What is claimed is:

1. A method for robotic bin picking comprising:

identifying one or more candidate objects for selection by a robot;

determining a path to the one or more candidate objects based upon, at least in part, a robotic environment and at least one robotic constraint;

validating a feasibility of grasping a first candidate object of the one or more candidate objects; and

if the feasibility is validated, controlling the robot to physically select the first candidate object;

if the feasibility is not validated, selecting at least one of a different grasping point of the first candidate object, a second path, or a second candidate object.

2. The method of claim 1, wherein validating includes using a robot kinematic model.

3. The method of claim 1, wherein the path is at least one of a feasible path or an optimal path.

4. The method of claim 1, wherein the path is determined at least in part in real-time while controlling the robot.

5. The method of claim 1, wherein determining the path includes using information about one or more surfaces of at least one object adjacent to the candidate object and avoiding a collision with the at least one object adjacent the candidate object.

6. The method of claim 1, further comprising:

displaying, at a graphical user interface, at least one of the robot or the one or more candidate objects, wherein the graphical user interface allows a user to visualize or control at least

one of the robot, a path determination, a simulation, a workcell definition, a performance parameter specification, or a sensor configuration.

7. The method of claim 6, wherein the graphical user interface allows for a simultaneous creation of a program and a debugging process associated with the program.

8. The method of claim 6, wherein the graphical user interface is associated with one or more of a teach pendant, a hand-held device, a personal computer, or the robot.

9. The method of claim 1, further comprising:

providing an image of the environment including one or more static and dynamic objects using a scanner, wherein the robot is configured to receive the image and use the image to learn the environment to determine the path and collision avoidance.

10. The method of claim 1, wherein controlling the robot includes performing a second scan of the first candidate object, moving the first candidate object to a placement target having a fixed location with an accuracy requirement, manipulating the first candidate object and delivering the first candidate object to the placement target in accordance with the accuracy requirement.

11. The method of claim 1, wherein controlling the robot includes presenting the first candidate object to a scanner to maximize the use of one or more features on the first candidate object to precisely locate the first candidate object.

12. The method of claim 1, wherein controlling the robot includes locating and picking the first candidate object in a way that maximizes the probability that is physically selected successfully.

13. The method of claim 10, wherein the second scan is in an area of maximum resolution of the scanner.

14. The method of claim 1, wherein determining a path to the one or more candidate objects is based upon, at least in part, at least one of a robot linkage or robot joint limitation.

15. The method of claim 6, further comprising:

displaying, at the graphical user interface, a shrink-wrap visualization over all non-selected components and non-selected surfaces other than the one or more candidate objects.

16. The method of claim 1, wherein at least one of identifying, determining, validating, or controlling are performed using at least one of a primary processor and at least one co-processor.

17. The method of claim 1, wherein determining a path to the one or more candidate objects is based upon, at least in part, at least one of: global path planning and local path planning.

18. The method of claim 1, wherein validating a feasibility of grasping a first candidate object includes analyzing conditional logic associated with a user program.

19. The method of claim 18, wherein validating a feasibility of grasping a first candidate object includes at least one of validating all path alternatives, validating a specific path alternative, validating any path alternative, validating one or more exception paths, excluding one or more sections from being validated, or performing parallelized validation of multiple sections of the path.

What is claimed is:

1. A method for robotic bin picking comprising:

identifying one or more candidate objects for selection by a robot;

determining a path to the one or more candidate objects based upon, at least in part, a robotic environment and at least one robotic constraint, wherein determining the path includes determining whether the one or more candidate objects is placeable, wherein the at least one robotic constraint includes at least one of a robot linkage or a robot joint limitation;

validating a feasibility of grasping a first candidate object of the one or more candidate objects, wherein validating the feasibility comprises checking for a collision-free path for a release retreat, wherein the collision-free path includes a path after the object is placed; and

if the feasibility is validated, controlling the robot to physically select the first candidate object;

if the feasibility is not validated, selecting at least one of a different grasping point of the first candidate object, a second path, or a second candidate object.

2. The method of claim 1, wherein validating includes using a robot kinematic model.

3. The method of claim 1, wherein the path is at least one of a feasible path or an optimal path.

4. The method of claim 1, wherein the path is determined at least in part in real-time while controlling the robot.

5. The method of claim 1, wherein determining the path includes using information about one or more surfaces of at least one object adjacent to the candidate object and avoiding a collision with the at least one object adjacent to the candidate object.

6. The method of claim 1, further comprising:

displaying, at a graphical user interface, at least one of the robot or the one or more candidate objects, wherein the graphical user interface allows a user to visualize or control at least one of the robot, a path determination, a simulation, a workcell definition, a performance parameter specification, or a sensor configuration.

7. The method of claim 6, wherein the graphical user interface allows for a simultaneous creation of a program and a debugging process associated with the program.

8. The method of claim 6, wherein the graphical user interface is associated with one or more of a teach pendant, a hand-held device, a personal computer, or the robot.

9. The method of claim 1, further comprising:

providing an image of the environment including one or more static and dynamic objects using a scanner, wherein the robot is configured to receive the image and use the image to learn the environment to determine the path and collision avoidance.

10. The method of claim 1, wherein controlling the robot includes performing a second scan of the first candidate object, moving the first candidate object to a placement target having a fixed location with an accuracy requirement, manipulating the first candidate object and delivering the first candidate object to the placement target in accordance with the accuracy requirement.

11. The method of claim 1, wherein controlling the robot includes presenting the first candidate object to a scanner to maximize the use of one or more features on the first candidate object to precisely locate the first candidate object.

12. The method of claim 1, wherein controlling the robot includes locating and picking the first candidate object in a way that maximizes the probability that is physically selected successfully.

13. The method of claim 10, wherein the second scan is in an area of maximum resolution of the scanner.

14. The method of claim 6, further comprising:

displaying, at the graphical user interface, a visualization over all non-selected components and non-selected surfaces other than the one or more candidate objects.

15. The method of claim 1, wherein at least one of identifying, determining, validating, or controlling are performed using at least one of a primary processor and at least one co-processor.

16. The method of claim 1, wherein determining a path to the one or more candidate objects is based upon, at least in part, at least one of: global path planning, and local path planning, a robot linkage, or a robot joint limitation.

17. The method of claim 1, wherein validating a feasibility of grasping a first candidate object includes analyzing conditional logic associated with a user program.

18. The method of claim 18, wherein validating a feasibility of grasping a first candidate object includes at least one of validating all path alternatives, validating a specific path alternative, validating any path alternative, validating one or more exception paths, excluding one or more sections from being validated, or performing parallelized validation of multiple sections of the path.

19. A method for robotic bin picking comprising:

identifying one or more candidate objects for selection by a robot;

determining a collision-free path to the one or more candidate objects and for a release retreat based upon, at least in part, a robotic environment and at least one robotic constraint, wherein determining a collision-free path includes determining how to avoid collisions with the robot, wherein the collision-free path includes a path after the object is placed;

validating a feasibility of grasping a first candidate object of the one or more candidate objects; and

if the feasibility is validated, controlling the robot to physically select the first candidate object;

if the feasibility is not validated, selecting at least one of a different grasping point of the first candidate object, a second path, or a second candidate object.

20. A method for robotic bin picking comprising:

identifying one or more candidate objects for selection by a robot;

determining a collision-free path to the one or more candidate objects and for a release retreat based upon, at least in part, a robotic environment and at least one robotic constraint, wherein determining the path includes analyzing the one or more candidate objects, the robot, and a gripper associated with the robot, wherein the collision-free path includes a path after the object is placed;

validating a feasibility of grasping a first candidate object of the one or more candidate objects; and

if the feasibility is validated, controlling the robot to physically select the first candidate object;

if the feasibility is not validated, selecting at least one of a different grasping point of the first candidate object, a second path, or a second candidate object.

21. The method of claim 1, further comprising:

configuring the first candidate object and the second candidate object to be picked by the robot based upon, at least in part, one or more models corresponding to the first candidate object and the second candidate object, wherein the first candidate object and the second candidate object are of different types.