

The allocation of taxi resources in the “Internet +” Era

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Abstract. First, each company's taxi subsidy scheme is mainly to improve fuel costs when oil prices rise subsidies, paid holidays, extreme weather subsidies. However, these subsidies with respect to the money and high fuel costs, but inadequate. In heavy traffic roads, peak demand periods, there are still many drivers pick off, refusing passengers, which resulting in a "taxi difficult" grim situation.

Recently, the emergence of a taxi software slight impact on this situation. Absolute value close to 1 from the timing and amount of the two aspects of the two taxi software to do similarity measure, draw a correlation coefficient, consider one of the short time lag, then know there is competition between the two companies. To further study the impact of competition between them on the "taxi difficult", observed trends in 2013 from Hangzhou daily average passenger subsidy programs with both software changes on the line graph: Subsidies have larger effort in the early, passenger traffic has Swells; With reducing subsidies, passenger traffic gradually fell, even lower than the average level of subsidy ago.

Thus, the vicious competition between these operators, "burn war", can not alleviate the "taxi difficult." To fundamentally solve the "taxi difficult" issue, companies need to change the traditional subsidy model, or even a mode of operation.

Introduction

Taxi is one of the important means of transportation, "taxi difficult" is a hot social issues. With the "Internet +" era, there are a number of companies rely on mobile Internet software to establish a taxi service platform, and information exchange between passengers and taxi drivers, as well as the introduction of a variety of taxi subsidy scheme.

Analysis of each company whether the taxi subsidy program "to ease taxi difficult" if that helps?

Model assumptions

1. In the case of taxi drivers refusing hire does not exist.
2. Taxi normal driving, no emergency situations, such as car trouble.
3. The selection of a taxi driver software is their recent passengers.
4. Drivers and passengers are high enough covered by the taxi software.
5. The taxi software service platform provides data record but extreme remote areas are not included, and there is enough scientific data.

Symbol Description

- x Common variable
 r_{qk} Sample x_q and x_k variable correlation coefficient
 m, n, q, k, l Positive integer (for counter)

Establishment and Solution Model

Variable similarity measure.

When variables cluster analysis, use sample correlation coefficient for the two variables to build similarity measure.

$$r_{qk} = \frac{\sum_{l=1}^m (x_{lq} - \bar{x}_q)(x_{lk} - \bar{x}_k)}{\left[\sum_{l=1}^m (x_{lq} - \bar{x}_q)^2 \sum_{l=1}^m (x_{lk} - \bar{x}_k)^2 \right]^{\frac{1}{2}}}$$

Sample correlation coefficient:

"Kuaidi taxi" subsidies paid time: $x_1 = (1.2, 2.17, 2.18, 3.4, 3.22, 5.17, 7.9, 8.9)^T$.

"Didi taxi" subsidies paid time: $x_2 = (1.10, 2.17, 2.18, 3.7, 3.23, 5.17, 7.9, 8.12)^T$.

"Kuaidi taxi" passenger subsidy amount: $x_3 = (10, 8, 8, 8, 8, 2, 0)^T$.

"Didi taxi" passenger subsidy amount: $x_4 = (10, 10, 10, 10, 10, 10, 2, 0)^T$.

"Kuaidi taxi" driver subsidy amount: $x_5 = (10, 11, 13, 10, 4, 0, 0, 0)^T$.

"Didi taxi" driver subsidy amount: $x_6 = (10, 12.5, 16, 10.5, 4, 0, 0, 0)^T$.

By equation (6) calculated, $r_{12} = 0.9955$, $r_{34} = 0.98$, $r_{56} = -0.8543$.

$|r_{qk}|$ closer to 1, the more related to x_k and x_q and the greater the relevance is. By the data, we could know "Didi taxi" and "Kuaidi taxi" subsidy scheme has great relevance, and because of the money issuance of a short lag time, we can infer the existence of a competitive relationship.

Taxi software subsidy programs' effect on passenger traffic volume.

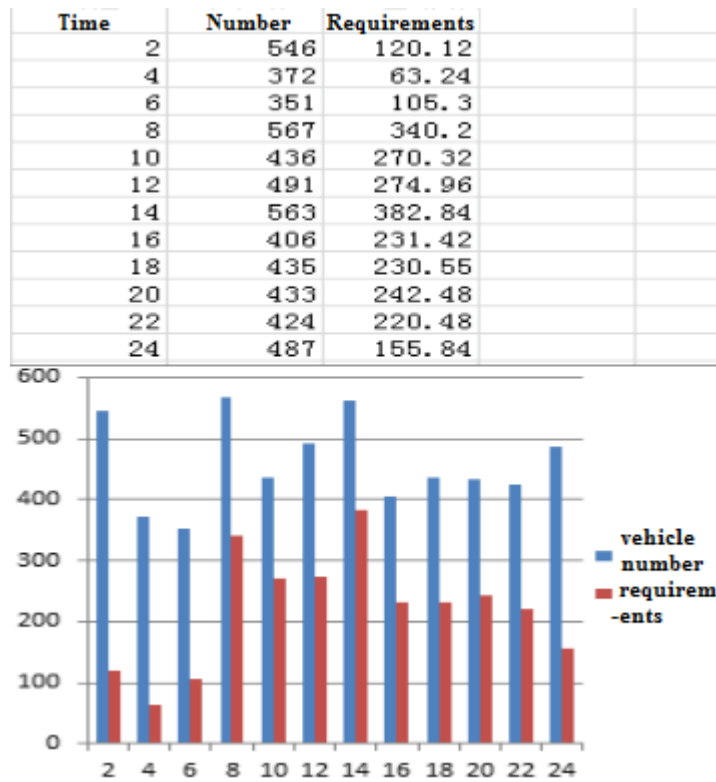


Fig. 1 September 9th Hangzhou 24 hours sub-period the number of taxi and requirements

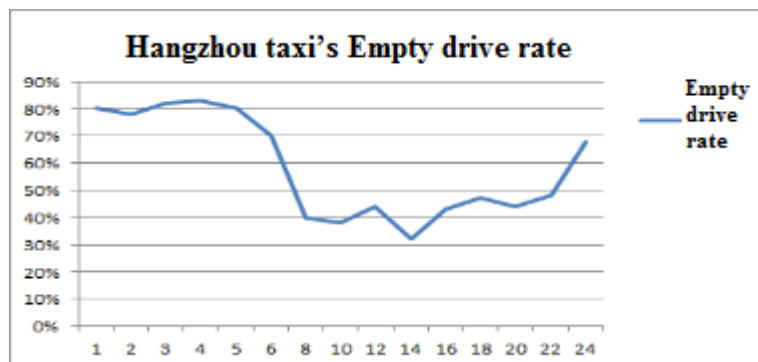


Fig. 2 September 9th Hangzhou 24 hours per taxi's Empty drive rate

Taxi's subsidy programs, mainly refers to the national government subsidies for fuel costs, usually paid quarterly, and in October 2013 to August 2015 ,within the period the money did not have much volatility, so the greater volatility in passenger traffic during this time may be considered primarily by changing the subsidy programs of taxi software company.

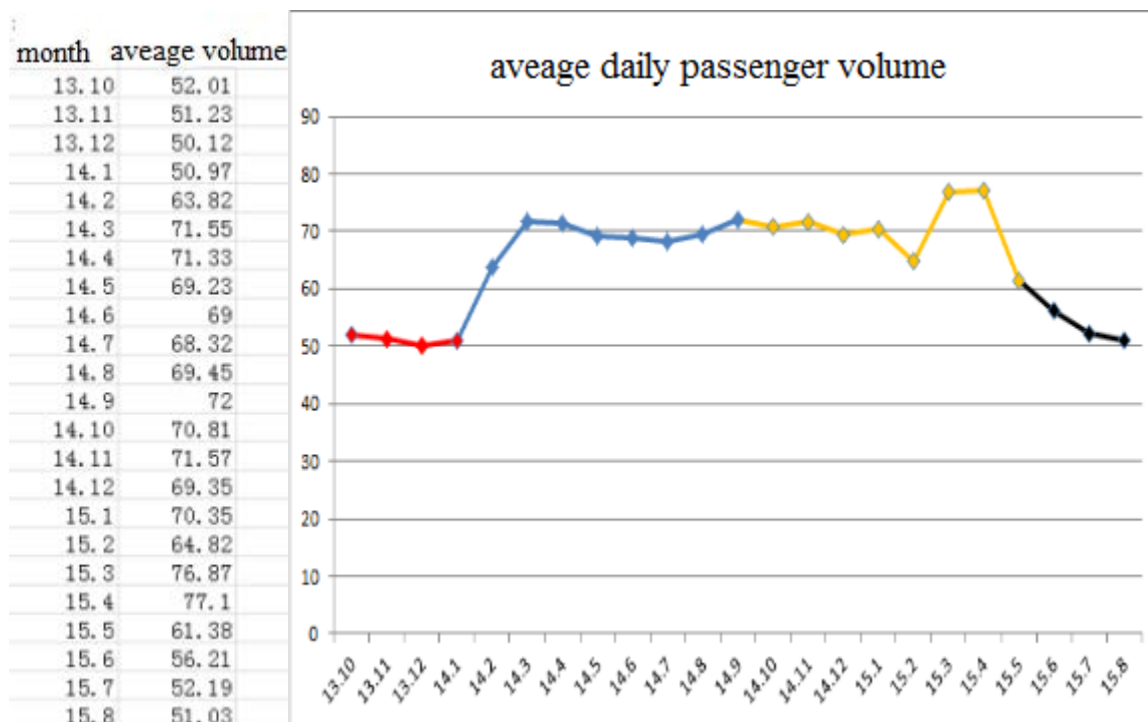


Fig. 3 Hangzhou Daily average taxi passenger traffic volume (October 2013 - August 2015)

① red line (October 2013 - January 2014)

During this time, there are no taxi Software subsidies for drivers and passengers, only taxi company's traditional subsidy (approximately constant). The daily average taxi passenger traffic volume of Hangzhou are at almost 50%.

② blue line (January 2014 - September 2014)

During this time the taxi software provides large subsidies, and the traditional subsidy is still present. Taxi software appear in the early, along with subsidies for the passengers and the drivers, the daily passenger volume surge, and later continued at 70% of the higher passenger traffic. To some extent, the convenience and economy of the taxi software alleviates the "taxi difficult" issue.

③ yellow line (September 2014 - April 2015)

During this time the taxi software no longer provides subsidies, only the traditional subsidies taxi is present. But after some time ago about taxi software's propaganda, the driver and passengers have a

certain coverage, and this time include the Spring Festival, passenger traffic is remained at a high level, and appears a peak.

④ black line (April 2015 - August 2015)

During this time, still only the traditional subsidy is present, and along with the last holiday, daily passenger volume declined, and has dropped to below 50%, below the level when the subsidies of taxi software exist before.

Summary

Based on the above analysis of four time periods, we can get: "Didi taxi" and "Kuaidi taxi"'s subsidy programs' exist because of competition, this "burn war" that aims to seize the mobile device taxi market. Although the larger the initial subsidies to stimulate traffic growth, but demand is also growing, which can not solve the "taxi difficult" problem fundamentally, it may bring new problems, and resulting in decreased passenger traffic to low level after stopping subsidies. In order to solve the problem thoroughly, we need to change the taxi company's traditional subsidy programs, even the traditional business model.

Reference

[1] Information on <http://wenku.baidu.com>.

[2] Information on <http://v.kuaidadi.com/>, 2015.9.11-13

[3] Taxi measure supply and demand in the three indicators - mileage utilization, vehicle load factor, people have the capacity [J] transportation managers in the world, 2007.05.05