

CLAIMS

What is claimed is:

1. A system using one or more robots to assist a human in order fulfillment, comprising:
 - a server configured to receive an order comprising an order item;
 - inventory storage operably connected to the server, the inventory storage comprising inventory items;
 - an order robot operably connected to the server, the order robot configured to assist a human to pick an order item from the inventory items, wherein assisting comprises moving the order robot in front of the human while the human is following the order robot; and
 - a human-operated device operably connected to one or more of the server, the inventory storage, and the order robot, the human-operated device configured to assist the human to pick the order item,
 - wherein the order robot comprises an information capture device configured to make an information capture.
2. The system according to claim 1, wherein the human-operated device is configured to assist the human to perform one or more of locating the order item, grasping the order item, and placing the order item so as to be accessible to the order robot.
3. The system according to claim 1 or claim 2, wherein the order robot is mobile.

4. The system according to any one of the preceding claims, wherein the information capture is usable to perform one or more of detecting a human location and tracking motion of the human.
5. The system according to any one of the preceding claims, wherein the information capture comprises a pick list comprising one or more order items to be picked.
6. The system according to any one of the preceding claims, wherein the order robot is configured, using the information capture, to position itself at an approximate robot position.
7. The system according to claim 6, wherein the robot position comprises an approximate robot position relative to the human.
8. The system according to claim 6 or claim 7, wherein the robot position comprises a point approximately located on the circumference of a circle centered at a human location of the human.
9. The system according to any one of claims 6 to 8, wherein the robot position comprises a point that is approximately nearest to the human of points located on the circumference of a circle centered at the human location of the human.
10. The system according to any one of claim 8 or claim 9, wherein the circle has a radius that is predetermined by a user.

11. A system using one or more robots to assist a human in order fulfillment, comprising:

a server configured to receive an order comprising an order item;

inventory storage operably connected to the server, the inventory storage comprising inventory items;

an order robot operably connected to the server, the order robot configured to assist a human to pick an order item from the inventory items, wherein assisting comprises following the human; and

a human-operated device operably connected to one or more of the server, the inventory storage, and the order robot, the human-operated device configured to assist the human to pick the order item,

wherein the order robot comprises an information capture device configured to make an information capture.

12. The system according to claim 11, wherein the human-operated device is configured to assist the human to perform one or more of locating the order item, grasping the order item, and placing the order item so as to be accessible to the order robot.

13. The system according to claim 11 or claim 12, wherein the order robot is mobile.

14. The system according to any one of claims 11 to 13, wherein the information capture is usable to perform one or more of detecting a human location and tracking motion of the human.

15. The system according to any one of claims 11 to 14, wherein the information capture comprises a pick list comprising one or more order items to be picked.

16. The system according to any one of claims 11 to 15, wherein the order robot is configured, using the information capture, to position itself at an approximate robot position.

17. The system according to claim 16, wherein the robot position comprises an approximate robot position relative to the human.

18. The system according to claim 16 or claim 17, wherein the robot position comprises a point approximately located on the circumference of a circle centered at a human location of the human.

19. The system according to any one of claims 16 to 18, wherein the robot position comprises a point that is approximately nearest to the human of points located on the circumference of a circle centered at the human location of the human.

20. The system according to any one of claim 18 or claim 19, wherein the circle has a radius that is predetermined by a user.

21. A method using one or more robots to assist a human in order fulfillment, comprising:
receiving, by an order robot, a selection of the order robot by the human;
receiving, by the order robot, from a server, an order comprising an order item;
receiving, by the order robot, from the server, a direction to assist the

human to pick the order;

capturing, by the order robot, information usable to perform one or more of detecting a human location and tracking motion of the human;

receiving, by the order robot, an assist trigger configured to trigger the order robot to assist the human to pick the order item;

assisting the human, by the order robot, in response to the assist trigger, to pick the order item, wherein assisting comprises moving the order robot in front of the human while the human is following the order robot;

receiving, by the order robot, from the server, an instruction to carry the order item to a final destination; and

carrying the order item to the final destination.

22. The method according to claim 21, wherein the step of receiving the direction comprises receiving a direction to assist the human to pick the order item from inventory items comprised in inventory storage.

23. The method according to claim 21 or claim 22, further comprising a step, performed after the step of receiving the selection and before the step of receiving the order, of transmitting the selection, by the order robot, to a server.

24. The method according to any one of claims 21 to 23, further comprising a step, performed after the step of receiving the order, and before the step of receiving the assist trigger, of:

capturing, by the order robot using an information capture device, a pick list comprising one or more items to be picked.

25. The method according to claim 24, further comprising a step, performed after the step of capturing the pick list, and before the step of receiving the assist trigger, of:

sending, by the order robot, to the server, the pick list comprising the one or more order items to be picked.

26. The method according to any one of claims 21 to 25, wherein the step of receiving the selection comprises receiving the selection through an information capture device comprised in the order robot.

27. The method according to any one of claims 21 to 26, wherein the step of receiving the selection comprises receiving the selection via a transmission from a human-operated device available to the human.

28. The method according to claim 27, wherein the step of receiving the selection comprises receiving the selection using a user interface comprised in the human-operated device.

29. The method according to any one of claims 21 to 28, wherein the step of receiving the selection comprises receiving the selection from the server.

30. The method according to any one of claims 21 to 29, wherein the step of transmitting comprises transmitting through an information capture device comprised in the order robot.

31. A method using one or more robots to assist a human in order fulfillment, comprising:

- receiving, by an order robot, a selection of the order robot by the human;
- receiving, by the order robot, from a server, an order comprising an order item;
- receiving, by the order robot, from the server, a direction to assist the human to pick the order;
- capturing, by the order robot, information usable to perform one or more of detecting a human location and tracking motion of the human;
- receiving, by the order robot, an assist trigger configured to trigger the order robot to assist the human to pick the order item;
- assisting the human, by the order robot, in response to the assist trigger, to pick the order item, wherein assisting comprises following the human;
- receiving, by the order robot, from the server, an instruction to carry the order item to a final destination; and
- carrying the order item to the final destination.

32. The method according to claim 31, wherein the step of receiving the direction comprises receiving a direction to assist the human to pick the order item from inventory items comprised in inventory storage.

33. The method according to claim 31 or claim 32, further comprising a step, performed after the step of receiving the selection and before the step of receiving the order, of transmitting the selection, by the order robot, to a server.

34. The method according to any one of claims 31 to 33, further comprising a step, performed after the step of receiving the order, and before the step of receiving the assist trigger, of:

capturing, by the order robot using an information capture device, a pick list comprising one or more items to be picked.

35. The method according to claim 34, further comprising a step, performed after the step of capturing the pick list, and before the step of receiving the assist trigger, of:

sending, by the order robot, to the server, the pick list comprising the one or more order items to be picked.

36. The method according to any one of claims 31 to 35, wherein the step of receiving the selection comprises receiving the selection through an information capture device comprised in the order robot.

37. The method according to any one of claims 31 to 36, wherein the step of receiving the selection comprises receiving the selection via a transmission from a human-operated device available to the human.

38. The method according to claim 37, wherein the step of receiving the selection comprises receiving the selection using a user interface comprised in the human-operated device.

39. The method according to any one of claims 31 to 38, wherein the step of receiving the selection comprises receiving the selection from the server.

40. The method according to any one of claims 31 to 39, wherein the step of transmitting comprises transmitting through an information capture device comprised in the order robot.

41. A method using one or more robots to assist a human in order fulfillment, comprising:

- receiving, by a server, an order comprising an order item;

- receiving, by the server, a selection by the human of the order robot;

- sending the order, by the server, to one or more of an order robot and a human-operated device available to the human;

- sending, by the server, to the order robot, a direction to assist the human to pick the order item; wherein assisting comprises moving the order robot in front of the human while the human is following the order robot;

- determining, by the server, that the order is nearly complete;

- determining, by the server, that an order robot replacement suitable for fulfilling a next order has not yet been sent;

- sending a dispatch instruction, by the server, to the order robot replacement instructing its dispatch;

- determining, by the server, that the order is complete; and

- instructing the order robot, by the server, to carry the order item to a final destination.

42. The method according to claim 41, wherein the step of sending the direction comprises sending a direction to assist the human to pick the order item from inventory items comprised in inventory storage.

43. The method according to claim 41 or claim 42, wherein the step of receiving the selection comprises receiving the selection from the order robot.

44. The method according to any one of claims 41 to 43, wherein the step of receiving the selection comprises receiving the selection from the human-operated device.

45. The method according to claim 44, further comprising a step, performed after the step of receiving the selection and before the step of sending the order, of sending the selection, by the server, to the order robot.

46. The method according to any one of claims 41 to 45, further comprising a step, performed after the step of sending the order and before the step of determining that the order is nearly complete, of:

receiving, by the server, from the order robot, a pick list comprising one or more order items to be picked.

47. The method according to any one of claims 41 to 46, wherein the step of instructing comprises a sub-step of:

determining one or more of the order item and a location of the order item.

48. The method according to any one of claims 41 to 47, further comprising a step,

performed after the step of sending the order and before the step of determining that the order is complete, of:

sending, by the server, to the order robot, an assist trigger configured to trigger the order robot to assist the human to pick the order item.

49. A method using one or more robots to assist a human in order fulfillment, comprising:

receiving, by a server, an order comprising an order item;

receiving, by the server, a selection by the human of the order robot;

sending the order, by the server, to one or more of the order robot and a human-operated device available to the human;

sending, by the server, to the order robot, a direction to assist the human to pick the order item, wherein assisting comprises following the human;

determining, by the server, that the order is nearly complete;

determining, by the server, that an order robot replacement suitable for fulfilling a next order has not yet been sent;

sending a dispatch instruction, by the server, to the order robot replacement instructing its dispatch;

determining, by the server, that the order is complete; and

instructing the order robot, by the server, to carry the order item to a final destination.

50. The method according to claim 49, wherein the step of sending the direction comprises sending a direction to assist the human to pick the order item from inventory items comprised in inventory storage.

51. The method according to claim 49 or claim 50, wherein the step of receiving the selection comprises receiving the selection from the order robot.

52. The method according to any one of claims 49 to 51, wherein the step of receiving the selection comprises receiving the selection from the human-operated device.

53. The method according to claim 52, further comprising a step, performed after the step of receiving the selection and before the step of sending the order, of sending the selection, by the server, to the order robot.

54. The method according to any one of claims 49 to 53, further comprising a step, performed after the step of sending the order and before the step of determining that the order is nearly complete, of:

receiving, by the server, from the order robot, a pick list comprising one or more order items to be picked.

55. The method according to any one of claims 49 to 54, wherein the step of instructing comprises a sub-step of:

determining one or more of the order item and a location of the order item.

56. The method according to any one of claims 49 to 55, further comprising a step, performed after the step of sending the order and before the step of determining that the order is complete, of:

sending, by the server, to the order robot, an assist trigger configured to trigger the order robot to assist the human to pick the order item.