

Civil Engineering 2016 : Development of a real world driving cycle of motorised three wheelers: A case study of an Indian city - Rakesh Kumar - SardarVallabhbhai National Institute of Technology

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The motorized three wheelers are one of the main modes of urban Indian roads. In this context, this paper aims to develop the driving usage pattern of intercity shared auto rickshaw using V-box. The driving uses data collected in three regions, central business districts (CBD), developed land use pattern and developing land use pattern at morning, evening peak hour and in the free flow conditions. The real-time travel attributes such as speed, time, and acceleration, dynamically related were estimated. The time-space data was obtained for thirty samples, trips for each type of study roads. The velocity of each trip for a single second was compared with the maximum probability of all the repeated velocity values. The likelihood of all the accelerations and rate of change of acceleration was found, and velocity value having a greater probability of acceleration or rate of change of acceleration was selected for the representative driving cycle. The driving pattern constructed using micro trip approach, with consideration of acceleration, cruising, deceleration and idling characteristics. The study has revealed that irrespective of road type, time periods and desired distance, duration and peak hours, a high percentage of driving time was spent in accelerating and decelerating phase. The three wheelers average running speed, and the average speed was estimated about 10 km/h and 11.30 km/h respectively in the arterial CBD. In the developed region, determined running and average speed as 21.88 km/h and 26.8 km/h respectively. The three-wheeler 95th percentile speed was calculated as 29 km/h for developing region with average running speed and average speed 29.67 km/h to 40 km/h respectively. In developing the region, acceleration and deceleration were estimated 34.42% and 37.57% respectively, and idling and cruising 5.13%, 22.88% respectively for the typical arterial road. The developed driving cycle was also compared with Indian standard driving cycle, which helped to get the usages pattern in typical Indian city.

The primary target of this examination is to build competitor driving cycles dependent on small scale trip investigation approach thinking about three driving boundaries; rate time spent in increasing speed (Pa), deceleration (Pd) and inert (Pi)state. K implies

bunching calculation is utilized to canister small scale outings of comparable to attributes. Assessment of competitor driving cycles is practiced through investigation of speed-increasing speed qualities of driving boundaries. Approval of up-and-comer cycle is accomplished through the entirety of the squared contrast between speed-quickening information of up-and-comer cycles furthermore, base cycles. This present reality driving cycle profiles of the three methods of vehicles is considered as base cycles. It is seen from the speed profile close to the convergence that speed decreases a long way from the upstream side of the crossing points and right around zero at convergences, and keeping in mind that leaving the crossing point it increments steadily. Numerous scientists have conveyed out an examination on driving cycle advancement from smaller scale trip investigation procedure. In which the smaller scale trip is the little segment of the driving cycle from sitting to lingering state, though in the current examination the small scale trip is the stretch of deceleration to the speeding up of the driving cycle at convergences. The examination thinks the stretch of the convergences remembers these activities of driving for arrangement.

Kamble et al. (2009) built up a Pune driving cycle dependent on miniaturized scale trip examination approach. Driving boundaries; increasing speed, deceleration journey, inert and normal speed of vehicles are assessed. The created cycle is contrasted and the current Indian Driving Cycle (IDC). Tamsanya et al. (2009) clarified the technique for producing the driving cycle from genuine driving information of Bangkok traffic. Boundaries of the new driving cycle are contrasted and true estimated information. This present reality traffic information is gotten by speed time information lumberjack prepared in a test vehicle. Diviners et al. (2015) have proposed a system for the advancement of explicit cycles for the city of Salanberry-de-Valleyfield (SdV)based on exploratory information. Created cycles are actualized in standard dynamometer estimations. Driving attributes in the forcefulness of proposed cycles produce higher fuel utilization and poison discharges than traditional driving cycles. Galgamuwa et al. (2015) assessed

different strategies utilized for the advancement of driving cycles under different conditions. The motivation behind the investigation is to create demonstrative driving cycles for given areas.

Driving cycle improvement is the significant procedure of assessing the speed of vehicles concerning time and separation. The speed profiles of the vehicles in genuine rush hour gridlock condition don't help the speed qualities of the whole zone. They basically give speed information of vehicles which are intentionally employing in the investigation zone in existing rush hour gridlock conditions. It is important to create run of the mill speed profiles of vehicles in different rush hour gridlock conditions, which is speaking to winning rate attributes of a specific region or a city. This elevates the progression to manufacture the driving cycle of different vehicles from the real speed information, which presents total speed attributes of a region. There are for the most part three stages related in driving cycle development; choice of the course, information assortment and driving cycle development. Course choice includes looking for a characteristic course which communicates the fluctuating street traffic conditions, so the produced cycles can be further held for speaking to speed attributes of the city. In information assortment, the speed of test vehicles was recorded accurately by V-box instrument with the exactness of 0.1 seconds. The cycle development steps involve information division into small scale trips, assessment of boundaries of small scale excursions and creating competitor driving cycles by incorporating agent miniaturized scale trips. The smaller scale trips are isolated from the base driving cycles and their powerful driving boundaries are assessed. Set of small scale trips are framed utilizing K-implies grouping dependent on their equivalency in driving attributes. Small scale trips have indistinguishable qualities are

binning in a solitary gathering. Three driving boundaries are assessed to portray the groups of miniaturized scale trips; deceleration, inert and increasing speed. Quantities of bunches were chosen to see all opportunities for getting ideal group number, which would ready to develop applicant driving cycle with less blunder. The delegate smaller scale trip is chosen from each bunch which conveys the least bunch separation inside the gathering (Fotouhi et al., 2013). All agent miniaturized scale trips are isolated and organized in progression to build delegate up-and-comer cycles. The course of action of miniaturized scale trips amasses one up-and-comer cycle and the procedure is rehashed to produce the quantity of up-and-comer cycles. Up-and-comer driving cycles are assessed dependent on the SSD execution measures.

Biography:

Rakesh Kumar, a graduate in Civil Engineering, Post-graduate & Doctorate from IIT Delhi in Sustainable Engineering, has around 20 years of professional experience in the field of Transportation & Highway Engineering. He is interested in factors that lead to a more efficient, equitable and sustainable urban and regional optimal highway construction and evaluation with NDT. His expertise is in pavement investigation and various rehabilitation techniques. He works on different goal oriented research projects funded by Department of science of Technology (DST), Ministry of Science and Technology, GOI. He has published more than 50 papers in reputed journals and has been serving as an Editorial Board Member of reputed journals.

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