10$
- $\text{Spending time} = \text{ending time (nth trip)} - \text{Starting time (1st trip)} + 15 + 30$
- $\text{Total Km} = \text{KM (1st trip)} + \text{KM (2nd trip)} + \dots + \text{KM (nth trip)}$

In the timetable when we change the route there is problem in calculations, So the making changes is very challenging task.

In the control chart maintains the record of buses which are comes in depot and going out of depot .In the allocation the Duties are allocated to the employee in the rotation manner if someone is absent in working day then the allocation of other employee takes place and this information is maintain daily and allocation of each duty to each employee by daily manner and all data daily send to the T2A section.

T2A is one type of form which is used for the calculations of the payments. It is very critical task for employees to calculate the payments manually. In the T2A the all the daily records of the conductor and drivers are recorded their extra work is also calculated in the T2A. The conductors and drivers are identified by some specified batch no. It is very important section of bus depot.

Daily operational report in this the daily profit and loss of the all buses are calculated. The DOR section takes help of trimix software which is already existed to see the total income from the single bus. According to that the all the income of all buses is calculated and this information is compared with the previous year so the profit and loss is calculated through this comparison.

Bus-based evacuation problem: Today in bus depot all work is done manually no any software system is used for the calculation. The employees which are work in depot require to do so many calculations. The employee



calculates the day wise salary of the conductors and the drivers and at the end they add all to calculate the monthly payment.

The employees require to do the arrangement of the duties of the conductor and driver manually. This system is so critical to work. In this system the daily operational report department calculate the all the daily profit and loss of the bus and this report is send to the main depot, so by doing manually they face many problems.

The T2A face many challenges during the calculating payments according to the work down. The extra overtime charges calculation is also done in this department.

IV.PSEUDO CODE

1. Create duty
2. Calculate Km, steering time, spending time.
3. Create Control chat
4. Allocate Duty
5. Calculate payment
6. Maintain daily record of profit and loss of buses
7. Send report to main depot.

8. Steering time = while (! end of trip)
 1. A= (nth trip steering time) -(n-1 trip ending time)
 2. If sub>10.
 3. Steering time= spending time - A+10
9. Spending time = ending time (nth trip) – Starting time (1st trip) + 15 + 30

10. Total Km = KM (1st trip) + KM (2nd trip) ++KM (nth trip)

11. End

VI.SIMULATION RESULTS

In accordance with the situation of the public transport management system at present, we design a new intelligent bus depot management system by using PHP MYSQL DATABASE server. It can improve the quality of the public transport service effectively. Its low cost is easy to accept by many public transport Corporation.

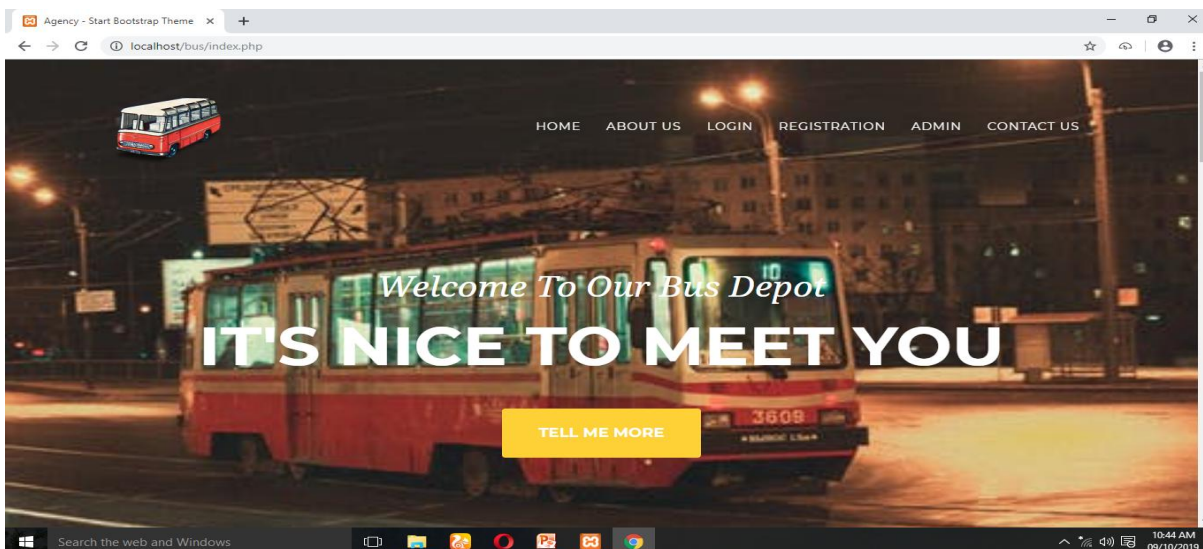


Fig2.Home page.

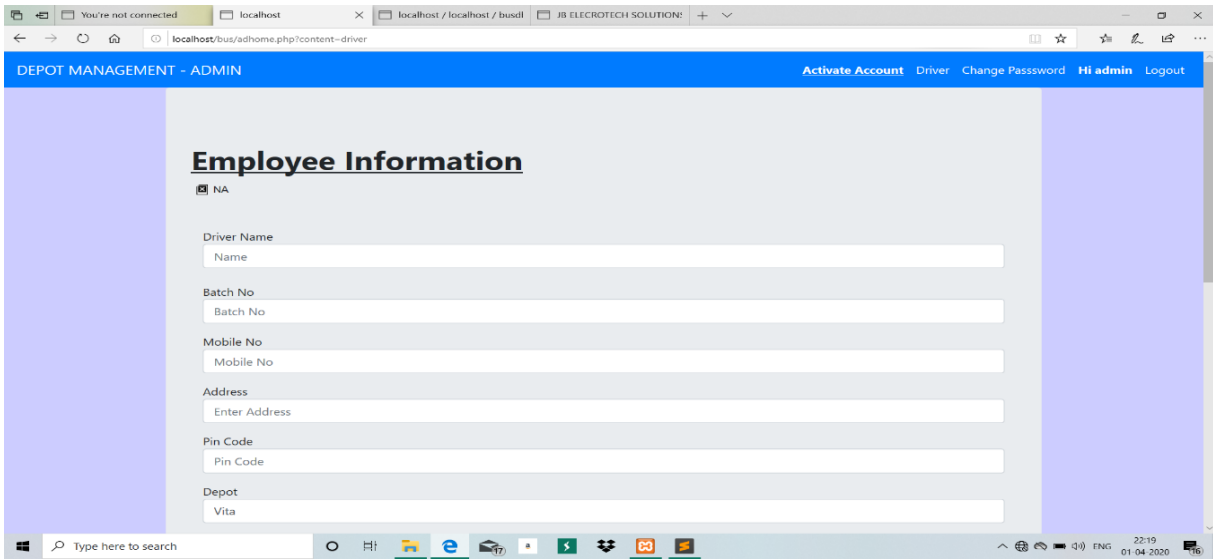


Fig3.Employee Info

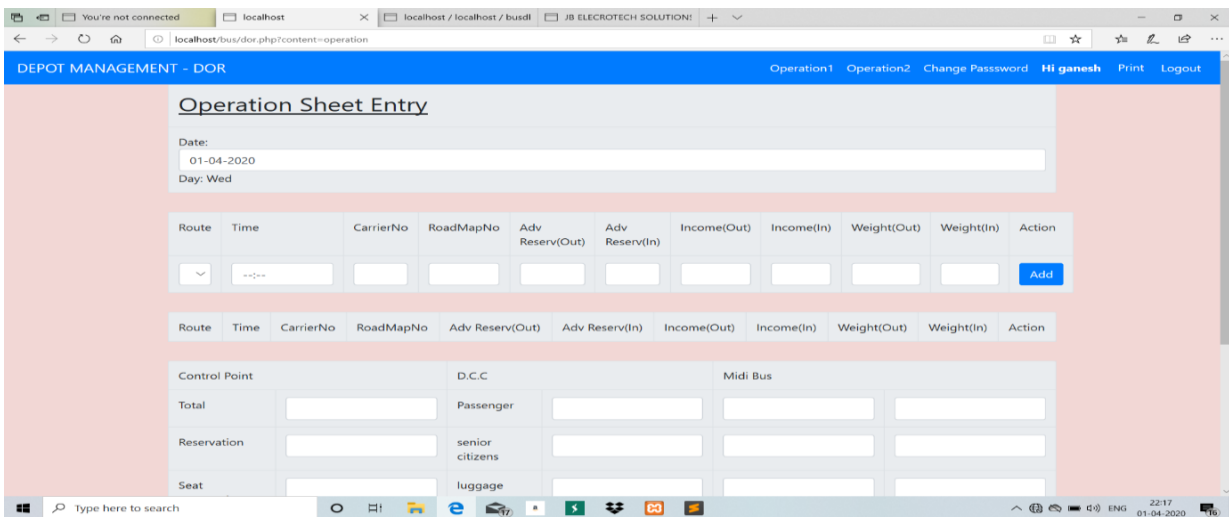


Fig4.DOR Operation sheet entry 1

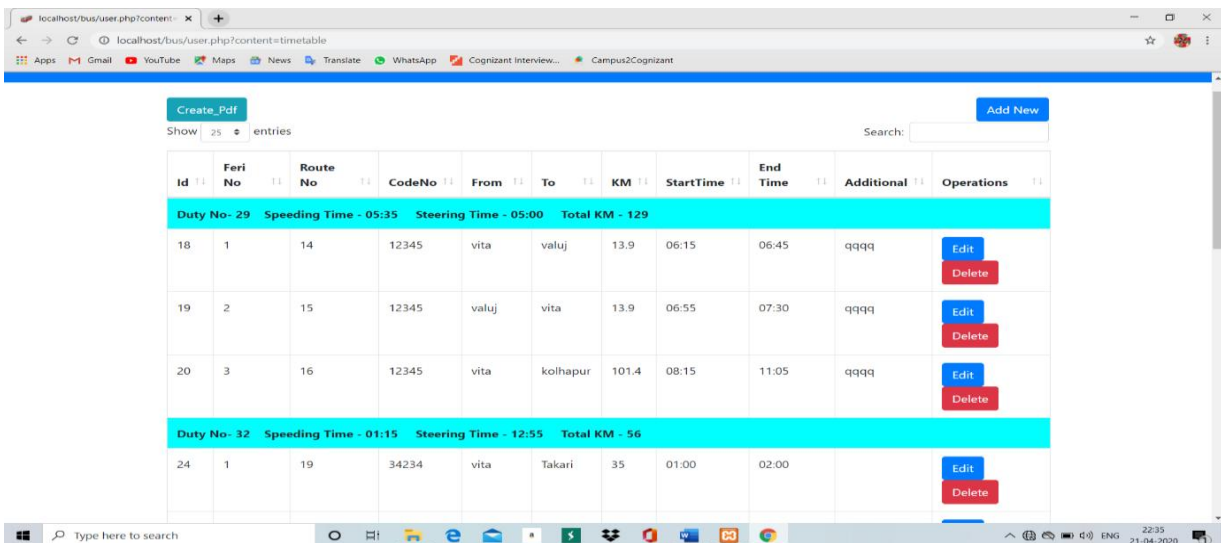


Fig5.Timetable of buses.



VII. CONCLUSION

In this paper, models and algorithms for bus-based depot management planning have been presented. It consists of finding smart operating strategies for the management to be used in critical conditions in order to achieve a desired objective. Four mixed integer linear programming models are developed to find these smart operating strategies.

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