

Claims

1. A system comprising:
 - a database comprising geographical data and historical delivery data, the geographical data being stored in pre-defined regions and sub-regions;
 - an expected delivery efficiency generator implemented in software or hardware, configured to:
 - receive geographical data from a plurality of the pre-defined regions and a plurality of the sub-regions, wherein the geographical data includes at least one of landscape data, business data, residential data, parking data, or building data;
 - determine, based on the geographical data, an expected delivery efficiency, the expected delivery efficiency being measured by percentiles of addresses visited by the workers per hour (APH); and
 - calculate, based on the historical delivery data, the APH for selected individual pre-defined regions and sub-regions;
 - a cross time generator implemented in software or hardware, configured to:
 - calculate an expected time for the workers to travel between first and second regions, wherein the expected time includes a cross-region time and a sub-region time based on a median time gap or an average time; and
 - determine, based on a linear regression and the cross-region time, a driving time between the first and the second regions; and
 - a route generator implemented in software or hardware, configured to:
 - determine candidate delivery regions and candidate delivery sub-regions;
 - combine the candidate delivery regions and the candidate delivery sub-regions into new regions for delivery;
 - determine a combination of the candidate delivery regions and the candidate delivery sub-regions based on the determined expected delivery efficiency and the calculated cross-region time;
 - redistribute at least one of candidate delivery regions and candidate delivery sub-regions based on the determined expected delivery efficiency and the calculated cross-region time;

receive data comprising groups of workers available for deliveries, the workers being classified into a plurality of categories;
 compare, based on the received groups, the workers against delivery routes and delivery sub-routes, wherein the delivery sub-routes are part of the delivery routes;
 assign, based on the comparison, packages, the delivery routes, and the delivery sub-routes to the workers;
 generate a plurality of candidate routes associated with the candidate delivery regions, the candidate delivery sub-regions, and the workers;
 calibrate, based on the assignment and the generated candidate routes, the delivery sub-routes;
 transmit, at least one of the delivery sub-routes to a mobile device associated with a delivery worker, the mobile device capturing data associated with an identifier of the packages upon delivery, wherein the expected delivery efficiency generator is further configured to:
 receive information from the mobile device relating to the delivery, wherein the information is configured to be stored in the database as historical delivery data; and
 recalculate, based on the historical delivery data, the APH for the selected individual pre-defined regions and sub-regions; and
 wherein the route generator is further configured to:
 recalibrate, based on the recalculated APH, at least one of the calibrated delivery sub-routes.

2. The system of claim 1, wherein the route generator is further configured to:
 determine delivery routes and delivery sub-routes based on the stored historical delivery data and optimized map data.
3. The system of claim 1, wherein the route generator is further configured to:
 calculate an average deviation value of the received groups from an average value of packages per worker delivery.

4. The system of claim 1, wherein the expected delivery efficiency generator is further configured to:
 - receive a type of worker available for deliveries, wherein the type includes at least one of experience or efficiency.
5. The system of claim 1, wherein the system is further configured to:
 - receive a number and a type of workers available for deliveries, from user input via a graphical user interface (GUI) from at least one of a web browser or a mobile device.
6. The system of claim 5, wherein the user input includes a package distribution and an attendance value.
7. The system of claim 1, wherein the expected delivery efficiency generator is further configured to:
 - receive data comprising the groups of pre-assigned workers available for deliveries, the pre-assigned workers being classified into a plurality of categories.
8. A method for attendance assignment, the method comprising:
 - receiving geographical data from a plurality of the pre-defined regions and a plurality of the sub-regions, wherein the geographical data includes at least one of landscape data, business data, residential data, parking data, or building data;
 - determining, based on the geographical data, an expected delivery efficiency, the expected delivery efficiency being measured by percentiles of addresses visited by the workers per hour (APH);
 - calculating, based on historical delivery data, the APH for selected individual pre- defined regions and sub-regions;
 - calculating an expected time for the workers to travel between first and second regions, wherein the expected time includes a cross-region time and a sub-region time based on a median time gap or an average time;
 - determining, based on a linear regression and the cross-region time, a driving time between the first and the second regions;
 - determining candidate delivery regions and candidate delivery sub-regions;

combining the candidate delivery regions and the candidate delivery sub-regions into new regions for delivery;

determining a combination of the candidate delivery regions and the candidate delivery sub-regions based on the determined expected delivery efficiency and the calculated cross-region time;

redistributing at least one of candidate delivery regions and candidate delivery sub-regions based on the determined expected delivery efficiency and the calculated cross-region time;

receiving data comprising groups of workers available for deliveries, the workers being classified into a plurality of categories;

comparing, based on the received groups, the workers against delivery routes and delivery sub-routes, wherein the delivery sub-routes are part of the delivery routes;

assigning, based on the comparison, packages, the delivery routes, and the delivery sub-routes to the workers;

generating a plurality of candidate routes associated with the candidate delivery regions, the candidate delivery sub-regions, and the workers;

calibrating, based on the assignment and the generated candidate routes, the delivery sub-routes;

transmitting, at least one of the delivery sub-routes to a mobile device associated with a delivery worker, the mobile device capturing data associated with an identifier of the packages upon delivery;

receiving information from the mobile device relating to the delivery, wherein the information is configured to be stored as historical delivery data;

recalculating, based on the historical delivery data, the APH for the selected individual pre-defined regions and sub-regions; and

recalibrating, based on the recalculated APH, at least one of the calibrated delivery sub-routes.

9. The method of claim 8, the method further comprising:

determining delivery routes and delivery sub-routes based on the stored historical delivery data and optimized map data.

10. The method of claim 8, the method further comprising:
calculating an average deviation value of the received groups from an average value of packages per worker delivery.
11. The method of claim 8, the method further comprising:
receiving a type of worker available for deliveries, wherein the type includes at least one of experience or efficiency.
12. The method of claim 8, the method further comprising:
receiving a number and a type of workers available for deliveries, from user input via a graphical user interface (GUI) from at least one of a web browser or a mobile device.
13. The method of claim 12, wherein the user input includes a package distribution and an attendance value.
14. The method of claim 8, the method further comprising:
receiving data comprising the groups of pre-assigned workers available for deliveries, the pre-assigned workers being classified into a plurality of categories.
15. A non-transitory computer-readable medium storing instructions that, when executed by a processor, cause the processor to perform operations comprising:
receiving geographical data from a plurality of the pre-defined regions and a plurality of the sub-regions, wherein the geographical data includes at least one of landscape data, business data, residential data, parking data, or building data;
determining, based on the geographical data, an expected delivery efficiency, the expected delivery efficiency being measured by percentiles of addresses visited by the workers per hour (APH);
calculating, based on historical delivery data, the APH for selected individual pre-defined regions and sub-regions;
calculating an expected time for the workers to travel between first and second regions, wherein the expected time includes a cross-region time and a sub-region time based on a median time gap or an average time;

determining, based on a linear regression and the cross-region time, a driving time between the first and the second regions;

determining candidate delivery regions and candidate delivery sub-regions;

combining the candidate delivery regions and the candidate delivery sub-regions into new regions for delivery;

determining a combination of the candidate delivery regions and the candidate delivery sub-regions based on the determined expected delivery efficiency and the calculated cross-region time;

redistributing at least one of candidate delivery regions and candidate delivery sub-regions based on the determined expected delivery efficiency and the calculated cross-region time;

receiving data comprising groups of workers available for deliveries, the workers being classified into a plurality of categories;

comparing, based on the received groups, the workers against delivery routes and delivery sub-routes, wherein the delivery sub-routes are part of the delivery routes;

assigning, based on the comparison, packages, the delivery routes, and the delivery sub-routes to the workers;

generating a plurality of candidate routes associated with the candidate delivery regions, the candidate delivery sub-regions, and the workers;

calibrating, based on the assignment and the generated candidate routes, the delivery sub-routes;

transmitting, at least one of the delivery sub-routes to a mobile device associated with a delivery worker, the mobile device capturing data associated with an identifier of the packages upon delivery;

receiving information from the mobile device relating to the delivery, wherein the information is configured to be stored as historical delivery data;

recalculating, based on the historical delivery data, the APH for the selected individual pre-defined regions and sub-regions; and

recalibrating, based on the recalculated APH, at least one of the calibrated delivery sub-routes.

16. The non-transitory computer-readable medium of claim 9, the operations further comprising:
determining delivery routes and delivery sub-routes based on the historical delivery data and optimized map data.
17. The non-transitory computer-readable medium of claim 9, the operations further comprising:
calculating an average deviation value of the received groups from an average value of packages per worker delivery.
18. The non-transitory computer-readable medium of claim 9, the operations further comprising:
receiving a type of worker available for deliveries, wherein the type includes at least one of experience or efficiency.
19. The non-transitory computer-readable medium of claim 9, the operations further comprising:
receiving, a number and a type of workers available for deliveries, from user input via a graphical user interface (GUI) from at least one of a web browser or a mobile device.
20. The non-transitory computer-readable medium of claim 19, wherein the user input includes a package distribution and an attendance value.
21. The system of claim 1, wherein the route generator is further configured to:
transmit, based on an identifier associated with an individual user of the mobile device, at least one of the calibrated delivery sub-routes to the mobile device associated with a delivery worker.