2. Main Result

The main result is following methods:

1) The first method: The reasonable amount $y = 110$ in form (4) used to be a mathematical expectation compares with the observed a series $y_i (i = 1, 2, 3, \cdots, 14)$, which is the data of a Shared bicycle unconsumed.in Guangzhou, China, for a period of time ,and these, x represents the number of used .That tabulate statistics the observed a series $y_i (i = 1, 2, 3, \cdots, 14)$

Tab 1. Obsened a Series $y_i (i = 1, 2, ..., 14)$

y_1	y_2	y_3	y_4	y_5	y_6	y_7	y_8	y_9	y_{10}	y_{11}	y_{12}	y_{13}	y_{14}
100	105	108	104	110	120	121	118	116	114	112	116	109	104

We compute the average $\bar{y}$

$$\bar{y} = \frac{1}{14} \sum_{i=1}^{14} y_i$$
$$= \frac{1}{14}(100 + 105 + 108 + 104 + 110 + 120 + 121 + 118 + 116 + 114 + 112 + 116 + 109 + 104)$$
$$= 111.21$$

And calculate their variance:

$$S^2 = \frac{1}{13}[(100 - 111.21)^2 + (105 - 111.21)^2 + (108 - 111.21)^2 + (104 - 111.21)^2 + (110 - 111.21)^2$$
$$+ (120 - 111.21)^2 + (121 - 111.21)^2 + (118 - 111.21)^2 + (116 - 111.21)^2 + (114 - 111.21)^2$$
$$+ (112 - 111.21)^2 + (116 - 111.21)^2 + (109 - 111.21)^2 + (104 - 111.21^2)] \quad (6)$$
$$\approx \frac{1}{13}(125.67 + 38.6 + 10.30 + 52.00 + 14.60 + 77.27 + 95.84 + 46.10 + 22.94 + 7.78$$
$$+ 0.63 + 22.94 + 4.88 + 51.98)$$
$$= 43.96$$

obeys the distribution; the reliability $\alpha = 0.05$ is given

As a statistic

$$T=\frac{\bar{y}-Y}{\frac{S}{\sqrt{n}}}$$

$$=\frac{111.21-110}{\frac{\sqrt{43.96}}{\sqrt{14}}}\approx\frac{1.21}{\frac{6.63}{3.74}}\approx\frac{1.21}{1.77}\approx 0.68 \qquad (7)$$

Establish the test hypothesis:

$H_0: \quad \mu=\bar{y}$

where μ is the population mathematical expectation.

$$p\left\{\left|\frac{\bar{y}-Y}{\frac{S}{\sqrt{14}}}\right|>1.96\right\}=0.05$$

According to mathematical statistics hypothesis test method, the series $y_i(i=1,2,3,\bullet\bullet\bullet,14)$ observed, are from the mathematical expectation .that means :The tracks of equation go through point $A(50,y_i)$, $y_i(i=1,2,3,\bullet\bullet\bullet,14)$ will approach a limit cycle and the series $y_i(i=1,2,3,\bullet\bullet\bullet,14)$ can be accepted to be the reasonable quantity sharing of bicycle.

2) $k=2480$ is considered and x_i , $\frac{dx_i}{dt}$ are various.

In form (4)is replaced by the $x_i=25,\ 26,\ 27,\ 28\ 29\ 31$ and $\frac{dx_i}{dt}=8\ \ 6\ \ 7\ \ 6\ \ 8\ \ 10$, $k=624\ \ 675\ \ 728\ \ 783\ \ 840\ \ 960$ .Then following $Y_i(i=1,2,3,4,5,6.)$ have been obtained :

$$y=\frac{dx}{dt}+x(x^2-k)\Bigg|_{\substack{\frac{dx}{dt}=8\\ x=25\\ k=624}}=33 \qquad (8)$$

$$y = \frac{dx}{dt} + x(x^2 - k)\Bigg|_{\substack{\frac{dx}{dt}=6 \\ x=26 \\ k=675}} = 32 \tag{9}$$

$$y = \frac{dx}{dt} + x(x^2 - k)\Bigg|_{\substack{\frac{dx}{dt}=7 \\ x=27 \\ k=728}} = 34 \tag{10}$$

$$y = \frac{dx}{dt} + x(x^2 - k)\Bigg|_{\substack{\frac{dx}{dt}=6 \\ x=28 \\ k=783}} = 34 \tag{11}$$

$$y = \frac{dx}{dt} + x(x^2 - k)\Bigg|_{\substack{\frac{dx}{dt}=8 \\ x=29 \\ k=840}} = 37 \tag{12}$$

$$y = \frac{dx}{dt} + x(x^2 - k)\Bigg|_{\substack{\frac{dx}{dt}=10 \\ x=31 \\ k=960}} = 41 \tag{13}$$

The result of the above listed in the table below:

Tab.2. The Values of Variables in Equation

x_i	25	26	27	28	29	31
$\frac{dx_i}{dt}$	8	6	7	6	8	10
k_i	624	675	728	783	840	960
y_i	33	32	34	34	37	41

Because the curve of the equation (2) is going to go to the limit cycle, $y_i (i=1,2,\bullet\bullet\bullet,6)$ of the above are reasonable quantity, and their average quantity and variance are computed:

$$\bar{y} = \frac{1}{6}\sum_{i=1}^{6} y_i = \frac{33+32+34+34+37+41}{6} \approx 35.17 \tag{14}$$

$$\begin{aligned} s &= \sqrt{\frac{(33-35.17)^2+(32-35.17)^2+(34-35.17)^2+(34-35.17)^2+(37-35.17)^2+(41-35.17)^2}{6-1}} \\ &= \sqrt{\frac{4.7089+10.0489+1.3689+10.0489+3.3489+33.9889}{5}} \\ &\approx 2.73 \end{aligned} \tag{15}$$

Now following is the actual stopping amount of a Shared bicycle:

$$Y_1 = 38,\ Y_2 = 39,\ Y_3 = 41,\ Y_4 = 38\quad Y_5 = 40,\ Y_6 = 42 \tag{16}$$

And If the reliability $\alpha = 0.05$ is given. Calculate their mean and variance:

$$\bar{Y} = \frac{1}{6}\sum_{i=1}^{6} Y_i = \frac{38+39+41+38+40+41}{6} \approx 39.5 \tag{17}$$

$$\begin{aligned} S &= \sqrt{\frac{(38-39.5)^2+(39-39.5)^2+(41-39.5)^2+(38-39,5)^2+(40-39.5)^2+(41-39.5)^2}{6-1}} \\ &= \sqrt{\frac{(38-39.5)^2+(39-39.5)^2+(41-39.5)^2+(38-39,5)^2+(40-39.5)^2+(41-39.5)^2}{6-1}} \\ &= \sqrt{\frac{2.25+0.25+2.25+2.25+0.25+2.25}{5}} \\ &= 1.9 \end{aligned} \tag{18}$$

Current statistic

$$F = \frac{s^2}{S^2} \tag{19}$$

First, establish the test hypothesis

$$H_0: \ \sigma_1 = \sigma_2 \tag{20}$$

where σ_1, σ_2 are the variances of Y, y.

When H_0 is established, F obeys distribution F ,which is of two degrees of freedom $6-1$.

If the reliability $\alpha = 0.05$ is given, and lookup table can confirm

$$P\left\{\frac{s^2}{S^2} < F_a\right\} = P\left\{\frac{s^2}{S^2} > F_b\right\} = \frac{\alpha}{2} = 0.025$$

where $F_b = F_{0.025}(6-1, 6-1) = 5.05$, and

$$P\left\{\frac{s^2}{S^2} < F_a\right\} = P\left\{\frac{S^2}{s^2} > \frac{1}{F_a}\right\} = 0.025$$

$$\frac{1}{F_a} = F_{0.025}(6-1, 6-1) = 7.15$$

$$F_a = \frac{1}{F_{0.025}(6-1, 6-1)} = \frac{1}{7.15} \approx 0.14$$

$$F = \frac{s^2}{S^2} = \frac{2.73^2}{1.9^2} = \frac{7.4529}{3.61} \approx 2.07$$

$$0.14 < 2.07 < 5.05$$

So H_0 :can't be refused , and $Y_1 = 38$, $Y_2 = 39$, $Y_3 = 41$, $Y_4 = 38$ $Y_5 = 40$, $Y_6 = 42$ in form (15) can be thought they are not different with the reasonable values $y_i (i = 1, 2, \cdots, 6.)$ in table (2) .because they can approach the limit cycles corresponding with $k_i (i = 1, 2, \cdots, 6.)$ in table (2). The values $Y_1 = 38$, $Y_2 = 39$, $Y_3 = 41$, $Y_4 = 38$ $Y_5 = 40$, $Y_6 = 42$ can be seen to be acceptable values， and build another hypothesis $\mu_1 = \mu_2$, which are two general mathematical expectations . Because

$$T = \frac{\bar{Y} - \bar{y}}{\sqrt{\frac{S^2 + s^2}{n}}} = \frac{39.5 - 35.17}{\sqrt{\frac{3.61 + 7.4592}{12}}} \approx \frac{4.33}{3.46} \approx 1.25$$

Obey the t distribution with two degrees of freedom $2n - 2$,which is on the hypothesis $H_0{}'$: $\mu_1 = \mu_2$,and , $\alpha = 0.05, n = 6$ and look table:

$$t_\alpha = t_{0.05}(10) = 2.228 > 1.25 = T$$

There is no obvious difference between the ideal sharing bicycle and the actual observed value.

Conclusion

This paper provides an ideal comparison method of the shared bicycle parking and the actual observation value, which provides the basis for the parking management of the shared bicycle. Make the businessman press the method of this article, consciously carry on the release. Also, the traffic management department shall supervise the inspection methods of this paper. It's very practical.

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