Supplementary material

We added a supplementary experiment about the trend surface of O/D points, to better conclude the characteristic of flow trend. The traditional quadratic trend surface model based on 2D points was constructed following the equation (S1):

$$\hat{\varphi}_i = a_0 + a_1 x_i + a_2 y_i + a_3 {x_i}^2 + a_4 {y_i}^2 \quad \text{(S1)}$$

where $\hat{\varphi}_i$ denotes the trend surface function of taxi pick-up/drop-off (O/D) point density, x_i and y_i are the coordinates of O/D point, a_0 is a constant, and a_1, a_2, a_3, a_4 are the polynomial coefficients of the trend surface function.

Table S1. The goodness of fit of the trend surface models

Time Periods	R^2 for O points model	R^2 for D points model
7:00-9:00 am	0.831***	0.977***
5:00-7:00 pm	0.862***	0.773***

Note: * indicates significance at the 0.05 level, ** indicates significance at the 0.01 level, *** indicates significance at the 0.001 level.

===Place Figure S1 near here===

Figure S1. The quadratic trend surfaces of taxi O/D points in the morning rush hours: (a) the trend surface of O points; (b) the trend surface of D points

===Place Figure S2 near here===

Figure S2. The quadratic trend surfaces of taxi O/D points in the evening rush hours: (a) the trend surface of O points; (b) the trend surface of D points

According to the goodness of fit R^2 in Table S1, the quadratic model performed well in discovering the trend surface of O/D points. All the trend surfaces in ===Place Figure S1 near here=== Figure S1 and ===Place Figure S2 near here=== Figure S2 displayed an increasing trend of point densities towards southwest, which were similar with the detected flow trends in the case study. In conclusion, we thought the discovered flow trend in the taxi OD data was consistent with the real phenomenon.