System and Method for Optimizing Order Batching

Technical Field

The present invention relates, in general terms, to a system and method for optimizing order batching. In particular, the present invention provides a system and method for real-time analysis of order parameters to optimize order batching.

Background

This background is provided for generally presenting the context of the disclosure. Contents of this background section are neither expressly nor implied admitted as prior art against the present disclosure.

With the rise of popularity of on-demand delivery services such as food delivery and ride hailing, affordability is a crucial consideration for users when deciding to order. The delivery fee, which might fluctuate throughout the day, is one element that directly affects affordability. It is subject to variables like the accessibility of delivery riders and demand surges in a certain location. For instance, costs can increase during lunchtime in residential areas with a high density of residents as a result of simultaneous meal orders from nearby customers. Although the delivery network stretches to accommodate such demand fluctuations, higher delivery fees may turn off users at the checkout.

Batching processing is a technique for automating and processing multiple orders as a single group. In on-demand delivery services, such as food delivery and ride-hailing, order batching is a common order picking technique when a single deliverer might handle multiple order pick-up with multiple drop off destinations.

Typical batching platforms only take batching requests passively, which means order batching often happens coincidentally. They also do not assess why orders were not batched, to increase the proportion of orders that are batched. Neither do they analyze the state of the batching system, to influence the outcome of following batching attempts.

It would be desirable to overcome or ameliorate at least one of the above-described problems, or at least to provide a useful alternative.

Summary

The present invention provides a system for optimizing order batching. The system comprising memory and a computing system comprising an order management module and a batching module. The memory stores instructions that, when executed by the computing system, cause the computing system to receive an order comprising a plurality of order parameters including a supplier and at least one route characteristic and a search query from a user, the search query comprising plurality of search query parameters including a product. The computing system also generates, at the batching module, a real-time recommendation comprising optimized order parameters based on the plurality of order parameters and the plurality of search query parameters, display the recommendation to the user, receive one of an acceptance signal and a refusal signal. In response to the acceptance signal, the computing system batches a new order with the order, at the batching module, the new order being based on the recommendation, or in response to the refusal signal, generates the new order based on the search query.

Advantageously, the order management module generates a real-time batching signal based on the order, and the batching module receives the batching signal and generates the real-time recommendation based on the batching signal and the plurality of search query parameters. The real-time batching signal may comprise a query for a recommendation for real-time batching candidates (i.e. other order with which a new order, based on the order parameters, can be batched). The real-time batching signal may further comprise the order parameters and/or other data from which the batching module can generate the recommendation.

Preferably, the optimized order parameters comprise a geolocation being one of a pick-up point, a drop-off point or one or more locations on a route between the pick-up and drop-off points.

In some embodiments, the plurality of order parameters comprise remaining time for batching and the optimized order parameters comprise a remaining time for sending the acceptance signal, the remaining time corresponding to the remaining batching time.

In an embodiment, the remaining time for batching corresponds to a waiting time for use of service.

In an embodiment, the product denotes on-demand services which may include but not limited to delivery of food products, small parcels, grocery, documents, furniture and ride-hailing.

In some embodiments, the order management module generates the refusal signal if the recommendation is accepted after expiry of the remaining time for batching.

In some embodiments, the order management module generates the refusal signal if the user refuses the recommendation.

In some embodiments, the recommendations are preferably ranked by complementary product category.

In an embodiment, the recommendations can be ranked by score in relation to the search query parameters and batching potential.

The disclosure also provides a method for optimizing order batching. The method comprises receiving an order comprising a plurality of order parameters including a supplier and at least one route characteristic, receiving a search query from a user, the search query comprising plurality of search query parameters including a product, generating a real-time recommendation comprising optimized order parameters based on the plurality of order parameters and the plurality of search query parameters, displaying the recommendation to the user, receiving one of an acceptance signal and a refusal signal, batching a new order with the order in response to the acceptance signal, the new order being based on the recommendation, or generating a new order based on the search query in response to the refusal

signal.

The present invention also provides a system for optimizing order batching system for optimizing order batching. The system comprising memory and a computing system comprising an order management module and a batching module. The memory stores instructions that, when executed by the computing system, cause the computing system to receive an order comprising a plurality of order parameters including a supplier and at least one route characteristic, request for batching recommendation from the batching module, the request comprises plurality of order parameters including a product. The computing system also generates, at the batching module, a real-time recommendation comprising optimized order parameters based on the plurality of order parameters, display the recommendation to the user, receive one of an acceptance signal and a refusal signal. In response to the acceptance signal, the computing system batches a new order with the order, at the batching module, the new order being based on the recommendation or, in response to the refusal signal, generates a new order based on the search query.

The disclosure also provides a method for optimizing order batching. The method comprises receiving an order comprising a plurality of order parameters including a supplier and at least one route characteristic, requesting for batching recommendation from the batching module, the request comprising plurality of order parameters including a product, generating a real-time recommendation comprising optimized order parameters based on the plurality of order parameters, displaying the recommendation to the user, receiving one of an acceptance signal and a refusal signal, batching a new order with the order in response to the acceptance signal, the new order being based on the recommendation, or generating a new order based on the search query in response to the refusal signal.

Brief Description of the Drawings

Embodiments of the present invention will now be described, by way of non-limiting example, with reference to the drawings in which:

Figure 1 illustrates a block diagram of a system for optimizing order batching;

Figure 2 illustrates a flowchart of a preferred embodiment for a method for optimizing order batching according to an embodiment of the invention;

Figure 3 illustrates a flowchart of another embodiment for a method for optimizing order batching according to an embodiment of the invention;

Figure 4a illustrates a schematic diagram of order batching by a conventional system with example of food delivery;

Figure 4b illustrates a schematic diagram of real-time optimized order batching of the present invention with example of food delivery;

Figure 5a illustrates a schematic diagram of order batching by a conventional system with example of ride hailing;

Figure 5b illustrates a schematic diagram of real-time optimized order batching of the present invention with example of ride hailing.

Detailed description

The present invention relates, in general terms, to a system and method for batching orders. In particular, the present invention describes a system and method for real-time analysis of order parameters to provide optimized order batching.

Hereinafter, the system and method according to the present invention will be described in detail with reference to Figure 1 through Figure 5b according to the preferred embodiments. It is to be understood that limiting the description to the preferred embodiments of the invention is merely to facilitate discussion of the present invention and it is envisioned without departing from the scope of the appended claims.

Figure 1 illustrates a block diagram of a system for batching orders. According to Figure 1, the system comprises at least one processor 102, memory 104 accessible to the processor 102 and a network interface 108 to facilitate communication with a plurality of driver's computing devices 150 and a user's computing device 170. Program code 106 provided in memory 104 comprises instructions executable by the processor 102 to perform at least a part of the method of the embodiments described herein. Notably, while individual computer systems are described in Figure 1, any such computer system may be distributed across multiple servers or multiple devices, or some functionality may be consolidated into a single server or device, without departing from the purposive intent of the present disclosure.

The driver's computing device 150 is associated with a specific vehicle 140 driven by the respective driver. The driver's computing device 150 comprises at least one processor 152, a memory 154, a GPS device 157 and a network interface 159. The memory 154 comprises program code 156 comprising instructions executable by the processor 152 to facilitate interactions with the order batching system 100. The user's computing device 170 comprises one or more processors 172, a memory 174, a GPS device and a network interface 179. The memory 174 comprises program code 176 comprising instructions executable by the processor 172 to facilitate interactions with the order batching system 100. The driver's computing device and the user's computing device may include a personal or handheld computing device such as a smartphone or a tablet. Network 130 facilitates communication between the various devices and may include one or more communication networks including the internet, cell phone networks etc.

One or more database 120 are also accessible to the system 100. The database 120 comprises records of suppliers' geolocations and waiting time for use of service such as food preparation time for food delivery services. The one or more database 120 are able to interact directly with the computing system 100.

As used hereinafter, the term "product" denotes on-demand services, which may include but not limited to food products, small parcels, grocery, documents, furniture and ride hailing. For food delivery, the term "product"

may include the type of desired food or cuisine or the name of a desired restaurant or supplier, and for ride hailing the term may include the location or route characteristic of a destination.

The system for batching orders 100 comprises memory 104, an order management module 107 and a batching module 109. When executed by the computing system 100, the instructions stored in the memory cause the computing system 100 or order management module 107 to receive an order comprising a plurality of order parameters including a supplier and at least one route characteristic. The order is therefore a pre-existing order for a product from a specific supplier. Further, the computing system 100 or order management module 107 receives a search query from a user 160, comprising a plurality of search query parameters including a product, pick-up (origin) and drop-off (destination) locations. The order management module 107 then sends a query to the batching module 109 for real-time batching candidate recommendation – i.e. recommending existing orders with which to batch an order created in accordance with the query. In return, the batching module 109 generates a real-time recommendation comprising optimized order parameters based on the plurality of order parameters and the plurality of search query parameters and displays the recommendation to the user. Display to the user may involve advising the user of a fare available if they choose to ride with another user (corresponding to an existing order), or other information from which the user can select whether or not to batch their order. In general, the specifics of one order will not be displayed to users who did not place the order.

For example, a pre-existing order may be received for a ride hailing pick-up at a first origin, for delivery to a first destination. A user's search query may then be received for a ride hailing pick-up at a second origin, for delivery to a second destination. The second origin may be located near the first origin or, the second destination is located near the first destination or, the second origin or the second destination is located along the route between the first origin and the first destination.

The order management module 107 then queries the batching module 109 for a real-time batching recommendation of other product located near the first

origin or a product located along the route between the first origin and the first destination. The batching module 109 may therefore present to the user a list of product recommendations which satisfy the query parameters. In another embodiment, product recommendations are ranked by product category, preferably complementary product category that are typically purchased with the product of existing order. This would encourage the user to select a product (i.e. submit another order or accept the recommendation) that can be attempted to be batched or batched with the pre-existing order. The order management module 107 or batching module 109 then receives one of an acceptance signal and a refusal signal. In response to an acceptance signal, the order management module 109 creates a new order, which is passed to the batching module 107 to be attempted to be batched together with the pre-existing order, the new order being based on the recommendation. In response to a refusal signal, the order management module 109 will generate a new order based on the search query. If batching fails – e.g. if an acceptance signal is received but, in the time it took the user to accept, the remaining time for batching with the existing order expires – this is considered to then constitute a refusal signal and is processed per a refusal signal received from the user.

In the conventional batching system, the batching module does not provide any real-time signal or batching recommendations back to the order management module or to the user. As a result, separate users place orders and the batching module would attempt batching, passively, without a feedback loop back to the user or to the order management module.

The system 100 is able to sequence orders on planned routes based on factors such as the type of delivery-partners that are in the vicinity, the time delivery-partners need to wait at the merchants (e.g. time for meal preparation) or waiting time for use of service, as well as traffic and weather.

If the drivers or delivery-partners have to manage more orders in a single trip, the algorithms take into account factors such as their mode of transport. For example, a car can carry more orders than a bike.

The algorithm logically assigns larger vehicles to larger orders or longer

distances. In contrast, smaller vehicles like motorcycles or bicycles are assigned to smaller orders and shorter trips.

Figure 2 illustrates a flowchart of a preferred embodiment for a method for optimizing order batching executable by the system 100. Particular embodiments may repeat one or more steps of the method of Figure 2, where appropriate. Although this disclosure describes and illustrates particular steps of the method of Figure 2 as occurring in a particular order, this disclosure contemplates any suitable steps of the method of Figure 2 occurring in any suitable order. Depending on order parameters, the method generates real-time analysis of the order parameters and the batching module to provide optimized order batching.

At step 210, the system 100 receives an order for food delivery or a ride from a user's device 170. The order comprises order parameters including a chosen supplier or vendor such as a restaurant (for food delivery), a driver or a delivery partner and at least one route characteristic such as origin and destination information, and time of order.

At step 220, the batching system receives a search query from a user, the search query comprising plurality of search query parameters including a product. Search query parameters can include user-defined parameters such as delivery date and/or time, destination to which the product is to be delivered, and others.

At step 230, the system 100 generates a real-time recommendation comprising optimized order parameters based on the plurality of order parameters and the plurality of search query parameters. In response to the search query parameters, the system 100 is able to rapidly recommend that the user places a new order which could be potentially batched together with the first order.

Recommendations are ranked by product category, preferably complementary product category. In the example of Figure 2, relating to ride hailing (request or order for a ride), the complementary product category would generally be limited to ride sharing (existing orders the users willing to share their ride)

though, in some embodiments, complementary orders may extend to other product categories such as food or parcel delivery. In other embodiments, such as food delivery, if the pre-existing order is for noodles (main course meal), complementary product category recommendations could consist of complementary beverages or desserts product categories, or products that are typically purchased with the product of existing order (in general, complementary product categories relate to products that are typically bought together). Recommendations may also be ranked by score in relation to the search query parameters and batching potential. For example, recommendation score may be higher if the location of supplier of a product (e.g. vendor for complementary drinks or beverages) is located near the origin of existing order or located along the route between the origin and the destination of existing order. Score may also be higher if that particular product is typically purchased with the product of existing order. The higher the score, the more likely the product is to be recommended.

At step 240, the system 100 displays the recommendation to the user at the user's computing device 170 as the recommendations comprises optimized order parameters based on the plurality of order parameters and the plurality of search query parameters.

The user 160 then decides whether to accept or refuse the recommendation in which the system 100 then receives one of an acceptance signal and a refusal signal accordingly.

In response to receiving an acceptance signal, the system receives or generates a new order, based on the acceptance signal, in step 250. In step 255, the system 100 attempts to batch the new order with the order in step 210, the new order being based on the recommendation.

In response to receiving a refusal signal, the system receives or generates a new order in step 260. In step 265, the system fulfils the order without batching.

Figure 3 illustrates a flowchart of another embodiment for a method for optimizing order batching executable by the system 100. Particular

embodiments may repeat one or more steps of the method of Figure 3, where appropriate. Although this disclosure describes and illustrates particular steps of the method of Figure 3 as occurring in a particular order, this disclosure contemplates any suitable steps of the method of Figure 3 occurring in any suitable order. Depending on order parameters, the method generates real-time analysis of the order parameters and the batching module to provide optimized order batching.

At step 310, the system 100 receives an order for food delivery from a user's device 170. The order comprises order parameters including a chosen supplier or vendor such as a restaurant (for food delivery), and time of order.

At step 320, the order management module sends a request for batching recommendation from the batching module 109, the request comprising plurality of existing order parameters including a product such as a route characteristic and a supplier.

At step 330, the system 100 or batching module 109 generates a real-time recommendation comprising optimized order parameters based on the plurality of order parameters. In response to the request for batching recommendation, the system 100 is able to rapidly recommend that the user places a new order which could be potentially batched together with the existing order.

The plurality of order parameters comprise remaining time for batching and the optimized order parameters comprise a remaining time for sending the acceptance signal, the remaining time corresponding to the remaining batching time.

The remaining time for batching corresponds to a waiting time for use of service.

The product denotes on-demand services which may include but not limited to delivery of food products, small parcels, grocery, documents, furniture and ride-hailing.

The order management module generates the refusal signal if the recommendation is accepted after expiry of the remaining time for batching.

Figures 4a, 4b, 5a and 5b illustrate the differences in order batching without real-time analysis of order parameters to provide optimized order batching. Figure 4a relates to a scenario for a food delivery platform that does not incorporate the disclosed systems and methods. In the scenario of Figure 4a, User 2 404 searches for a product having a plurality of search query parameters including type of desired food - e.g. noodle. There is an existing booking from User 1 402 with Supplier 1 406 having noodle in its menu list. The conventional system would recommend Supplier 2 408 to User 2 404, as Supplier 2 is closer to User 2, or attempts conventional batching methods passively.

With batching module 412 in Figure 4b, the system 100 is able to generate real-time recommendations comprising optimized order parameters for the User 2 to choose from in order to combine or batch his order with an existing order of User 1 402. The recommendations are preferably ranked by product category in relation to the search query parameters and batching potential. The user may be enticed to select the recommendation through provision of a lower delivery fee or some other incentive.

Figure 5a relates to a scenario for a ride hailing platform that does not incorporate the disclosed systems and methods. In the scenario of Figure 5a, Passenger 2 504 searches for a destination 508 having a plurality of search query parameters that may include the name of destination. Initially, the Passenger 2 does not look for ride-sharing product. There is an existing booking of Passenger 1 502 that is for a ride-sharing product (i.e. where multiple passengers book the same vehicle and share the overall fare) with 1 minute remaining time for batching – this avoids Passenger 1 (or the user who placed any pre-existing order, in other embodiments) from waiting an excessive time while the system attempts to batch their order. After 1 minute is up, Passenger 2 504 tries searching for a destination 508 again but this time for a ride-sharing product. However, Passenger 1's booking has already expired. Without batching module, the order management system 510 generates basic recommendations, without real-time batching

recommendations for Passenger 2 to choose from while ordering. As a result, Passenger 1 502 and Passenger 2 504 travel alone separately or travel with other passengers through conventional batching methods.

With batching module 512 in Figure 5b, the system is able to generate real-time batching recommendation for Passenger 2 504 to choose from in order to combine his ride order with an existing order within a reasonable batching time or remaining time for batching. For example, when Passenger 2 504 is ordering a ride hailing service with destination 508 which is close to Passenger 1's destination 506, the system may recommend a ride sharing service that can be batched with Passenger 1 502.

Users who select the option to batch their order or ride with an existing order allow for an extended delivery time as their orders get batched together with others on a driver or delivery partner's route. In exchange, they may enjoy lower delivery fees. At the same time, drivers or delivery partners are able to increase their earnings by getting the opportunity to complete more orders with less time and effort.

It will be appreciated that many further modifications and permutations of various aspects of the described embodiments are possible. Accordingly, the described aspects are intended to embrace all such alterations, modifications, and variations that fall within the spirit and scope of the appended claims.

Throughout this specification and the claims which follow, unless the context requires otherwise, the word “comprise”, and variations such as “comprises” and “comprising”, will be understood to imply the inclusion of a stated integer or step or group of integers or steps but not the exclusion of any other integer or step or group of integers or steps.

The reference in this specification to any prior publication (or information derived from it), or to any matter which is known, is not, and should not be taken as an acknowledgment or admission or any form of suggestion that that prior publication (or information derived from it) or known matter forms part of the common general knowledge in the field of endeavour to which this specification relates.

Claims

1.A system for optimizing order batching, comprising:

memory; and

a computing system comprising an order management module and a batching module, the memory storing instructions that, when executed by the computing system, cause the computing system to:

receive:

an order comprising a plurality of order parameters including a supplier and at least one route characteristic; and

a search query from a user, the search query comprising plurality of search query parameters including a product;

generate, at the batching module, a real-time recommendation comprising optimized order parameters based on the plurality of order parameters and the plurality of search query parameters;

display the recommendation to the user;

receive one of an acceptance signal and a refusal signal; and

in response to the acceptance signal, batches a new order with the order, at the batching module, the new order being based on the recommendation; or

in response to the refusal signal, generates the new order based on the search query.

2. The system as claimed in claim 1, wherein the order management module generates a real-time batching signal based on the order, and the batching module receives the batching signal and generates the real-time recommendation based on the batching signal and the plurality of search query parameters.

3. The system as claimed in claim 1 or claim 2, wherein the optimized order parameters comprise a geolocation being one of a pick-up point, a drop-off point or one or more locations on a route between the pick-up and drop-off points.

4. The system as claimed in any preceding claim, wherein the plurality of order parameters comprise remaining time for batching and the optimized order parameters comprise a remaining time for sending the acceptance signal, the remaining time corresponding to the remaining batching time.

5. The system as claimed in claim 4, wherein the remaining time for batching corresponds to a waiting time for use of service.

6. The system as claimed in claim 1, wherein the product denotes on-demand services which may include but not limited to delivery of food products, small parcels, grocery, documents, furniture and ride-hailing.

7. The system as claimed in claim 4, wherein the order management module generates the refusal signal if the recommendation is accepted after expiry of the remaining time for batching.

8. The system as claimed in any preceding claim, wherein the order management module generates the refusal signal if the user refuses the recommendation.

9. The system as claimed in any preceding claim, wherein recommendations are preferably ranked by complementary product category.

10. The system as claimed in any preceding claim, wherein recommendations can be ranked by score in relation to the search query parameters and batching potential.

11. A method for optimizing order batching, comprising:

receiving an order comprising a plurality of order parameters including a supplier and at least one route characteristic;

receiving a search query from a user, the search query comprising plurality of search query parameters including a product;

generating a real-time recommendation comprising optimized order parameters based on the plurality of order parameters and the plurality of search query parameters;

displaying the recommendation to the user;

receiving one of an acceptance signal and a refusal signal;

batching a new order with the order in response to the acceptance signal, the new order being based on the recommendation; or

generating a new order based on the search query in response to the refusal signal.

12.A system for optimizing order batching, comprising:

memory; and

a computing system comprising an order management module and a batching module, the memory storing instructions that, when executed by the computing system, cause the computing system to:

receive an order comprising a plurality of order parameters including a supplier and at least one route characteristic;

request for batching recommendation from the batching module, the request comprising plurality of order parameters including a product;

generate, at the batching module, a real-time recommendation comprising optimized order parameters based on the plurality of order parameters;

display the recommendation to the user;

receive one of an acceptance signal and a refusal signal; and

in response to the acceptance signal, batches a new order with the order, at the batching module, the new order being based on the recommendation; or

in response to the refusal signal, generates the new order based on the search query.

13. A method for optimizing order batching, comprising:

receiving an order comprising a plurality of order parameters including a supplier and at least one route characteristic;

requesting for batching recommendation from the batching module, the request comprising plurality of order parameters including a product;

generating a real-time recommendation comprising optimized order parameters based on the plurality of order parameters;

displaying the recommendation to the user;

receiving one of an acceptance signal and a refusal signal;

batching a new order with the order in response to the acceptance signal, the new order being based on the recommendation; or

generating a new order based on the search query in response to the refusal signal.