Claims

1. A robot fleet management platform for configuring robot fleet resources, the platform comprising:

a set of one or more processors that execute a set of computer-readable instructions, wherein the set of one or more processors collectively execute:

a job parsing system that applies a set of filters to job content received in association with a job request to identify portions thereof suitable for robot automation;

a task definition system that establishes a set of robot tasks that each define at least a type of robot and a task objective, the set of robot tasks being based at least in part on the portions of the job request that are suitable for robot automation and meet a first fleet objective of a set of fleet objectives;

a fleet configuration proxy service that processes the set of robot tasks and additional job content relating to the job request to produce a fleet resource configuration data structure for the job request that defines a set of task associations and a set of robot adaptation instructions, wherein each task association associates at least one robot operating unit to a respective robot task of the set of robot tasks and wherein the set of robot adaptation instructions define a manner by which one or more robot operating units of a robot fleet are to be adapted to perform respective tasks to which robots are assigned;

a fleet intelligence layer that activates a set of intelligence services to produce at least one recommended robot task and associated contextual information that facilitates robot selection and task ordering in a workflow of robot tasks;

a job workflow system that generates a workflow that defines an order of performance of the robot tasks based on the fleet resource configuration data structure and the set of robot tasks;

a workflow simulation system configured to simulate performance of the job based on the workflow and a job execution simulation environment, wherein the workflow simulation system applies the workflow in the job execution simulation environment that includes digital models of the robot operating units assigned to the robot fleet and digital models of the task definitions to produce a simulation result, such that the simulation result is used to iteratively redefine one or more of the set of tasks, the fleet resource configuration data structure, or the workflow until the simulation result satisfies a second fleet objective of the set of fleet objectives corresponding to the job request; and

a job execution plan generator that, in response to the simulation result satisfying the set of fleet objectives, generates a job execution plan based on the set of tasks, the fleet resource configuration data structure, and the workflow.

2. The robot fleet management platform of claim 1, wherein the task definition system interacts with the intelligence layer to suggest alternate tasks that meet a second fleet objective.

3. The robot fleet management platform of claim 1, wherein the task definition system interacts with the intelligence layer to optimize at least one of a robot type and a task objective based on the first fleet objective.

4. The robot fleet management platform of claim 3, wherein the first fleet objective includes fleet resource utilization criteria.

5. The robot fleet management platform of claim 1, wherein the task definition system receives from the fleet configuration proxy service a particular robot type for use when performing the robot task.

6. The robot fleet management platform of claim 5, wherein the task definition system configures the set of robot tasks based on the particular robot type provided by the fleet configuration proxy service.

7. The robot fleet management platform of claim 1, wherein the task definition system generates at least one of:

a data structure for each task in the set of tasks that includes a reference to a digital twin for at least one of the task and at least one robot operating unit for performing the tasks for use by the workflow simulation system,

a data structure for each task in the set of tasks that identifies at least one a type of robot and a robot operating unit for performing the task and a configuration data structure for configuring a robot for performing the task,

a data structure for each task in the set of tasks and stores the data structure in a library of robot tasks that is indexed by information indicative of the job request and an identifier of at least one of the robot type and the robot operating unit, and

a plurality of robot tasks for a plurality of different robot types to achieve a task objective.

8. The robot fleet management platform of claim 1, wherein the task definition system matches requirements for constraints identified in the job request with robot capabilities when identifying the type of robot for meeting the task objective.

9. The robot fleet management platform of claim 1, wherein the task definition system queries a library of robot tasks for candidate robot tasks that satisfy the task objective and interacts with the fleet configuration proxy service to select a robot tasks from the candidate robot tasks based on the at least one fleet objective.

10. The robot fleet management platform of claim 9, wherein the at least one fleet objective is compatibility with available robot operating units.

11. The robot fleet management platform of claim 1, wherein the task definition system queries a library of robot tasks for candidate robot tasks that satisfy the task objective and interacts with the fleet intelligence layer to select a robot task from the candidate robot tasks based on a suitability of the candidate robot tasks for achieving the task objective.

12. The robot fleet management platform of claim 1, wherein the task definition system references information descriptive of sensor detection packages that indicate preferred sequences of sensing tasks when defining the set of tasks.

13. The robot fleet management platform of claim 1, wherein the job workflow system references information descriptive of sensor detection packages that indicate preferred sequences of sensing tasks when defining the workflow of robot tasks.

14. The robot fleet management platform of claim 1, wherein the job workflow system generates the workflow of robot tasks based on second task dependency on a first task for meeting an objective of the second task.

15. The robot fleet management platform of claim 1, wherein the job workflow simulation system operates digital twins of tasks in the set of tasks for determining an optimized workflow order of tasks.