OD Volume Fluctuation Analysis For Tokyo Metropolitan Expressway By ETC Data

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Key words: OD volume fluctuation, vehicle type, neutral network

Background

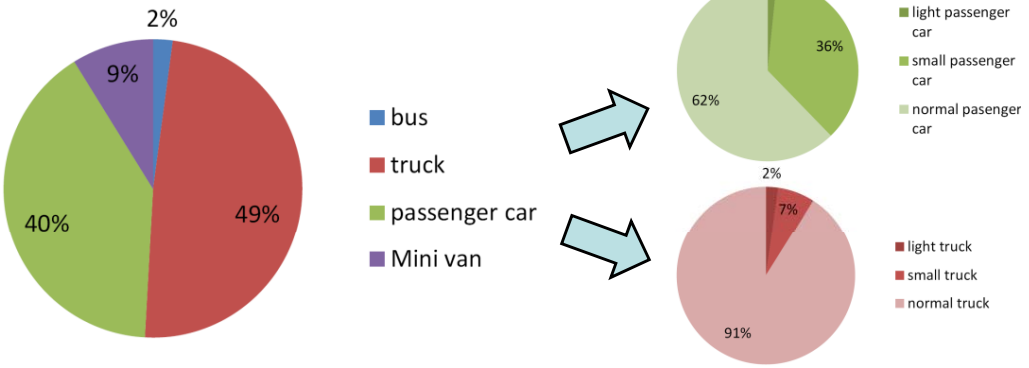
Expressway traffic congestion is one of the most serious problems in Tokyo area. To reduce the congestion condition, OD volume analysis is necessary to show an inside view of expressway network.

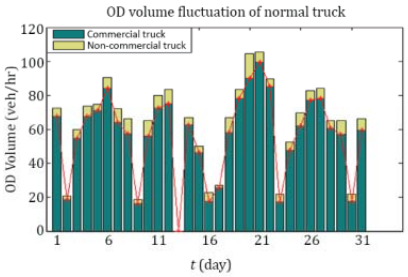
Purpose

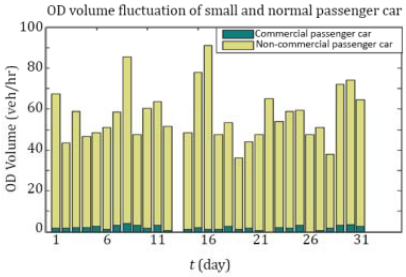
This paper focuses on OD volume analysis to explore characteristics and reasons of the high fluctuation. The selected OD pair is from Yoga main road toll gate to Kawaguchi main road exit. Analysis period is morning peak hours from 6:00 to 8:00 in July 2006

Method

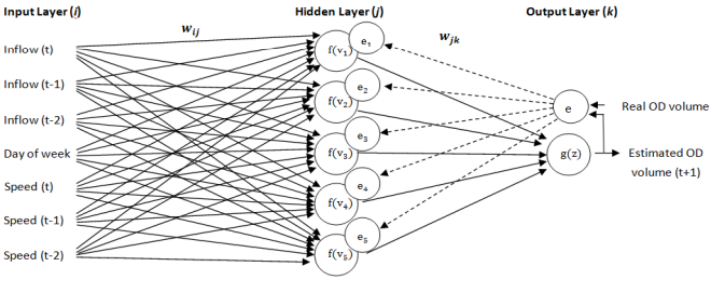
Passenger cars and trucks taking 89% of total OD volume. The majority of trucks are normal sizes which maximum load is over 5 tons. The most passenger cars are small and normal sizes

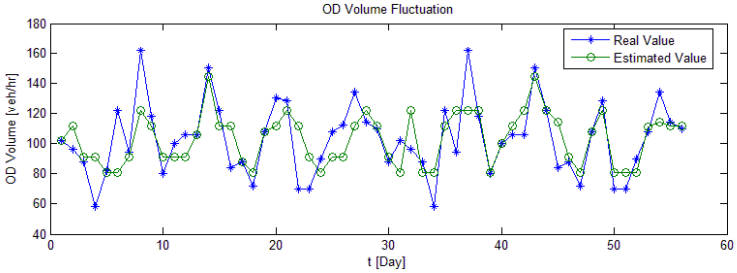






The commercial truck OD volume is much greater than non-commercial truck OD volume and commercial truck OD volume is changed by day of the week regularly. On the other hand, the OD volume of passenger car fluctuates randomly without any periodicity.





A fluctuation simulator is developed by feed-forward back propagation neural networks to explore the characteristics of the fluctuation. Compared the difference between real OD fluctuation and estimated fluctuation of morning peak hours, The root mean squared error of the estimated result is 16.3 [veh/hr].

Conclusion

OD volume fluctuation has been analysed by vehicle types and the neutral network model. Since the OD volume of most trucks are changed periodically, the random fluctuation of passenger car which takes 40% of the total OD volume is the main reason to cause the OD volume fluctuation. In the further study, based on the neutral network model, an estimator will be developed to separately predict the OD volume by different type of vehicle and improve the prediction accuracy.

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