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CASE STUDY ON TRAVEL TIME RELIABILITY FOR VARIOUS ROUTES IN AMRAVATI CITY

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Abstract: Providing travel time information to travelers on available route alternatives in traffic networks is widely believed to yield positive effects on individual drive behavior and choice behavior, as well as on collective traffic operations in terms of, for example, overall time savings and if nothing else on the reliability of travel times. As such, there is an increasing need for fast and reliable online travel time prediction models. Urban population of Indian cities is increasing at the rate of 3% per annum with major focus on metropolitan cities. of late, travel time has become a crucial performance parameter for evaluating urban corridors and networks for traffic control and regulation as a short term measure and system enhancement as a long term measure. Unpredictable travel-time delays in urban road networks in India due to traffic problems like congestion, road-accidents etc., are creating serious concerns about transport system quality. this is the crucial reason why traffic and transportation planners have to seriously look into the issue and develop a strategic plan to ensure travel time reliability and demand for reliable mobility and desired level of service on the urban roads.

Keywords: Public transport; Travel time variability; Reliability; Travel time distribution; Probability; communication, travel time prediction., vehicular occupancy.

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INTRODUCTION

Road traffic conditions in India are getting worse day by day. About 65% of freight and 80 % passenger traffic is carried by the roads. The average number of vehicles in India is growing at the annual rate of 10.16% since last five years. Spending hours in traffic jam has become part of metropolitan life style, leading to health and environmental hazards. Unpredictable travel-time delays in Indian road networks due to traffic problems like congestion, road- accidents etc., are becoming a serious concern. This is the crucial reason why travel time reliability has received much attention from researchers and practitioners. It not only affects driver route choice behavior but also it is used in the assessment of transportation system performance. In past few years, the reliability of transport systems has been widely recognized as a key issue in transport planning. Travel time reliability is significant to many transportation system users, whether they are vehicle drivers, transit riders, freight shippers, or even air travelers. A personal and business traveler values the reliability because it allows them to make better use of their own time. Shippers and freight carriers require predictable travel times to remain competitive. Travel-time variability (TTV) has been defined in the literature as the variance in travel times of vehicles travelling similar trips However; the definition is better suited for measuring private rather than public transport, as confusion arises in the definition of “similar trips.” While private transport vehicles are treated as homogenous to some extent, public transport vehicles are noticeably different. By stopping at only selected stops, express routes are significantly faster than local routes, questioning the definition of “similar trips” particularly for practical purposes. Conversely, the availability of individual travel-time data of each transit vehicle will provide

III. TRAVEL TIME VARIABILITY ANALYSIS

Travel time variability arises due to both recurrent and non-recurrent sources. Non recurrent sources include incidents, weather and special events. Recurrent congestion, meanwhile, is a result of insufficient capacity and demand fluctuation which are due to various factors. Variability can be differentiated into three category inter-day, inter-period and inter-vehicle. Inter-day variability most commonly reflects changes in

Trips No.	Time(AM)	Actual Travel Time(Sec.)	Posted Travel Time(Sec.)	Delay (Sec.)
1	8:00	432.7	233.95	198.75
2	8:20	407.26	233.95	173.31
3	8:40	393.5	233.95	159.55
4	9:00	452.28	233.95	218.33
5	9:20	412.25	233.95	178.3

6	9:40	420.53	233.95	186.58
7	10:00	420.86	233.95	186.91
8	10:20	368.15	233.95	134.2

Travel times from one day to the next. It can be caused by unexpected events such as Construction or unfair weather or traffic patterns during different weekdays. Inter period or daily variation generally refers to the changes in travel time due to peak hour congestion. Meanwhile inter-vehicle variability is a result of individual driver behavior including lane changes and speed.

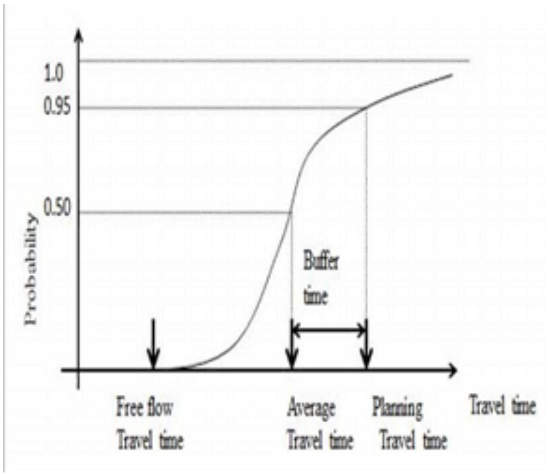
VARIATION IN TRAVEL TIME IN MORNING PEAK HOUR

Variation in travel time between eight numbers of trips is tabulated in table highest value 218.33 sec. is observed in morning 9:00 am.

Travel Time Variability With Respect To Time (M.P.H.)

IV. RELIABILITY MEASURES

Various methods have been developed for the measurement of travel time reliability are briefly described in fig



Cumulative Probability Distribution Function for Travel Time

90th or 95th Percentile Travel Time

Amount of delay will be on the heaviest travel days for specific travel trips or routes? The 90th or 95th percentile travel times are reported in minutes and seconds and should be easily

understood by commuters familiar with their trips. This measure has the disadvantage of not being easily compared across trips, as most trips will have different lengths. Hence simplest measure of travel time reliability is 95th or other percentiles travel times for specific travel routes or trips, which indicates the severe condition of delay in travel times. 95th percentile travel time indicates that 19 out of 20 working days travel is in time to work. This measure ideally suited for traveler information.

Buffer Index (BI)

Buffer Index (BI) is a measure of trip reliability that expresses the amount of extra buffer time needed to be on time for 95 percent of the trips (e.g., late for work on one day out of the typical 20-work-day month.)

Buffer Time Index (BTI) =

For example, a buffer index of 40 percent means that a traveler should budget an additional 12 minutes for a 30 minutes average peak trip time to ensure 95% on time arrival.

Planning Time Index (PTI)

This index represents the amount of total time a traveler should have to ensure on time arrival. It also represents the extra time that is included by most of the travelers when planning peak period trips. The planning time index differs from the buffer index in a manner that it includes typical delay as well as unexpected delay.

Planning Time Index (PTI) =

For example, a planning time index of 1.60 means travelers plan for an additional 60% travel time above the off-peak travel time to ensure 95% on time arrival. Time Index would be a preferred travel time reliability measure since it is based on average travel time; for those who are not familiar with that, planning time index may be preferred as it is based on free flow travel time (2.2)

V. Vehicular Population Growth

The vehicles registered in Amravati RTO area has raised from fifty thousand in 2001 to twelve lakhs in 2014.Fig. Shows vehicular percent wise distribution two wheelers comprise nearly 77% of the total number of vehicles while cars constitute about 14%, three wheeler 4% and 5% other vehicle in Amravati city.

Growth rate in vehicular population in Amravati region has been observed from 2001 to 2014. Traffic is a function of amount and spread of activities. As the activities are concentrated in the cities, the traffic grows within and around the cities. The rate of increase of fast moving vehicles within the city of Amravati is quite alarming.

VI .METHODOLOGY

1. To find out object & scope of work

2. To study literature review

3. To find study area selection

4. To carry out fields study

5. To take data retrieval & compilation

6. Data interpretation & analysis

7 estimation of TTR indices

8. Development of TTR models

VII. CONCLUSIONS

The study shows variation in travel time along the morning peak hours. Within the observed duration, variability in travel time reliability indices is observed to have maximum delay and congestion in morning peak period. The power function based model for predicting planning time index for the given space mean speed is found to have best explanatory fit indicating non-linear relationship between the measure of effectiveness i.e. speed and the transport system reliability in general. Further, the artificial neural network analyses for travel time indices, space mean speed, width, and length from respective data set shows that analysis and validation to the neural network fitting tool was best for planning time index.

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