



Analysis Of User Preference For Traffic Information Service In Beijing

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Outline

1. Background
2. Analysis Method
3. Analysis Results of Beijing
4. Conclusion

- Motivation
 - User preference based traffic information service is required.
 - Probe cars have been used widely.
- Method
 - Analyze user preference based on historical probe car data

Compared with other analysis method, the method has following advantages:

- High accuracy
 - Cover the whole road network.
- Real time
 - By using telecommunication techniques, probe car data can be transmitted to data processing center in real time .

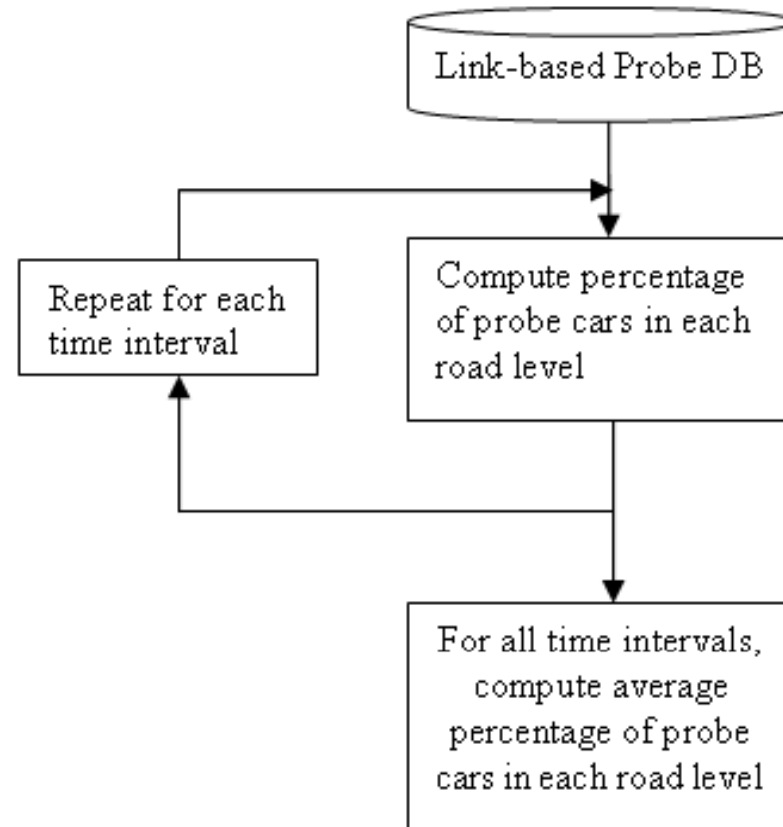
Analyze different road levels by following measures:

- Choice Probability
 - The probability of drivers to choose each road level in daily life.
- Usage Ratio
 - The distance ratio of different road levels used by probe cars and their factual distance.
- Load
 - The ratio of factual travel speed and designed travel speed.

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Analysis Method

- Calculate Choice Probability



- Calculate Usage Ratio

$$\text{Usage Percentage (L)} = \text{UsedTL(L)} / \text{FactTL(L)}$$

UsedTL(L) : the total length of road level L used by probe car.

FactTL(L) : the factual length of road level L.

- Calculate Load

$$\text{LoadWD(L)} = \text{FactSpd(L, WD)} / \text{DesSpd(L)}$$

FactSpd(L, WD): factual average travel speed of road level L for the whole day.

DesSpd(L) : designed speed of road level L.

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Analysis Results (Beijing, China)

- Probe car data

| | |
|------------------------------|---------------------------------|
| City | Beijing, China |
| Time term of data | May, 15, 2007 – July, 10, 2007. |
| Total number of days | 57 days |
| Total number of links | 10982 |

- Road level

| Road Level | Meanings | Limited Speed |
|-------------------|-----------------|----------------------|
| 1 | Expressway | <u>100 km/h</u> |
| 2 | Main road | <u>70 km/h</u> |
| 3 | Others | <u>40 km/h</u> |

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Analysis Results (Beijing, China)

● Choice Probability

| Road Level | Choice Probability |
|---------------|--------------------|
| 1: Expressway | 58% |
| 2: Main Road | 60% |
| 3: Others | 45% |

Greater probabilities of choosing expressway and main road indicate that drivers of Beijing prefer high level road.

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Analysis Results (Beijing, China)

● Usage Ratio

| Road Level | Length Percentage | Usage ratio |
|---------------|-------------------|-------------|
| 1: Expressway | 15.4% | 857660.46% |
| 2: Main Road | 36.3% | 756443.15% |
| 3: Others | 48.3% | 652550.57% |

Almost half of roads in Beijing are lower level roads (level 3); however, their usage ratio is lowest.

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Analysis Results (Beijing, China)

● Load

| Road Level | Expressway | Main Road | Others |
|----------------------------|------------|-----------|--------|
| Average Speed of Day | 51.69 | 38.97 | 32.35 |
| Average Speed of Rush Hour | 49.04 | 35.07 | 29.65 |
| Designed Speed | 100 | 70 | 40 |
| LoadWD | 51.69% | 55.67% | 80.84% |
| LoadRH | 49.04% | 50.10% | 74.13% |

Load of expressway is heaviest especially in rush hour.

- Microscopic Analysis



Fig. 1(a) Route A (3.2 km, 11mins)



Fig. 1(b) Rout B (3.7 km, 6 mins)

It shows that choose main roads rather than low level roads will save travel time greatly.

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Analysis Results (Beijing, China)

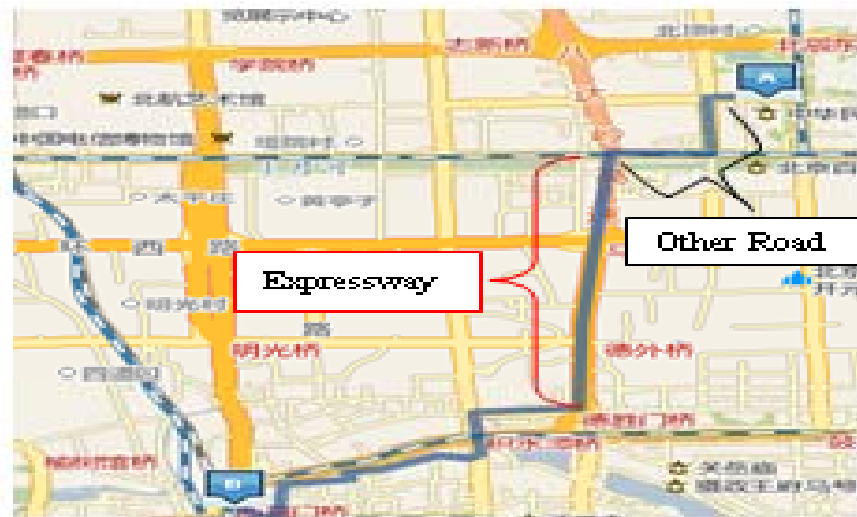


Fig. 2(a) Route A (7.6km, 21min)

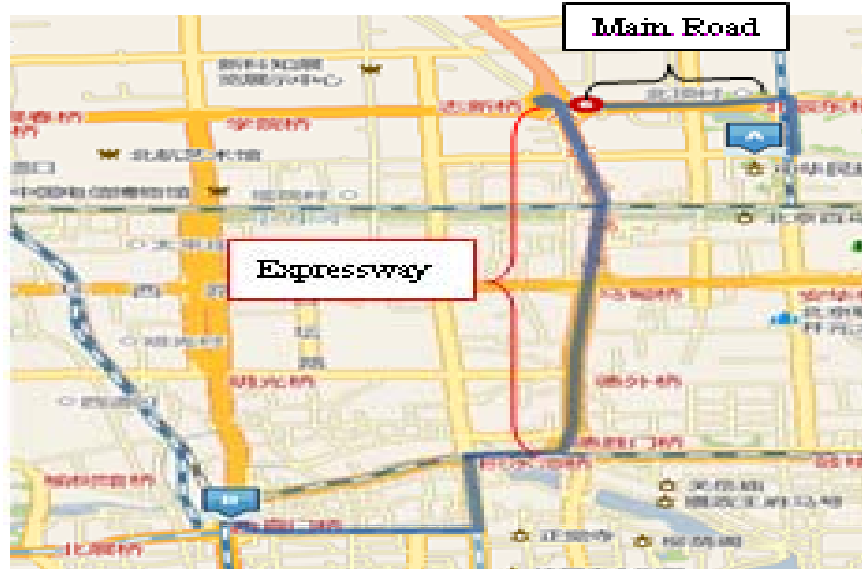


Fig. 2(b) Route B (9.3km, 13min)

Compare with route A, route B detours to a main road firstly and use longer expressway, so this total travel distance is longer than route A. However, its travel time is shorter than route A.

- Traffic information service(Hitachi)
 - Real-time traffic information service (2006)
 - Statistical data based traffic information prediction service (2007)
 - User preference based traffic information service (2008-now)
- User preference analysis
 - Road level choice
 - OD distribution
 - Frequentest routes



Thanks for listening!

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