

### Background

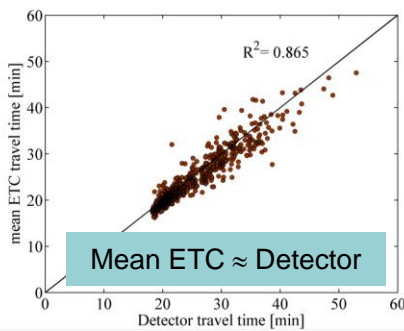
The knowledge of route choice can be used to evaluate and predict the effects of various management strategies on expressways.

However, the accurate information of drivers' route choices can be hardly obtained in practice. The availability of traffic surveillance systems and electronic toll collection (ETC) system opens possibilities to derive information of route choice for each vehicle.

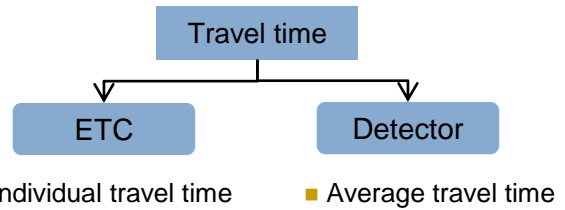
### Purpose

- To identify route used by each vehicle using ETC and detector data.
- To modify methodology using parametric method.

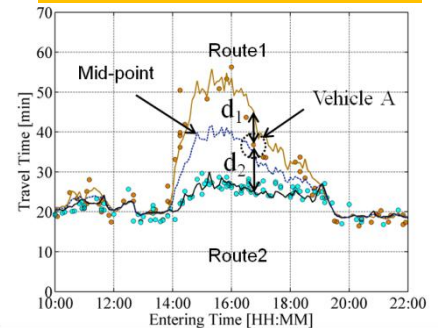
### Method



- If travel time between alternative routes are different.
- Route used by each vehicle can be estimated by comparing travel time obtained from ETC and detector data.
- 2 methods have been introduced: 1) Non-parametric and 2) parametric method

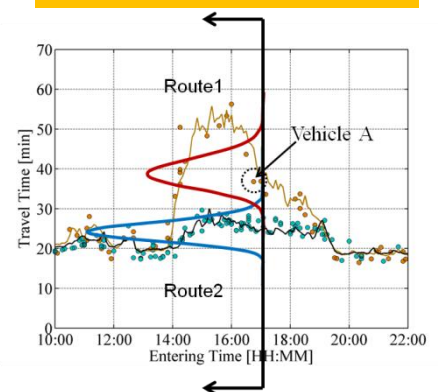


### 1. Non-parametric method



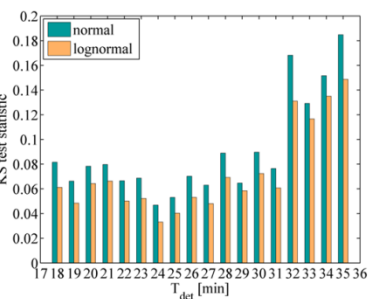
- If  $d_1 < d_2$ , vehicle A is identified to travel on Route 1.

### 2. Parametric method



- If  $pdf_1 > pdf_2$ , vehicle A is identified to travel on Route 1.

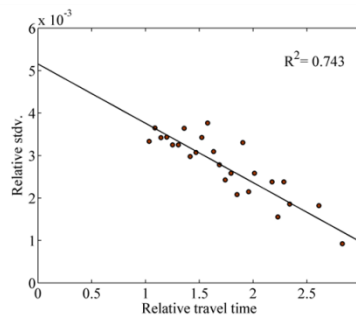
- ETC travel time deviates around mean (detector travel time).
- This makes possibility to assume distribution of ETC travel time.



- The travel time distribution tends to follow Lognormal rather than normal pdf.

$$f_{T_{ETC}}(t_{ETC}) = \frac{1}{\sqrt{2\pi}\zeta t_{ETC}} \exp\left[-\frac{1}{2}\left(\frac{\ln t_{ETC} - \lambda}{\zeta}\right)^2\right] \quad 0 \leq t_{ETC} \leq \infty$$

$$\lambda = \ln(t_{det}) - \frac{1}{2}\zeta^2 \quad \zeta^2 = \ln\left(1 + \frac{\sigma^2}{t_{det}^2}\right)$$



- Lognormal pdf's parameters are estimated using empirical data.
- The relationship between detector travel time and  $\zeta$  is described using linear regression.

### Conclusions

- Around 30% of error can be expected from both methods.
- Improvement of parameters estimation technique in parametric method can enhance the accuracy of results.

### Contact