

CLAIMS:

1. A computer-implemented system for multi-point destination arrival time analysis, the system comprising:
a memory storing instructions; and
at least one processor configured to execute the instructions to:
 - receive, from a first external system via a network, a request for at least one orderable item, and store a timestamp in a data store;
 - receive, from a second external system via the network, an acceptance of an order associated with the first external system, the order comprising at least one item;
 - determine a first arrival estimate based on a first estimated travel time between locations associated with the first external system and the second external system, and the greater of:
 - a determined preparation time for the at least one item, and
 - a second estimated travel time between locations associated with the second external system and a plurality of third external systems;
 - determine a second arrival estimate based on the first estimated travel time, and the greater of:
 - the determined preparation time for the at least one item, and
 - a third estimated travel time between locations associated with the second external system and an assigned third external system;
 - determine a third arrival estimate based on the first estimated travel time; and
 - forward, upon their determination, the first, second, and third arrival estimates to the first external system.

2. The system of claim 1, wherein the instructions further cause the processor to:

store a plurality of durations associated with the orderable items in a data store,
the durations based on past history of producing the orderable items;
calculate, based on the stored plurality of durations, the determined preparation
time for the at least one item.

3. The system of claim 2, wherein calculating the determined preparation time further comprises:
retrieving, from the data store, the stored plurality of durations associated with
the at least one item;
feeding the stored plurality of durations associated with the at least one item and
associated metadata to a machine learning algorithm;
receiving an estimated preparation time for the at least one item.
4. The system of claim 1, wherein the instructions further cause the processor to:
assign, based on the determined preparation time, a third external system to
fulfill the order;
receive, from the third external system, an acceptance to fulfill the order.
5. The system of claim 4, wherein the instructions further cause the processor to:
calculate the first arrival estimate based on receiving the acceptance of the order;
calculate the second arrival estimate based on receiving the acceptance to fulfill
the order; or
calculate the third arrival estimate based on determining that the order has been
retrieved.
6. The system of claim 1, wherein the instructions further cause the processor to:
determine, based on signals transmitted by the third external system, a location
of the third external system;
determine, based on the determined location, that the third external system will
arrive at the location associated with the second external system before
the determined preparation time has elapsed;

delay assignment of the order to the third external system; and
 assign the order to the third external system at the conclusion of the delay
 period.

7. The system of claim 1, wherein at least one of the first, second, or third arrival estimates comprise a buffer.
8. The system of claim 1, wherein estimated travel time between locations is calculated by:
 determining a straight-line distance between two locations;
 selecting a constant speed;
 determining the estimated travel time along the straight-line distance at the selected constant speed.
9. The system of claim 1, wherein:
 the first external system comprises a customer device for requesting delivery;
 the second external system comprises a merchant device; and
 the third external system comprises a mobile device for use by a delivery worker.
10. A computer-implemented method for multi-point destination arrival time analysis, the method comprising:
 receiving, from a first external system via a network, a request for at least one orderable item, and store a timestamp in a data store;
 receiving, from a second external system via the network, an acceptance of an order associated with the first external system, the order comprising at least one item;
 determining a first arrival estimate based on a first estimated travel time between locations associated with the first external system and the second external system, and the greater of:
 a determined preparation time for the at least one item, and

a second estimated travel time between locations associated with the second external system and a plurality of third external systems; determining a second arrival estimate based on the first estimated travel time, and the greater of:
the determined preparation time for the at least one item, and
a third estimated travel time between locations associated with the second external system and an assigned third external system;
determining a third arrival estimate based on the first estimated travel time; and forwarding, upon their determination, the first, second, and third arrival estimates to the first external system.

11. The method of claim 10, further comprising:
storing a plurality of durations associated with the orderable items in a data store, the durations based on past history of producing the orderable items;
calculating, based on the stored plurality of durations, the determined preparation time for the at least one item.
12. The method of claim 11, wherein calculating the determined preparation time further comprises:
retrieving, from the data store, the stored plurality of durations associated with one item;
feeding the stored plurality of durations associated with one item and associated metadata to a machine learning algorithm;
receiving an estimated preparation time for the one item.
13. The method of claim 10, further comprising:
assigning, based on the determined preparation time, a third external system to fulfill the order;
receiving, from the third external system, an acceptance to fulfill the order.
14. The method of claim 13, further comprising:

calculating the first arrival estimate based on receiving the acceptance of the order;
calculating the second arrival estimate based on receiving the acceptance to fulfill the order; or
calculating the third arrival estimate based on determining that the order has been retrieved.

15. The method of claim 10, further comprising:
determining, based on signals transmitted by the third external system, a location of the third external system;
determining, based on the determined location, that the third external system will arrive at the location associated with the second external system before the determined preparation time has elapsed;
delaying assignment of the order to the third external system; and
assigning the order to the third external system at the conclusion of the delay period.
16. The method of claim 10, wherein at least one of the first, second, or third arrival estimates comprise a buffer.
17. The method of claim 10, wherein estimated travel time between locations is calculated by:
determining a straight-line distance between two locations;
selecting a constant speed;
determining the estimated travel time along the straight-line distance at the selected constant speed.
18. The method of claim 10, wherein:
the first external system comprises a customer device for requesting delivery;
the second external system comprises a merchant device; and
the third external system comprises a mobile device for use by a delivery worker.

19. A computer-implemented system for multi-point destination arrival time analysis, the system comprising:
 - a memory storing instructions; and
 - at least one processor configured to execute the instructions to:
 - receive, from a customer device for requesting delivery via a network, a request for at least one orderable item, and store a timestamp in a data store;
 - receive, from a merchant device via the network, an acceptance of an order associated with the customer device, the order comprising at least one item, and in response thereto:
 - determine a first arrival estimate based on a first estimated travel time between locations associated with the customer device and the merchant device, and the greater of:
 - a determined preparation time for the at least one item, and
 - a second estimated travel time between locations associated with the merchant device and a plurality of delivery devices for use by delivery workers; and
 - forward the first arrival estimate to the customer device;
 - receive, from an assigned delivery device, an acceptance to fulfill the order, and in response thereto:
 - determine a second arrival estimate based on the first estimated travel time, and the greater of:
 - the determined preparation time for the at least one item, and
 - a third estimated travel time between locations associated with the merchant device and an assigned delivery device; and
 - forward the second arrival estimate to the customer device; and

receive, from a merchant device or an assigned delivery device,
confirmation that the order has been retrieved, and in response
thereto:
determine a third arrival estimate based on the first estimated travel
time; and
forward the third arrival estimate to the customer device.

20. The system of claim 19, the at least one processor configured to execute the instructions to:
- store a plurality of durations associated with the orderable items in a data store,
the durations based on past history of producing the orderable items;
 - retrieve, from the data store, the stored plurality of durations associated with one
item;
 - feed the stored plurality of durations associated with one item and associated
metadata to a machine learning algorithm;
 - receive an estimated preparation time for the one item.