

Claims

1. A computer-implemented system for optimizing sorting and loading of packages, the system comprising:

- a memory storing instructions; and
- at least one processor configured to execute the instructions to perform operations comprising:
 - receiving data comprising a plurality of package identifiers associated with a plurality of packages;
 - determining, based on the data, a plurality of block areas associated with delivery locations for the plurality of packages;
 - determining a delivery route comprising a sequence for delivering the plurality of packages by:
 - determining a first set of routes,
 - transforming the first set of routes to determine optimal combinations of user inputs for each of the first set of routes, and
 - determining a shortest route by swapping the order of block areas associated with each transformed route;
 - causing a sorting device or a robotic sorter to sort the plurality of packages into one or more compartments within a plurality of modular containers, each compartment corresponding with one of the plurality of block areas so that the compartments can be accessed in sequence based on the order of block areas in the delivery route;
 - receiving configuration parameters of a delivery vehicle, the configuration parameters comprising at least one of dimensions, available positions, or access points;
 - determining a loading order in which to load the plurality of modular containers into the available positions based on the delivery route; and
 - generating instructions for a device to display a visual representation of the determined loading order.

2. The system of claim 1, wherein determining the loading order comprises determining an order in which to load the plurality of modular containers

into the delivery vehicle and determining a position within the delivery vehicle at which to load each modular container.

3. The system of claim 1, wherein determining the plurality of block areas comprises:

determining a geographic area to which the plurality of packages is to be delivered; and

determining one or more unbreakable areas within the geographic area to which at least one package is to be delivered, each unbreakable area representing one block area.

4. The system of claim 1, wherein determining the plurality of block areas comprises:

determining one or more postal codes associated with the plurality of packages to be delivered; and

determining one or more areas within the geographical area represented by the postal codes to which a group of packages is to be delivered, each area representing one block area.

5. The system of claim 1, wherein determining the delivery route comprises determining a sequence for delivering the plurality of packages to each block area based on one or more of historical data, efficiency preferences, resource data, geographic data, or delivery data.

6. The system of claim 1, wherein the operations further comprise:
transmitting the generated instructions to the device, wherein the device displays the visual representation of the loading order upon receiving the instructions, wherein the visual representation comprises a visualized loading map of the delivery vehicle and a position for each package of the plurality of packages.

7. The system of claim 1, wherein determining the loading order comprises determining a position in the delivery vehicle for each package of the plurality of packages.

8. A computer-implemented method for optimizing sorting and loading of packages, comprising:

receiving data comprising a plurality of package identifiers associated with a plurality of packages;

determining, based on the data, a plurality of block areas associated with delivery locations for the plurality of packages;

determining a delivery route comprising a sequence for delivering the plurality of packages, by:

determining a first set of routes,

transforming the first set of routes to determine optimal combinations of user inputs for each of the first set of routes, and

determining a shortest route by swapping the order of block areas associated with each transformed route;

causing a sorting device or a robotic sorter to sort the plurality of packages into one or more compartments within a plurality of modular containers, each compartment corresponding with one of the plurality of block areas, so that the compartments can be accessed in sequence based on the order of block areas in the delivery route;

receiving configuration parameters of a delivery vehicle, the configuration parameters comprising at least one of dimensions, available positions, or access points;

determining a loading order in which to load the plurality of modular containers into the available positions based on the delivery route; and

generating instructions for a device to display a visual representation of the determined loading order.

9. The method of claim 8,

wherein determining the loading order comprises determining an order in which to load the plurality of modular containers into the delivery vehicle and determining a position within the delivery vehicle at which to load each modular container.

10. The method of claim 8, wherein determining the plurality of block areas comprises:

determining a geographic area to which the plurality of packages is to be delivered; and

determining one or more unbreakable areas within the geographic area to which at least one package is to be delivered, each unbreakable area representing one block area.

11. The method of claim 8, wherein determining the delivery route comprises determining a sequence for delivering the plurality of packages to each block area based on one or more of historical data, efficiency preferences, resource data, geographic data, and delivery data.

12. The method of claim 8, further comprising:
transmitting the generated instructions to the device, wherein the device displays the visual representation of the loading order upon receiving the instructions.

13. The method of claim 8, wherein the visual representation of the loading order comprises a visualized loading map of the delivery vehicle, the visualized loading map including a position for each package of the plurality of packages.

14. The method of claim 8, wherein determining the loading order comprises determining a position in the delivery vehicle for each package of the plurality of packages.

15. A system for optimizing sorting and loading of packages, comprising:
a computer-implemented system comprised of a memory and a processor, the memory storing instructions that cause the processor to execute operations comprising:

receiving data comprising a plurality of package identifiers associated with a plurality of packages;

determining, based on the data, a plurality of block areas associated with delivery locations for the plurality of packages;

determining a delivery route comprising area sequence for delivering the plurality of packages, by

determining a first set of routes,
transforming the first set of routes to determine optimal combinations of user inputs for each of the first set of routes, and
determining a shortest route by swapping the order of block areas associated with each transformed route;
determining a loading order in which to load each of the plurality of packages into a delivery vehicle based on the delivery route;
generating loading instructions for displaying a visual representation of the loading order; and
transmitting the loading instructions to a sorting device or a robotic sorter, a loading device, and a display;
the sorting device or the robotic sorter configured to perform the operations comprising:
receiving the loading instructions; and
sorting the plurality of packages according to the determined loading order, so that the plurality of packages can be accessed in sequence based on the order of block areas in the delivery route;
the loading device configured to perform the operations comprising:
receiving the loading instructions; and
displaying the visual representation of the loading order, and
the display configured to perform the operations comprising:
receiving the loading instructions; and
displaying locations of a subset of the plurality of packages within the delivery vehicle corresponding to a block area based on a current location of the delivery vehicle.

16. The system of claim 15, wherein determining the loading order comprises determining an order in which to load a plurality of modular containers into the delivery vehicle and determining a position within the delivery vehicle at which to load each modular container; and wherein sorting the plurality of packages comprises sorting the plurality of packages into one or more compartments within the plurality of modular containers, each compartment corresponding with one of the plurality of block areas.

17. The system of claim 15, wherein the visual representation comprises a visualized loading map, the visualized loading map depicting at least one of the cargo area of the delivery vehicle or a position within the cargo area for each package of the plurality of packages.

18. The system of claim 15, wherein the loading device is configured to display the visual representation by printing the visual representation, by transmitting the visual representation to one or more mobile devices, by displaying the visual representation on a screen, or a combination thereof.