Claims

1. A robot fleet management platform, comprising:

a set of datastores that store a governance library that defines a set of governance standards that include at least one set of security standards, legal standards, ethical standards, regulatory standards, quality standards, or engineering standards that are applied to decisions made by one or more respective intelligence services; and

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 governance-enabling intelligence layer that receives and responds to intelligence requests received from respective intelligence service clients, wherein the intelligence layer includes:

a set of artificial intelligence services that includes at least one of a machine learning service, a rules-based intelligence service, a digital twin service, a robot process automation service, or a machine vision service; and

an intelligence layer controller that coordinates performance of respective intelligence services on behalf of the respective intelligence service clients and performance of a set of analyses corresponding to the respective intelligence services based in part on the set of governance standards,

wherein the intelligence layer returns decisions determined collectively by the artificial intelligence service in response to the intelligence requests, such that the decisions are determined based on a set of intelligence service data sources and the set of analyses.

2. The platform of claim 1, wherein the intelligence layer controller is configured to:

receive an intelligence request from an intelligence service client indicating a requested decision;

determine zero or more governance standards that are implicated by a type of the requested decision, wherein the zero or more governance standards are selected from the governance standards defined in the governance library;

determine zero or more pre-defined analyses that are implicated by the type of the requested decision or by a governance standard implicated by the type of decision; and

provide the zero or more governance standards and the zero or more pre-defined analyses to the artificial intelligence service.

3. The platform of claim 2, wherein the intelligence layer controller is further configured to iteratively determine and provide additional governance standards and pre-defined analyses to the artificial intelligence service in response to determinations made by the artificial intelligence service until the requested decision is provided by the artificial intelligence service.

~~4. The platform of claim 2, wherein the intelligence layer is further configured to determine the set of intelligence layer data sources based on the type of the requested decision.~~

~~5. The platform of claim 2, wherein a requesting intelligence service client provides the set of intelligence layer data sources with the request.~~

~~6. The platform of claim 1, wherein the decisions provided by the intelligence layer define respective actions to be taken by the respective intelligence service clients.~~

~~7. The platform of claim 6, wherein the respective actions include an action to request human intervention.~~

~~8. The platform of claim 6, wherein the respective actions include non-adaptive pre-defined actions.~~

~~9. The platform of claim 6, wherein the respective actions include domain-specific actions that are responsive to the respective requests.~~

~~10. The platform of claim 1, wherein the intelligence service clients include a security system that requests classifications of potential security risks.~~

~~11. The platform of claim 1, wherein the intelligence service clients include a resource provisioning system that requests recommendations for resources to support a robot fleet.~~

~~12. The platform of claim 1, wherein the intelligence service clients include a logistics system that requests logistics-based recommendations with respect to one or more robot fleets.~~

~~13. The platform of claim 1, wherein the intelligence service clients include a job configuration system that requests proposed job configurations given a job request.~~

~~14. The platform of claim 1, wherein the intelligence service clients include a fleet configuration system that requests proposed fleet configurations given a set of tasks to be completed by a robot fleet.~~

~~15. The platform of claim 1, wherein the intelligence service clients include a robot operating unit deployed by the robot fleet management platform.~~

1~~16~~. 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~~17~~. The robot fleet management platform of claim 1~~16~~, wherein the task definition system interacts with the intelligence layer to suggest alternate tasks that meet a second fleet objective.

318. The robot fleet management platform of claim 116, 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.

419. The robot fleet management platform of claim 318, wherein the first fleet objective includes fleet resource utilization criteria.

520. The robot fleet management platform of claim 116, wherein the task definition system receives from the fleet configuration proxy service a particular robot type for use when performing the robot task.

621. The robot fleet management platform of claim 520, wherein the task definition system configures the set of robot tasks based on the particular robot type provided by the fleet configuration proxy service.

722. The robot fleet management platform of claim 116, 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.

~~23. The robot fleet management platform of claim 16, wherein the task definition system generates 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.~~

~~24. The robot fleet management platform of claim 16, wherein the task definition system generates 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.~~

825. The robot fleet management platform of claim 116, 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.

~~26. The robot fleet management platform of claim 16, wherein the task definition system generates a plurality of robot tasks for a plurality of different robot types to achieve a task objective.~~

927. The robot fleet management platform of claim 116, 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.

1028. The robot fleet management platform of claim 927, wherein the at least one fleet objective is compatibility with available robot operating units.

1129. The robot fleet management platform of claim 116, 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.

1230. The robot fleet management platform of claim 116, 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.

1331. The robot fleet management platform of claim 116, 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.

1432. The robot fleet management platform of claim 116, 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.

1533. The robot fleet management platform of claim 116, wherein the job workflow simulation system operates digital twins of tasks in the set of tasks for determining an optimized workflow order of tasks.

~~34. 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 configuration system that receives a job request and determines a set of robot tasks to be performed by a robot fleet based on job content associated with the job request and at least one fleet objective in a set of fleet objectives;~~

~~a fleet configuration proxy service that applies fleet configuration services to the set of robot tasks and the job content to produce a fleet resource configuration data structure for the job request;~~

~~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 to produce a simulation result that is used to recursively 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.~~

~~35. The robot fleet management platform of claim 34, wherein the job configuration system comprises a job parsing system that applies content and structural filters to job content received in association with a job request to identify portions thereof suitable for robot automation.~~

~~36. The robot fleet management platform of claim 35, wherein the job configuration system comprises 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 are 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 the set of fleet objectives.~~

~~37. The robot fleet management platform of claim 34, wherein the fleet resource configuration data structure 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 the robots are assigned.~~

38. The robot fleet management platform of claim 34, 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 the simulation result.

39. The robot fleet management platform of claim 34, wherein the job configuration system interacts with the intelligence layer to suggest alternate tasks that meet a second fleet objective.

40. The robot fleet management platform of claim 34, wherein the job configuration system interacts with the intelligence layer to optimize at least one of a robot type and a task objective based on at least one of the set of fleet objectives.

41. The robot fleet management platform of claim 40, wherein the first fleet objective includes fleet resource utilization criteria.

42. The robot fleet management platform of claim 34, wherein the job configuration system receives from the fleet configuration proxy service a particular robot type for use when performing the robot task.

43. The robot fleet management platform of claim 42, wherein the job configuration system configures the set of robot tasks based on the particular robot type provided by the fleet configuration proxy service.

44. The robot fleet management platform of claim 34, wherein the job configuration system generates 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.

45. The robot fleet management platform of claim 34, wherein the job configuration system generates 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.

46. The robot fleet management platform of claim 34, wherein the job configuration system generates 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.

~~47. The robot fleet management platform of claim 34, wherein the job configuration system matches requirements for constraints identified in the job request with robot capabilities when identifying the type of robot for meeting the task objective.~~

~~48. The robot fleet management platform of claim 34, wherein the job configuration system generates a plurality of robot tasks for a plurality of different robot types to achieve a task objective.~~

~~49. The robot fleet management platform of claim 34, wherein the job configuration 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.~~

~~50. The robot fleet management platform of claim 49, wherein the at least one fleet objective is compatibility with available robot operating units.~~

~~51. The robot fleet management platform of claim 34, wherein the job configuration 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.~~

~~52. The robot fleet management platform of claim 34, wherein the job configuration system references information descriptive of sensor detection packages that indicate preferred sequences of sensing tasks when defining the set of tasks.~~

~~53. The robot fleet management platform of claim 34, 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.~~

~~54. The robot fleet management platform of claim 34, 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.~~

~~55. The robot fleet management platform of claim 34, wherein the job workflow simulation system operates digital twins of tasks in the set of tasks for determining an optimized workflow order of tasks.~~

~~56. A robot fleet management 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:~~

~~receiving a job request comprising information descriptive of job deliverable and request-specific constraints for delivering the job deliverable;~~

~~applying content and structural filters to content received in association with a job request to identify portions thereof suitable for robot automation;~~

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

~~applying fleet configuration services to the job content and the set of robot tasks to produce a fleet resource configuration data structure for the job request that associates at least one robot operating unit with each task in the set of tasks and, based on the at least one robot operating unit, robot adaptation instructions for performing the associated task;~~

~~recommending robot task and associated contextual information that facilitates robot selection and task ordering in a workflow of robot tasks with a fleet intelligence layer;~~

~~generating a workflow of the robot tasks based on the fleet resource configuration data structure and the set of robot tasks;~~

~~simulating digital models of the robot operating units performing digital models of the task definitions thereby validating the generated workflow while providing a result of the job execution simulation for recursively establishing the set of robot tasks; and~~

~~generating at least a first portion of an execution plan for robot fleet resources configured in the fleet resource configuration data structure.~~

~~57. The robot fleet management platform of claim 56, further comprising suggesting alternate tasks that meet a second fleet objective with the fleet intelligence layer.~~

~~58. The robot fleet management platform of claim 56, further comprising optimizing at least one of a robot type and a task objective with the intelligence layer based on the first fleet objective.~~

~~59. The robot fleet management platform of claim 58, wherein the first fleet objective includes fleet resource utilization criteria.~~

~~60. The robot fleet management platform of claim 56, wherein the task definition system receives from the fleet configuration proxy service a particular robot type for use when performing the robot task.~~

~~61. The robot fleet management platform of claim 60, wherein establishing the set of robot tasks is based on the particular robot type provided by the fleet configuration proxy service.~~

62. The robot fleet management platform of claim 56, wherein establishing the set of robot tasks includes generating 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.

63. The robot fleet management platform of claim 56, wherein establishing the set of robot tasks includes generating 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.

64. The robot fleet management platform of claim 56, wherein establishing the set of robot tasks includes generating 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.

65. The robot fleet management platform of claim 56, wherein establishing the set of robot tasks includes matching requirements for constraints identified in the job request with robot capabilities when identifying the type of robot for meeting the task objective.

66. The robot fleet management platform of claim 56, wherein establishing the set of robot tasks includes generating a plurality of robot tasks for a plurality of different robot types to achieve a task objective.

67. The robot fleet management platform of claim 56, wherein establishing the set of robot tasks includes querying 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.

68. The robot fleet management platform of claim 67, wherein the at least one fleet objective is compatibility with available robot operating units.

69. The robot fleet management platform of claim 56, wherein establishing the set of robot tasks includes querying 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.

70. The robot fleet management platform of claim 56, wherein establishing the set of robot tasks includes referencing information descriptive of sensor detection packages that indicate preferred sequences of sensing tasks when defining the set of tasks.

71. The robot fleet management platform of claim 56, wherein generating the workflow of the robot tasks includes referencing information descriptive of sensor detection packages that indicate preferred sequences of sensing tasks when defining the workflow of robot tasks.

72. The robot fleet management platform of claim 56, wherein generating the workflow of the robot tasks is based on second task dependency on a first task for meeting an objective of the second task.

73. The robot fleet management platform of claim 56, wherein simulating digital models of the robot operating units includes operating digital twins of tasks in the set of tasks for determining an optimized workflow order of tasks.

74. A robot fleet platform for preparing a job request for facilitating configuration of a robot fleet operated by the robot fleet platform, the system 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 request ingestion system configured to receive job content relating to at least one of picking, packing, moving, storing, warehousing, transporting or delivering of a set of items in a supply chain, the job content including an electronic job request and related data;

a job content parsing system configured to apply filters to the received job content to identify candidate portions thereof for robot automation;

a fleet intelligence layer that activates a set of intelligence services to process terms in the candidate portions of the job content and receive therefrom at least one recommended robot task and associated contextual information that facilitates robot selection and task ordering in a workflow of robot tasks;

a demand intelligence layer that provides real time information relating to a parameter of demand for the set of items in the supply chain; and

a job requirements system that produces a set of job request instance-specific job requirements based on the portions of the job content that indicate robot automation, the real time information from the demand intelligence layer and the at least one recommended robot task and associated contextual information, wherein the set of job requirements is stored in a non-transitory computer readable memory that is accessible by at least one processor of the set of processors.

75. The robot fleet platform of claim 74, wherein the job content parsing system retrieves a set of content and structural filters from a job configuration library that facilitates mapping indicia of the job content with target terms that indicate robot automation.

~~76. The robot fleet platform of claim 74, wherein the job content parsing system augments a set of default content and structural filters with filter criteria from a job configuration library that facilitates mapping indicia of the job content with target terms that indicate robot automation.~~

~~77. The robot fleet platform of claim 74, wherein the content filter indicates terms in the job content that distinguish robot automation content from other content in the job content.~~

~~78. The robot fleet platform of claim 77, wherein the terms are retrieved from a job configuration library that facilitates mapping indicia of the job content with terms that indicate robot automation.~~

~~79. The robot fleet platform of claim 74, wherein the fleet intelligence layer facilitates sending portions of the job content identified as suitable for robot automation to a machine learning service of the set of intelligence services for improving job content parsing.~~

~~80. The robot fleet platform of claim 79, wherein the machine learning service is trained with training data sets comprising human-generated feedback on job content parsing results for a plurality of job requests, robot automation knowledge bases, desired job-specific knowledge bases, technical dictionaries, and content received from job experts.~~

~~81. The robot fleet platform of claim 74, wherein the job parsing system is configured to detect physical location information in the job content that facilitates automatically determining at least one of transportation options, operational constraints, permitting requirements, transport restrictions, fleet assets that are local to a physical location of the job request, and logistics constraints.~~

~~82. The robot fleet platform of claim 80, wherein the physical location information comprises one or more of an address, a region, GPS data, aerial photography, a marked location on a map image, map coordinates, latitude, longitude, altitude, a route, a depth relative to sea level.~~

~~83. The robot fleet platform of claim 74, wherein the job parsing system is configured to detect electrical power information for at least one location in the job content including a plurality of voltages, frequencies, currents, schedules of availability, schedules of grid-provided electricity costs, cost per kwh, a power demand profile, a maximum thermal density, and proximity to the at least one location.~~

~~84. The robot fleet platform of claim 74, wherein the job parsing system is configured to detect digital data representative of a layout of a portion of a job site that is present or referenced in the job content to facilitate generating at least one job request instance-specific requirement associated with job site layout.~~

~~85. The robot fleet platform of claim 74, wherein the job parsing system is configured to detect at least one of information descriptive of an operating environment, deliverables, interfaces through which information about the job request is communicated with a job requester, wireless communication network accessibility, budget constraints for performing tasks, and scheduling of resources in regards to access and operation at a job site.~~

~~86. The robot fleet platform of claim 74, wherein the job request ingestion system is configured to scan received job content for external links to related data.~~

~~87. The robot fleet platform of claim 86, wherein the job request ingestion system is configured to retrieve related data for use by the robot fleet platform based on the external links.~~

~~88. The robot fleet platform of claim 74, wherein the job request ingestion system is configured to determine and forward to a job content parsing system portions of job content received that include references to activities suitable for being performed by a robotic fleet resource.~~

~~89. The robot fleet platform of claim 74, wherein the job request ingestion system is configured to process content received with a job configuration indicia filter that automatically routes job configuration indicia in the job content to a job configuration library look up service for classifying the job configuration indicia as one of a current job configuration, a prior job configuration, or an unknown job configuration.~~

~~90. The robot fleet platform of claim 74, wherein the job content parsing system is configured to identify structural and content elements in the received content that facilitate identification of candidate robot tasks.~~

~~91. The robot fleet platform of claim 74, wherein the job content parsing system is configured to identify structural elements in the received content that indicate at least one of tasks, sub tasks, task ordering, task dependencies, and task requirements for facilitating selection of fleet robot operating units.~~

~~92. The robot fleet platform of claim 74, wherein the job content parsing system is configured to identify content terms indicative of at least one robot minimum capacity.~~

~~93. The robot fleet platform of claim 74, wherein the job content parsing system is configured with a robot type filter that when applied to the job request content identifies terms indicative of a type of robot for performing a task.~~

~~94. The robot fleet platform of claim 74, wherein the job request ingestion system includes a job request ingestion interface for receiving the electronic job request.~~

~~95. The robot fleet platform of claim 74, wherein applying the content and structural filters includes scanning received content for data indicative of robot activities.~~

~~96. The robot fleet platform of claim 74, wherein applying the content and structural filters with the job content parsing system includes processing received content with a robot type filter that when applied to the job request content identifies terms indicative of a type of robot for performing a task.~~

~~97. The robot fleet platform of claim 74, wherein the job parsing system utilizes the content filters to detect qualified job data.~~

~~98. The robot fleet platform of claim 97, further comprising a qualified data query generation system configured to generate a query regarding at least one element of qualified data in the job content for clarification thereof.~~

~~99. The robot fleet platform of claim 98, wherein the query regarding the at least one element of qualified data is presented in the user interface.~~

~~100. The robot fleet platform of claim 98, wherein the query regarding at least one element of qualified data is provided to the fleet intelligence layer for processing with at least one intelligence service of the set of intelligence services to provide at least one clarification item of data for the at least one element of qualified data through the fleet intelligence layer.~~

~~101. The robot fleet platform of claim 74, further comprising a qualified data resolution system configured to evaluate at least one qualified data element in the job content for similarity to clarified data from a plurality of job requests, and based on an outcome of the evaluation to adjust the at least one qualified data element based on a similar clarified data element.~~

~~102. The robot fleet platform of claim 101, wherein adjusting the at least one qualified data element includes replacing a qualified data value in the qualified data element with a corresponding data value from the clarified data element.~~

~~103. The fleet robot platform of claim 74, wherein the content filters are configured to identify qualified data, including at least one of missing data, unclear data and qualitative references.~~

~~104. The robot fleet platform of claim 103, wherein the fleet intelligence layer facilitates processing qualified data with a machine learning service of the set of intelligence services for improving parsing of qualified data.~~

~~105. The robot fleet platform of claim 74, wherein the content filters are configured to identify qualified data and related context for facilitating resolution of at least one of missing data, unclear data and qualitative references in the qualified data.~~

~~106. A value chain network automation system, comprising:~~

~~a supply chain robotic fleet data set including attributes of a set of states and capabilities of a set of robotic systems in a supply chain for a set of goods;~~

~~a demand intelligence robotic process automation data set including attributes of a set of states of a set of robotic process automation systems that undertake automation of a set of demand forecasting tasks for the set of goods; and~~

~~a coordination system that provides a set of robotic task instructions for the supply chain robotic fleet based on processing the supply chain robotic fleet data set and the demand intelligence robotic process automation data set to coordinate supply and demand for the set of goods.~~

~~107. An information technology system having an artificial intelligence system for learning on a training set of outcomes, parameters, and data collected from a set of distributed manufacturing network entities in a distributed manufacturing network to optimize a set of digital production processes and workflows.~~

~~108. An information technology system for a distributed manufacturing network, comprising:~~

~~an additive manufacturing management platform configured for managing process and production workflows for a set of distributed manufacturing network entities through design, modelling, printing and supply chain stages;~~

~~an artificial intelligence system configured for learning on a training set of outcomes, parameters, and data collected from the distributed manufacturing network entities of the distributed manufacturing network to optimize digital production processes and workflows; and~~

~~a distributed ledger system integrated with a digital thread configured for providing unified views of workflow and transaction information to entities in the distributed manufacturing network.~~

~~109. The information technology system of claim 108 further comprising a control system configured to adjust the data and one or more parameters collected from the distributed manufacturing network entities in real time.~~

~~110. The information technology system of claim 108 further comprising a digital twin system configured to build a digital twin of one or more distributed manufacturing network entities, the digital twin providing a substantially real-time representation of the distributed manufacturing network entity through data from one or more sensors positioned in, on or near the distributed manufacturing network entity, wherein the artificial intelligence system executes simulations on the digital twin for predicting a possible future state of the distributed manufacturing network entity.~~

~~111. The information technology system of claim 108 wherein the distributed manufacturing network entities include a set of printed parts, products, processes, equipment, 3D printers, users, customers, designers, engineers, retailers, suppliers, packagers and manufacturing nodes.~~

~~112. A distributed manufacturing network comprising:~~

~~an additive manufacturing management platform with an artificial intelligence system configured to learn on a training set of outcomes, parameters, and data collected from a set of distributed manufacturing network entities for optimizing manufacturing and supply chain processes and workflows; and~~

~~a distributed ledger integrated with digital threads of the distributed manufacturing network entities configured to store data related to the distributed manufacturing network entities.~~

~~113. The distributed manufacturing network of claim 112 wherein the distributed network entity is a part being manufactured using additive manufacturing.~~

~~114. The distributed manufacturing network of claim 113 wherein the digital thread constitutes information related to the complete lifecycle of the part from design, modeling, production, validation, use and maintenance through disposal.~~

~~115. An autonomous additive manufacturing platform comprising:~~

~~a plurality of sensors positioned in, on, and/or near a product or a part and configured to collect sensor data related to the product or the part, the sensor data being substantially real-time sensor data;~~

~~an adaptive intelligence system connected to the plurality of sensors and configured to receive the sensor data from the plurality of sensors, the adaptive intelligence system including:~~

~~a machine learning system configured to input the sensor data into one or more machine learning models, the sensor data being used as training data for the machine learning models, the machine learning models being configured to transform the sensor data into simulation data;~~

~~a digital twin system configured to create a product twin or a part twin based on the simulation data, the product twin or the part twin providing for substantially real-time representation of the product or the part and providing for simulation of a possible future state of the product or the part via the simulation data; and~~

~~an artificial intelligence system configured to execute simulations on the digital twin system,~~

~~wherein the one or more models are utilized by the artificial intelligence system to make classifications, predictions, and other decisions relating to the product and the part.~~

~~116. The autonomous additive manufacturing platform of claim 115 wherein the models trained by the machine learning system are utilized by the artificial intelligence system to execute simulations on the part twin for predicting part shrinkage.~~

~~117. The autonomous additive manufacturing platform of claim 115 wherein the models trained by the machine learning system are utilized by the artificial intelligence system to execute simulations on the part twin for predicting part warpage.~~

~~118. The autonomous additive manufacturing platform of claim 115 wherein the models trained by the machine learning system are utilized by the artificial intelligence system to execute simulations on the part twin for calculating necessary changes to an additive manufacturing process of the autonomous additive manufacturing platform to compensate for part shrinkage and warpage.~~

~~119. The autonomous additive manufacturing platform of claim 115 wherein the models trained by the machine learning system are utilized by the artificial intelligence system to execute simulations on the part twin for testing the compatibility of 3D printed parts with other parts or with a 3D printer.~~

~~120. The autonomous additive manufacturing platform of claim 115 wherein the models trained by the machine learning system are utilized by the artificial intelligence system to execute simulations on the part twin for predicting deformations or failure in a 3D printed part.~~

~~121. The autonomous additive manufacturing platform of claim 115 wherein the models trained by the machine learning system are utilized by the artificial intelligence system to execute simulations on the part twin for optimizing a build process of the autonomous additive manufacturing platform to minimize the occurrence of deformations.~~

~~122. The autonomous additive manufacturing platform of claim 115 wherein the models trained by the machine learning system are utilized by the artificial intelligence system to execute simulations on the product twin for predicting the cost or price of the product.~~

~~123. An information technology system for a distributed manufacturing network comprising:~~

~~an additive manufacturing management platform with an artificial intelligence system configured to learn on a training set of outcomes, parameters, and data collected from a set of distributed manufacturing network entities and execute simulations on digital twins of the distributed manufacturing network entities to make classifications, predictions, and optimization related decisions for the distributed manufacturing network entities; and~~

~~a distributed ledger system integrated with a digital thread configured to provide unified views of workflow and transaction information to the entities in the distributed manufacturing network.~~

~~124. The information technology system of claim 123 wherein the digital manufacturing network entities include a set of printed parts, products, processes, 3D printers, users, customers, packagers and manufacturing nodes.~~

~~125. The information technology system of claim 124 wherein the artificial intelligence system executes simulations on one or more of the part twins, the product twins and the printer twins for generating 3D printing quotes.~~

~~126. The information technology system of claim 124 wherein the artificial intelligence system executes simulations on one or more of the part twins, the product twins and the printer twins for generating recommendations related to printing to a user of the platform.~~

~~127. The information technology system of claim 126 wherein the recommendations relate to a choice of a material for printing or a 3D printing technique.~~

~~128. The information technology system of claim 126 wherein the recommendations relate to a choice of a manufacturing node, source of manufacturing, location of manufacturing, timing of scheduling of an additive manufacturing job, or step thereof and parameters for design.~~

~~129. The information technology system of claim 124 wherein the artificial intelligence system executes simulations on one or more of the part twins, the product twins and the printer twins for predicting delivery times for 3D printing jobs.~~

~~130. The information technology system of claim 124 wherein the artificial intelligence system executes simulations on one or more of the part twins, the product twins, the printer twins and the manufacturing node twins for predicting cost over-runs in the manufacturing process.~~

~~131. The information technology system of claim 124 wherein the artificial intelligence system executes simulations on one or more of the part twins, the product twins, the printer twins and the manufacturing node twins for optimizing the production sequencing of parts and products based on quoted price, delivery, sale margin, order size, or similar characteristics.~~

~~132. The information technology system of claim 124 wherein the artificial intelligence system executes simulations on one or more of the part twins, the product twins, the printer twins and the manufacturing node twins for optimizing the cycle time for manufacturing.~~

~~133. The information technology system of claim 124 wherein the artificial intelligence system executes simulations on one or more of the part twins, the product twins, the printer twins, the customer twins and the manufacturing node twins to predict and manage product demand from one or more customers.~~

~~134. The information technology system of claim 124 wherein the artificial intelligence system executes simulations on one or more of the part twins, the product twins, the printer twins, the supplier twins, the customer twins and the manufacturing node twins to predict and manage supply from the digital manufacturing network.~~

~~135. The information technology system of claim 124 wherein the artificial intelligence system executes simulations on one or more of the part twins, the product twins, the printer twins, the supplier twins, the customer twins and the manufacturing node twins to optimize production capacity for a distributed manufacturing network.~~

~~136. The information technology system of claim 123, wherein the distributed manufacturing entities include an Enterprise Resource Planning (ERP) system, a Manufacturing Execution system (MES), a Product Lifecycle Management (PLM) system, a maintenance management system (MMS), a Quality Management system (QMS), a certification system, a compliance system, a Robot/Cobot system, and an SCCG system.~~

~~137. A computer-implemented method for facilitating manufacture and delivery of a 3D printed product to a customer using one or more manufacturing nodes of a distributed manufacturing network, comprising: receiving one or more product requirements from the customer; tokenizing and storing the product requirements in a distributed ledger system; determining one or more manufacturing nodes, printers, processes and materials based on the product requirements; generating a quote including pricing and delivery timelines; and upon acceptance of the quote by the customer, manufacturing and delivering the 3D printed product to the customer.~~

~~138. The method of claim 137 further comprising rating one or more manufacturing nodes based on a customer satisfaction score for meeting customer requirements.~~

~~139. The method of claim 137 wherein determining includes matching a customer order with a manufacturing node or a 3D printer based on factors like printer capabilities, locations of the customer and the manufacturing nodes, available capacity at each node, pricing and timelines requirements and the customer satisfaction score.~~

~~140. A distributed manufacturing network comprising:~~

~~a distributed ledger system integrated with digital threads of a set of distributed manufacturing network entities for storing information on event, activities and transactions related to the distributed manufacturing network entities; and~~

~~an artificial intelligence system configured to learn on a training set of outcomes, parameters, and data collected from the distributed manufacturing network entities to optimize manufacturing and value chain workflows.~~

~~141. The distributed manufacturing network of claim 140 wherein the distributed ledger system includes a decentralized application downloadable by entities in the distributed manufacturing network.~~

~~142. The distributed manufacturing network of claim 140 wherein the distributed ledger system includes a user interface configured to provide a set of unified views of the workflows to the set of entities of a distributed manufacturing network.~~

~~143. The distributed manufacturing network of claim 140 wherein the distributed ledger system includes a user interface configured to provide tracking and reporting on state and movement of a product from order through manufacture and assembly to final delivery to a customer.~~

~~144. The distributed manufacturing network of claim 140 wherein the distributed ledger system includes a system for digital rights management of entities in the distributed manufacturing network.~~

~~145. The distributed manufacturing network of claim 141 wherein the distributed ledger system stores digital fingerprinting information of documents/files and other information including creation, modification.~~

~~146. The distributed manufacturing network of claim 140 wherein the distributed ledger system includes a cryptocurrency token to incentivize value creation and transfer value between entities in the distributed manufacturing network.~~

~~147. The distributed manufacturing network of claim 140 wherein the distributed ledger system includes a system for validating capabilities of a manufacturing node.~~

~~148. The distributed manufacturing network of claim 140 wherein the distributed ledger system includes a system for attesting the experience of a manufacturing node.~~

~~149. The distributed manufacturing network of claim 140 wherein the distributed ledger system includes a system for capturing the end to end traceability of a part.~~

~~150. The distributed manufacturing network of claim 140 wherein the distributed ledger system includes a system for tracking all transactions, modifications, quality checks and certifications on the distributed ledger.~~

~~151. The distributed manufacturing network of claim 140 wherein the distributed ledger system includes smart contracts for automating and managing the workflows in the distributed manufacturing network.~~

~~152. The distributed manufacturing network of claim 140 wherein the distributed ledger system includes a smart contract for executing a purchase order covering the scope of work, quotation, timelines, and payment terms.~~

~~153. The distributed manufacturing network of claim 140 wherein the distributed ledger system includes a smart contract for processing of payment by a customer upon delivery of product.~~

~~154. The distributed manufacturing network of claim 140 wherein the distributed ledger system includes a smart contract for processing insurance claims for a defective product.~~

~~155. The distributed manufacturing network of claim 140 wherein the distributed ledger system includes a smart contract for processing warranty claims.~~

~~156. The distributed manufacturing network of claim 140 wherein the distributed ledger system includes a smart contract for automated execution and payment for maintenance.~~

~~157. A distributed manufacturing network information technology system, comprising:~~

~~a cloud-based additive manufacturing management platform with a user interface, connectivity facilities, data storage facilities, and monitoring facilities;~~

~~a set of applications for enabling the additive manufacturing management platform to manage a set of distributed manufacturing network entities; and~~

an artificial intelligence system configured to learn on a training set of outcomes, parameters, and data collected from the distributed manufacturing network entities to optimize manufacturing and value chain workflows.

158. The distributed manufacturing network information technology system of claim 157 wherein the artificial intelligence system is configured to provide optimization and process control across the entire lifecycle of manufacturing from product conception and design through manufacturing and distribution to service and maintenance.

159. The distributed manufacturing network information technology system of claim 157 wherein the artificial intelligence system is configured to provide generative design and topology optimization to determine at least one product design suitable for fabrication.

160. The distributed manufacturing network information technology system of claim 157 wherein the artificial intelligence system is configured to provide optimization of build preparation process.

161. The distributed manufacturing network information technology system of claim 157 wherein the artificial intelligence system is configured to optimize part orientation process for superior production results.

162. The distributed manufacturing network information technology system of claim 157 wherein the artificial intelligence system is configured to optimize toolpath generation.

163. The distributed manufacturing network information technology system of claim 157 wherein the artificial intelligence system is configured to provide optimize dynamic 2D, 2.5D and 3D nesting to maximize the number of printed parts while minimizing the raw material waste.

164. The distributed manufacturing network information technology system of claim 157 wherein the user interface includes a dashboard providing tracking and tracing of production history of one or more 3D printed part.

165. The distributed manufacturing network information technology system of claim 157 wherein the user interface includes a dashboard providing batch traceability to identify parts from the same batch.

166. The distributed manufacturing network information technology system of claim 157 wherein the user interface includes a digital twin interface to resolve queries from a user of the network related to a part or a product.

~~167. The distributed manufacturing network information technology system of claim 157 wherein the user interface includes a virtual reality (VR) interface configured to enable a user build 3D models in VR.~~

~~168. The distributed manufacturing network information technology system of claim 157 wherein the applications are selected from a group consisting of production management applications, production reporting applications, production analysis applications and value chain management applications.~~

~~169. The distributed manufacturing network information technology system of claim 157 wherein the application is an order tracking application configured to track the product order through its movement in the distributed manufacturing network.~~

~~170. The distributed manufacturing network information technology system of claim 157 wherein the application is a workflow management application configured to manage the complete 3D printing production workflow.~~

~~171. The distributed manufacturing network information technology system of claim 157 wherein the application is an alerts and notifications application configured to generate alerts, notifications and reports about one or more events in the distributed manufacturing network to a user or customer of the network.~~

~~172. The distributed manufacturing network information technology system of claim 157 wherein the alerts and notifications application is configured to transmit alerts related to print errors or failures to a computing device of a user.~~

~~173. The distributed manufacturing network information technology system of claim 157 wherein the application is a payment gateway application configured to manage the entire billing, payment and invoicing process for a customer ordering a product using the distributed manufacturing network.~~

~~174. The distributed manufacturing network information technology system of claim 157 wherein the artificial intelligence system is configured to automatically classify and cluster 3D printed parts based on similarity of attributes, including physical attributes, shapes, functional attributes, material attributes, performance attributes and economic attributes.~~

~~175. The distributed manufacturing network information technology system of claim 157 wherein the artificial intelligence system is configured to analyze usage patterns associated with one or more users and learn user preferences with respect to outputs, materials, orientations, timing, colors, shapes, orientations and/or print strategies.~~

~~176. The distributed manufacturing network information technology system of claim 157 wherein the artificial intelligence system is configured to minimize material waste production during additive manufacturing process.~~

~~177. The distributed manufacturing network information technology system of claim 157 wherein the artificial intelligence system is configured to manage the real time dynamics affecting inventory levels for smart inventory and materials management in the distributed manufacturing network.~~

~~178. The distributed manufacturing network information technology system of claim 157 wherein the artificial intelligence system is configured to build, maintain, and provide a library of parts with preconfigured parameters, and is searchable by materials, properties, functions, equipment compatibility, shape compatibility, interface compatibility, part type, part class, industry, and compliance.~~

~~179. The distributed manufacturing network information technology system of claim 157 wherein the connectivity facilities include network connections, interfaces, ports, application programming interfaces (APIs), brokers, services, connectors, wired or wireless communication links, human-accessible interfaces, software interfaces, micro-services, SaaS interfaces, PaaS interfaces, IaaS interfaces, cloud capabilities, or the like.~~

~~180. The distributed manufacturing network information technology system of claim 157 configured to provide 3D printed products that conform to a body part or anatomy of a user wherein the 3D printed product is a wearable selected from a group consisting of eyewear, footwear, earwear and headgear.~~

~~181. The distributed manufacturing network information technology system of claim 157 configured to support manufacture, replacement or service of parts such as using portable or mobile additive manufacturing units, equipped with robotic or other autonomous mobility, units positioned in or on vehicles or units located in sufficiently close proximity to a customer.~~

~~182. The distributed manufacturing network information technology system of claim 157 configured to support printing of parts or products using an additive manufacturing unit with multiple source materials and multiple extrusion nozzles voxelated soft matter multi-material, multi-nozzle printing, with high-speed switching between materials.~~

~~183. The distributed manufacturing network information technology system of claim 157 configured to support printing of parts or products comprising functionally graded materials (FGMs), such as where two materials are joined with a graded interface that avoids a distinct boundary between the materials.~~

~~184. The distributed manufacturing network information technology system of claim 157 wherein the artificial intelligence system makes use of an algorithm comprising an artificial neural network, a decision tree, a logistic regression model, a generative model, an evolutionary model, a stochastic gradient descent model, a fuzzy classifier, a support vector machine, a Bayesian network, a hierarchical clustering algorithm, a k-means algorithm, a genetic algorithm, a deep convolutional neural network, deep recurrent neural network, a transformer neural network or any combination thereof.~~

~~185. The distributed manufacturing network information technology system of claim 184 wherein an instruction set for additive manufacturing is automatically generated from a text description using a natural language-based transformer neural network model.~~

~~186. The distributed manufacturing network information technology system of claim 184 wherein the evolutionary models utilizes feedback and filtering functions based on semantic properties, design constraints, physical or functional requirements, consumer engagement, outcomes, costs, safety or liability, regulatory requirements, certification and smart contracts.~~

~~187. The distributed manufacturing network information technology system of claim 186 wherein feedback to design evolution is derived from a favorable smart contract engagement, such as where a particular design is reserved via the smart contract at a profitable price and in favorable volumes.~~

~~188. An information technology system for supporting additive manufacturing and value chain workflows, comprising:~~

~~a cloud-based metal additive manufacturing management platform including an artificial intelligence system configured to learn on a training set of outcomes, parameters, and data collected from one or more additive manufacturing nodes to optimize additive manufacturing and value chain processes and workflows; and~~

~~a distributed ledger system configured to store data related to the manufacturing nodes.~~

~~189. The information technology system of claim 188 wherein the artificial intelligence system learns on a training set of outcomes, parameters, and data collected from one or more additive manufacturing nodes to optimize process and material selection for additive manufacturing.~~

~~190. The information technology system of claim 188 wherein the artificial intelligence system learns on a training set of outcomes, parameters, and data collected from one or more additive manufacturing nodes to optimize formulation of feedstock for additive manufacturing.~~

~~191. The information technology system of claim 188 wherein the artificial intelligence system learns on a training set of outcomes, parameters, and data collected from one or more additive manufacturing nodes to optimize part design for additive manufacturing.~~

~~192. The information technology system of claim 188 wherein the artificial intelligence system learns on a training set of outcomes, parameters, and data collected from one or more additive manufacturing nodes to optimize a combination of material utilization, energy utilization and labor resource utilization during the additive manufacturing process.~~

~~193. The information technology system of claim 188 wherein the artificial intelligence system learns on a training set of outcomes, parameters, and data collected from one or more additive manufacturing nodes to optimize material utilization while factoring in waste production and material recapture or recycling during the additive manufacturing process.~~

~~194. The information technology system of claim 188 wherein the artificial intelligence system learns on a training set of outcomes, parameters, and data collected from one or more additive manufacturing nodes to predict and manage risk related to the manufacture or delivery of a part or product by the one or more manufacturing nodes to a customer.~~

~~195. The information technology system of claim 194 wherein the risk is predicted by analyzing data from one or more external sources including social media feeds, weather patterns, marketplace websites, research websites and crowdsourcing systems.~~

~~196. The information technology system of claim 188 wherein the artificial intelligence system learns on a training set of outcomes, parameters, and data collected from one or more additive manufacturing nodes to provide personalized marketing and customer service with respect to a part or product manufactured and delivered by the one or more manufacturing nodes to a customer.197. A dynamic vision system having an artificial intelligence system for learning on a training set of outcomes, parameters, and data collected from a variable focus liquid lens optical assembly to recognize an object.~~

~~198. The dynamic vision system of claim 197 wherein the artificial intelligence system learns on a training set of outcomes parameters, and data collected from a variable focus liquid lens optical assembly to control the optical assembly to optimize the collection of data for processing by the artificial intelligence system.~~

~~199. A dynamic vision system comprising:~~

~~a variable focus liquid lens optical assembly;~~

~~a control system configured to adjust one or more optical parameters and data collected from the optical assembly in real time; and~~

~~a processing system that dynamically learns on a training set of outcomes, parameters and data collected from the optical assembly to train one or more machine learning models to recognize an object.~~

~~200. The dynamic vision system of claim 199 wherein the variable focus liquid lens is continuously adjusted by the control system based on environment factors and on feedback from the processing system to generate an object concept.~~

~~201. The dynamic vision system of claim 200 wherein the object concept includes contextual intelligence about the object and its environment and provides superior object recognition by the dynamic vision system.~~

~~202. The dynamic vision system of claim 199 wherein a first machine learning model is used to optimize collection of signals by the optical assembly and a second machine learning model is used to operate on the signals to achieve a desired vision outcome.~~

~~203. The dynamic vision system of claim 199 wherein the processing system receives real-time adjustable data streams from the variable focus liquid lens optical assembly to generate situational awareness or create out-of-focus images of the object so as to capture rich metadata and contextual intelligence about the object and its environment.~~

~~204. The dynamic vision system of claim 199 wherein the control system and the processing system are integrated with the variable focus liquid lens optical assembly.~~

~~205. The dynamic vision system of claim 199 wherein the optical parameters adjusted by the control system include focal length, fluid materials, specularity, color, environment and lens shape which in turn impacts spherical aberration, field curvature, coma, chromatic aberration, distortion, vignetting, ghosting, flaring and diffraction.~~

~~206. The dynamic vision system of claim 199 wherein the processing system learns on a set of outcomes, parameters, and data from the liquid lens optical assembly to derive the configuration of the liquid lens optical assembly wherein the configuration includes liquid lens materials, geometry, shape, optical properties, performance and design.~~

~~207. The dynamic vision system of claim 199 wherein the machine learning models are embodied on a semiconductor chip that is integrated into a device or system that houses the optical assembly.~~

~~208. The dynamic vision system of claim 199 wherein the machine learning models are pre-trained on a separate system, such as in a cloud computing environment, such as using a large training data set of visual information and/or outcomes, to perform a set of machine vision tasks, and the resulting models are deployed on a device or system that includes the optical assembly.~~

~~209. A robotic vision system comprising:~~

~~an optical assembly including one or more sensors, a variable focus liquid lens and a photon capture board; and~~

~~a processing system configured to dynamically learn on a training set of outcomes, parameters and data collected from the optical assembly to train an artificial intelligence model to recognize an object.~~

~~210. The robotic vision system of claim 209 further comprising a control system configured to adjust one or more optical parameters and data collected from the optical assembly in real time.~~

~~211. The robotic vision system of claim 209 wherein the artificial intelligence model is trained for classification, predictions or optimization related decisions about the object.~~

~~212. The robotic vision system of claim 211 wherein the artificial intelligence model determines the position, orientation and motion of the object.~~

~~213. The robotic vision system of claim 211 wherein the artificial intelligence model is a neural network.~~

~~214. The robotic vision system of claim 211 wherein the artificial intelligence model builds a three-dimensional representation of the object in a single step without the intermediate step of processing into two-dimensional images.~~

~~215. The robotic vision system of claim 209 wherein the one or more sensors include cameras, LIDARs, RADARs, SONARs, thermal imaging sensor, hyperspectral imaging sensor, illuminance sensors, force sensors, torque sensors, velocity sensors, acceleration sensors, position sensors, proximity sensors, gyro sensors, sound sensors, motion sensors, location sensors, load sensors, temperature sensors, touch sensors, depth sensors, ultrasonic range sensors, infrared sensors, chemical sensors, magnetic sensors, inertial sensors, gas sensors, humidity sensors, pressure sensors, viscosity sensors, flow sensors, object sensors and tactile sensors.~~

~~216. The robotic vision system of claim 215 wherein the processing system temporally combines the output from two or more sensors using conditional probabilities to create a combined view of the object that is richer and includes information about the position, orientation and motion of the object.~~

217. A dynamic vision system comprising:

a variable focus liquid lens optical assembly;

a variable lighting assembly;

a control system configured to adjust one or more optical parameters and data collected from the optical assembly in real time;

a control system configured to adjust the variable lighting assembly; and

a processing system that dynamically learns on a training set of outcomes, parameters and data collected from the optical assembly to train a set of machine learning models to control the optical assembly to optimize the collection of data for processing by the set of machine learning models.

218. A vision system for dynamically learning an object concept about an object of interest, the vision system comprising:

a variable focus liquid lens assembly;

a control system configured to adjust one or more optical parameters of the variable focus liquid lens assembly in real time;

one or more vision sensors configured to capture real-time pixel array based on the data received from the variable focus liquid lens assembly in response to adjustments by the control system, the pixel array representing the object concept; and

an adaptive intelligence system configured to process the object concept to build a three-dimensional representation of the object, the adaptive intelligence system including:

a machine learning system configured to input the object concept into one or more machine learning models, the object concept being used as training data for the machine learning models;

an artificial intelligence system configured to make classifications, predictions, and other decisions relating to the object including determining the position, orientation and motion of the object.

219. A method for recognizing an object, comprising:

receiving at a sensor, real time adjustable data streams representing visual and contextual information about an object of interest;

generating by an image processing system, an object concept including contextual intelligence about the object and its environment;

adjusting by a control system, optical parameters of a conformable liquid lens;

revising by a machine learning system the object concept in response to the adjustment of optical parameters of the conformable liquid lens; and

determining by an artificial intelligence system, the object attributes including object classification, depth, location, orientation and motion,

~~wherein the object concept is constantly revised in response to the adjustment of optical parameters of the conformable liquid lens and used as an input to train a machine learning model, which dynamically learns on a training set of outcomes, parameters and data collected from the conformable liquid lens.~~