CLAIMS

[Claim 1] A method for forecasting a delivery fare and determining a batching possibility prediction-based dynamic discount for a scheduled order of a goods delivery service, the method comprising:

Predicting, by one or more servers, a delivery fare for a scheduled delivery in an available time slot;

predicting, by the one or more servers, a batching rate for the scheduled delivery to be batched with at least one other order in the available time slot;

determining, by the one or more servers, a discount for the scheduled delivery in the available time slot, based on the predicted batching rate;

determining, by the one or more servers, a final delivery fare for the scheduled delivery in the available time slot, based on the predicted delivery fare and the determined discount;

displaying, on a graphical user interface of a user device, the determined final delivery fare for user selection of the scheduled delivery; and

based on the user selection of the scheduled delivery via the graphical user interface, controlling the one or more servers to inform a driver or a vehicle allocated for fulfilling the goods delivery service to provide the goods delivery service.

[Claim 2] The method of claim 1, wherein the predicting the delivery fare comprises:

obtaining coordinates of an origin for the scheduled delivery, coordinates of a destination for the scheduled delivery, the available time slot, a base fare or tier base fare for the scheduled delivery, and a surge rate range; and

predicting the delivery fare for the scheduled delivery in the available time slot, based on the obtained coordinates of the origin, the obtained coordinates of the destination, the obtained available time slot, the obtained base fare or tier base fare and the obtained surge rate range.

[Claim 3] The method of any one of claims 1 and 2, wherein the delivery fare is predicted using at least one among quantile regression, linear regression, lasso regression, support vector regression, a multilayer perceptron neural network, a long short-term memory neural network, and a decision tree-based algorithm.

[Claim 4] The method of claim 3, wherein each of the quantile regression neural networks comprises a multiple hidden layer feedforward neural network that is trained with historical data and a quantile loss.

[Claim 5] The method of any one of claims 1 to 4, wherein the predicting the batching rate comprises:

obtaining coordinates of an origin for the scheduled delivery, coordinates of a destination for the scheduled delivery, the available time slot, a number of completed orders in an area of the scheduled delivery and during the same time slot as the available time slot in a prior week, and a batching rate of the completed orders; and

predicting the batching rate for the scheduled delivery to be batched with the at least one other order in the available time slot, based on the obtained coordinates of the origin, the obtained coordinates of the destination, the obtained available time slot, the obtained number of the completed orders and the obtained batching rate of the completed orders.

[Claim 6] The method of claim 5, wherein the predicting the batching rate further comprises determining a bearing for the scheduled delivery, the bearing representing a direction between the origin and the destination for the scheduled delivery, and

the batching rate for the scheduled delivery to be batched with the at least one other order in the available time slot is predicted further based on the determined bearing.

[Claim 7] The method of claim 6, wherein the predicting the batching rate further comprises determining the number of the completed orders in the area of the scheduled delivery, having the determined bearing, and during the same time slot as the available time slot in the prior week, and determining the batching rate of the completed orders, and

the batching rate for the scheduled delivery to be batched with the at least one other order in the available time slot is predicted further based on the determined number of the completed orders and the determined batching rate of the completed orders.

[Claim 8] The method of claim 5, wherein the predicted batching rate is low, based on the available time slot comprising non-peak hours, and

the predicted batching rate is high, based on the available time slot comprising peak hours.

[Claim 9] The method of any one of claims 1 to 8, wherein the batching rate is predicted using a neural network with long short-term memory (LSTM) layers that is trained with historical data.

[Claim 10] The method of any one of claims 1 to 9, wherein the determining the discount comprises:

obtaining the predicted batching rate, coordinates of an origin for the scheduled delivery, coordinates of a destination for the scheduled delivery, the available time slot, a distance of the scheduled delivery, and a duration of the scheduled delivery; and

determining the discount for the scheduled delivery in the available time slot, based on the obtained predicted batching rate, the obtained coordinates of the origin, the obtained coordinates of the destination, the obtained available time slot, the obtained distance of the scheduled delivery, and the obtained duration of the scheduled delivery.

[Claim 11] The method of claim 10, wherein the discount is determined using an S-shaped sigmoid function having the predicted batching rate as an input and the discount as an output.

[Claim 12] The method of claim 11, wherein the S-shaped sigmoid function comprises:

$$discount = \frac{a}{b+exp^{-c(BR-d)}} + e,$$

where *a*, *b*, *c*, *d* and *e* are coefficients and *BR* is the predicted batching rate.

[Claim 13] The method of claim 12, wherein each of the coefficients *a*, *b*, *c*, *d* and *e* is a function of a length of the available time slot.

[Claim 14] The method of claim 10, wherein the determined discount is small, based on the available time slot being short, and

the determined discount is large, based on the available time slot being long.

[Claim 15] The method of claim 10, wherein the determined discount is a preset minimum value, based on the predicted batching rate being less than a predetermined minimum value, and

the determined discount is a preset maximum value, based on the predicted batching rate being greater than or equal to a predetermined maximum value.

[Claim 16] The method of any one of claims 1 to 15, wherein the final delivery fare is determined using an equation comprising:

$$Final\ Fare\ =\ Predicted\ Fare\ *(1-Discount),$$

where *Predicted Fare* is the predicted delivery fare, and *Discount* is the determined discount.

[Claim 17] The method of any one of claims 1 to 16, wherein the determined final delivery fare is displayed with the available time slot on a display, and is highlighted when selected by a user.

[Claim 18] A computer program element comprising program instructions, which, when executed by one or more processors, cause the one or more processors to perform the method of any one of claims 1 to 17.

[Claim 19] A computer-readable medium comprising program instructions, which, when executed by one or more processors, cause the one or more processors to perform the method of any one of claims 1 to 17.