

Construction of task pricing scheme about "earning money by taking photos"

Jingmei Yang

School of mathematics and statistics, Qujing Normal University, Qujing, Yunnan

421327416@qq.com

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Abstract. In the era of information, with the increasingly developed network, "to earn money by taking photos" is a self-service model under the mobile Internet. The user downloads the APP, registers as a member of the APP, and then takes a task that needs to take photographs from the APP and earns the reward of the task on the APP. The article uses the task data and membership information data of an already completed project, including the member's location and reputation value. On the basis of reasonable assumption, the data was processed with the MATLAB, SPSS and Excel software. This article mainly compared with the previous program, a new task pricing program is designed for the project to obtain the confidence level by means of the SPSS software, to estimate the reasonable range of the task pricing, predict and design a new pricing program on the reasonable price range.

1. Problem analysis

Aimed at the problem of designing a new task pricing program for the project, the statistical analysis of the completion and the unfinished quantity corresponding to the task price is carried out with help of EXCEL, and then the scatterplot is drawn according to the relationship between the GPS longitude and latitude, the task prices, from which the relationship between task execution, GPS latitude and longitude, task pricing can be found. The SPSS software is applied to estimate range of the reasonable task prices in the new program. Finally, data fitting was carried out with EXCEL to find out the correlation between task prices, GPS latitude and longitude, also the data fitting chart is used to design a new pricing program.

2. Model establishment and solution of the new task pricing program

2.1 Statistics for completion under the task price

Firstly, statistics of completed and uncompleted quantity of the task execution under each task price is carried out, with red marking the task prices for the 3 tasks with the largest completed quantity, green marking the task prices for the 3 tasks with the smallest uncompleted quantity. From the table, it can be found that the completed quantity of the tasks with a higher price is not necessarily higher, and the possible reasons for why the task cannot be completed are the difficulty of the task, traffic convenience, flow of people and so on.

Table 1

Task price	Completed quantity	Uncompleted quantity
85	24	3
80	9	4
75	59	19
74.5	1	1
74	1	4
73.5	3	2
73	7	3
72	42	18
70	11	19
68.5	6	5
68	25	5
67.5	17	6
66	46	57
65.5	76	74
65	35	30

2.2 Relationship between task pricing and task location

Given that under different longitudes and latitudes, the difficulty of the task, the traffic convenience, the flow of people and so on are the same, the scatter plot is drawn according the location and price of the task. It can be seen that the range of the task prices is concentrated between 65-75, shown as below:

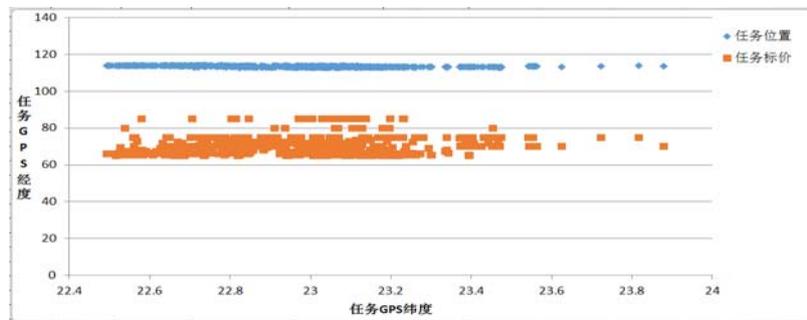


Fig.1

2.3 Estimation for the reasonable range of the task price

Firstly, task prices are classified and collected, in order to estimate the reasonable task pricing at different latitudes and longitudes, the following random samples are taken for the overall $N(\mu, \sigma^2)$, and the confidence interval of μ is calculated to be 0.95. Also, for the test task price, whether the overall average task price is significantly different from the price of each task at different latitudes and longitudes, and analysis can be carried out according to the data in the table.

(1) Propose the original hypothesis and alternative hypothesis: for the test task price, there is no significant difference between the overall average task price and price of each task at different latitudes and longitudes V_S there is a significant difference between the overall average task price and price of each task at different latitudes and longitudes.

(2) Confirmation of the test statistic:

$t(n-1) \sim \frac{\bar{x}-\mu}{s/\sqrt{n}}$, $t(n-1) \sim \frac{\bar{x}-\mu}{s/\sqrt{n}}$, \bar{X} is the average value of the sample, n for the number of samples, s for sample standard deviation.

(3) It can be obtained through calculation:

$$\bar{x} = 71.08, s = 4.7210, df = 23 - 1 = 22, \alpha = 0.05, \frac{\alpha}{2} = 0.025, t_{0.025}(5) = 2.571,$$

$$-t_{0.025}(5) \sim \frac{\bar{x}-\mu}{s/\sqrt{n}} < t_{0.025}(5)$$

$$-2.571 \sim \frac{\bar{x}-\mu}{s/\sqrt{n}} < 2.571, \bar{x} - s/\sqrt{n} t_{0.025}(5) < \mu < \bar{x} + s/\sqrt{n} t_{0.025}(5)$$

$$71.087 - 4.7210/\sqrt{23} \approx 2.572 < \mu < 71.087 + 4.7210/\sqrt{23} \approx 2.571$$

$$69.045 < \mu < 73.128$$

(4) It can be concluded that the reasonable range of task price in different latitudes and longitudes is [69.045,73.128].

(5) This question is a two-sided test, if the significance level of the test is $\alpha = 0.05$, and the critical value $t_{0.025}(5) = 2.571$, $|t| = 72.214 > 2.571$ can be obtained with reference to the distribution table, showing that the t value is within the accepted domain, namely the alternative hypothesis is accepted. Therefore, it can be considered that there is a significant difference between the task price and the overall average task price at different latitudes and longitudes. Also, it can be obtained on the SPSS software:

Table 2

单个样本统计量				
	N	均值	标准差	均值的标准误
任务标价	23	71.087	4.7210	.9844

单个样本检验						
检验值 = 0						
	t	df	Sig. (双侧)	均值差值	差分的 95% 置信区间	
					下限	上限
任务标价	72.214	22	.000	71.0870	69.045	73.128

In the above test results, Sig. (two-sided) = 0.90400 > 0.05, so the alternative hypothesis is accepted, in which it is considered that there is a significant difference between the task price and the overall average task price at different latitudes and longitudes. (Note: In the case of a significance level of $\alpha = 0.05$, the Sig value in the result of the hypothesis test is compared with 0.05. If the Sig value is less than 0.05, the test result would be that the original hypothesis is rejected. If the Sig value is greater than or equal to 0.05, the test result would be that the original

hypothesis is accepted)

2.4 Data fitting for the price, the GPS longitude and latitude data of the task

It can be obtained from the above equation that task pricing, GPS latitude and longitude are correlated, and the relationship between the three is assumed as: $y = c_1x_1^2 + c_2x_2 + c_3$

The fitting results can be obtained through data fitting between the task price and GPS latitude directly with EXCEL:

$c_1 = 0.1836, c_2 = -6.2265, c_3 = 115.23, R^2 = 0.0145$. The obtained relation formula is as

follows: $y = 0.1836x_1^2 - 6.2265x_2 + 115.23$

The data fitting chart is shown as below in Fig.2:

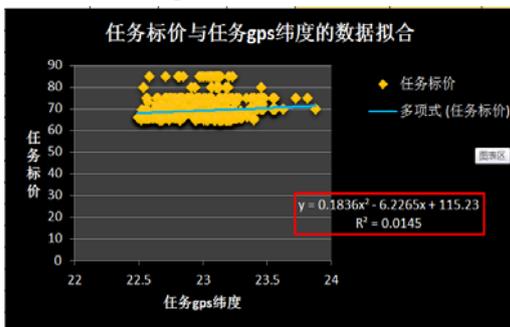


Fig.2

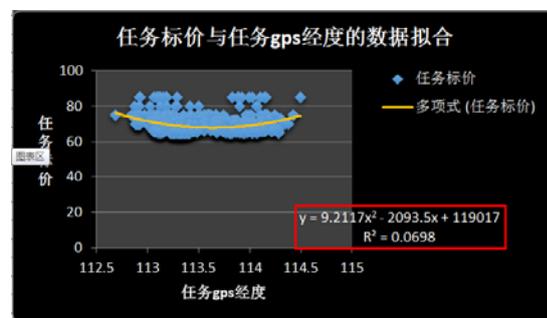


Fig.3

Similarly, the task price and GPS longitude, longitude are correlated, the relationship between the three is assumed as: $y = c_1x_1^2 + c_2x_2 + c_3$

The fitting results can be obtained through data fitting between the task price and GPS latitude directly with EXCEL.

$c_1 = 9.2117, c_2 = -2093.5, c_3 = 119017, R^2 = 0.0698$

The obtained relation formula is as follows: $y = 9.2117x_1^2 - 2093.5x_2 + 119017$. Data fitting chart (Fig.3):

From the above calculation, it can be concluded that the task prices are concentrated in the range of 69-73, of which the GPS latitude is about 22.5 and the longitude is about 113.9, so the error fluctuation range is small. It can be seen from the solving process with SPSS and EXCEL that the reason for the failure of the priced task is lack of consideration on the impact of the GPS location on the priced task (GPS longitude and GPS latitude).

Based on the above judgment, compared with the original program, it will greatly improve the task execution rate, and factors that have influences on the GPS latitude and longitude are fully considered, which can well meet the demand of users.

References

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