


ALLNAMES:(Syrius Robotics) 

63 results

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1. [3885858](#) DISTRIBUTED ROBOT DISPATCH DECISION-MAKING METHOD, DEVICE AND SYSTEM, ELECTRONIC DEVICE AND STORAGE MEDIUM EP - 29.09.2021Int.Class [G05B 19/418](#)  Appl.No 18940929 Applicant SYRIUS ROBOTICS CO LTD Inventor YANG ZHIQIN

Provided is a distributed robot scheduling decision method. The method includes: a task pack including at least one task is received, and the task pack is transmitted to other robots in swarm robots [S10]; a decision is made according to a claiming decision variable to claim a task suitable for execution in the task pack [S11]; and the task suitable for execution is executed [S12]. In such a manner, swarm robots may communicate with one another for task transmission and make decisions according to claiming decision variables to claim tasks suitable for execution in the task pack for execution. Therefore, a technical effect that the swarm robots may make decisions independently rather than in centralized decision and central control decision manners to effectively avoid overloading a server at a high possibility is achieved, and moreover, a technical effect of intelligently selecting tasks for execution to improve the execution efficiency is achieved.

2. [11202105245V](#) DISTRIBUTED ROBOT SCHEDULING DECISION METHOD, APPARATUS AND SYSTEM, ELECTRONIC DEVICE AND STORAGE MEDIUM SG - 29.06.2021Int.Class [G05B 19/418](#)  Appl.No 11202105245V Applicant SYRIUS ROBOTICS CO., LTD. Inventor YANG, Zhiqin

20 PN156103 Abstract Distributed Robot Scheduling Decision Method, Apparatus and System, Electronic Device and Storage Medium Provided a robot decision The includes: task including at least one task is received, and the task pack is transmitted to other robots in swarm robots [S10]; a decision is made according to a claiming decision variable to claim a task suitable for execution in the task pack [S11]; and the task suitable for execution is executed [S12]. In such a manner, robots communicate one for transmission make decisions according to claiming decision variables to claim tasks suitable for execution in the task pack execution. a effect the robots make independently rather than in centralized decision and central control decision manners to effectively avoid a at high is and a effect intelligently selecting tasks for execution to improve the execution efficiency is achieved. Figure 1



3. 3120404 DISTRIBUTED ROBOT SCHEDULING DECISION METHOD, APPARATUS AND SYSTEM, ELECTRONIC DEVICE AND STORAGE MEDIUM CA - 28.05.2020

Int.Class [G05B 19/418](#) (?) **Appl.No** 3120404 **Applicant** SYRIUS ROBOTICS CO., LTD. **Inventor**

A distributed robot dispatch decision-making method, comprising: receiving a task package comprising at least one task and transmitting the same to other robots in a robot group [S10], determining, according to a claim decision variable, to claim a task suitable for execution in the task package [S11], and executing the task suitable for execution [S12], such that the robots in the robot group can communicate with one another and perform task transmission, and can claim, according to the claim decision variable, the task suitable for execution in the task package and execute the task, thereby enabling independent decision-making of robots in a robot group and avoiding dependence on centralized decision-making and control schemes, effectively preventing overloading of a server and enabling smart selection and execution of tasks, improving execution efficiency.

4. 3886014 ROBOT-BASED LOGISTICS ZONING PICKING METHOD, DEVICE, TERMINAL AND SYSTEM, AND STORAGE MEDIUM EP - 29.09.2021

Int.Class [G06Q 10/08](#) (?) **Appl.No** 18940536 **Applicant** SYRIUS ROBOTICS CO LTD **Inventor** WAN QI

Provided is a robot-based subarea logistics picking method, which includes that: order information of goods is acquired, the goods being arranged in a warehouse area and the order information including goods location information of the goods [S10]; picking location information, mapped by the goods location information, of a robot is acquired [S11]; and a planned path for guiding the robot is calculated according to the picking location information to guide the robot to go to a corresponding picking location to convey the goods picked by a picker to a packaging area [S12]. Therefore, an occupation rate of a warehouse space is reduced, the flexibility in planned use of the warehouse space is improved, and moreover, human-machine configuration can be implemented flexibly to meet requirements of small-batch high-frequency orders changing dramatically with peak values on subarea picking efficiency and flexibility in an electronic commerce environment.

5. 3120407 ROBOT-BASED SUBAREA LOGISTICS PICKING METHOD AND APPARATUS, TERMINAL, SYSTEM AND STORAGE MEDIUM CA - 28.05.2020

Int.Class [G06Q 10/08](#) (?) **Appl.No** 3120407 **Applicant** SYRIUS ROBOTICS CO., LTD. **Inventor**

The present invention provides a robot-based logistics zoning picking method. The method comprises: obtaining order information of goods, the goods being placed in a warehouse zone, and the order information comprising position information of the goods [S10]; obtaining picking position information of a robot mapped by the position information [S11]; calculating according to the picking position information to obtain a planned path of the guidance robot to guide same to a corresponding picking position so as to carry the goods picked by a picking person to a packing area [S12]. Therefore, not only can the warehouse space occupancy rate be reduced and the flexibility of the planning and use of the warehouse space be improved, but also the man-machine configuration can be flexibly performed, so as to meet the requirements of high efficiency and flexibility of zoning picking for orders with small batch, high frequency, and sharp change of peak value under the e-commerce environment.

6. 11202105247P ROBOT-BASED SUBAREA LOGISTICS PICKING METHOD AND APPARATUS, TERMINAL, SYSTEM AND STORAGE MEDIUM SG - 29.06.2021


Int.Class [G06Q 10/08](#) (?) **Appl.No** 11202105247P **Applicant** SYRIUS ROBOTICS CO., LTD. **Inventor** WAN, Qi



19 PN156099 Abstract Robot-based Subarea Logistics Picking Method and Apparatus, Terminal, System and Storage Medium Provided is a robot-based subarea logistics picking method, which includes that: order information of goods acquired, goods arranged a area the information including goods location information of the goods [S10]; picking location information, mapped by the goods location information, of a robot is acquired [S11]; and a planned path for guiding the robot is according the location to the to corresponding picking location to convey the goods picked by a picker to a packaging area [S12]. Therefore, an occupation rate of a warehouse space is reduced, the flexibility in planned use of the warehouse space is improved, and moreover, human-machine configuration can be implemented flexibly to meet requirements of small-batch high-frequency orders changing dramatically with peak values on subarea picking efficiency and flexibility in an electronic commerce environment. Figure 1

7. 3128101 ORDER PICKING METHOD AND DEVICE, AND STORAGE MEDIUM

CA - 06.08.2020

Int.Class G06Q 10/08  Appl.No 3128101 Applicant SYRIUS ROBOTICS CO., LTD. Inventor

The embodiments of the present invention relate to an order picking method and device, and a storage medium. The method comprises: acquiring at least one piece of order information [S101]; acquiring information of storage bins in a circulation box, wherein multiple storage bins are arranged in the circulation box [S102]; associating the order information with the information of storage bins, wherein the order information is in one-to-one correspondence with the information of storage bins [S103]; acquiring position information of all commodities, corresponding to multiple pieces of order information, in a commodity warehouse [S104]; determining an order picking path according to commodity information and the position information [S105]; and moving the circulation box in the commodity warehouse according to the order picking path in order to complete commodity picking [S106]. A robot is used as a replacement for manual order picking, and an order picker only needs to wait, beside a commodity shelf, for the robot to bring a circulation box, wherein same then picks up commodities according to the displayed commodity information and position information of the commodities to be picked, and places the commodities into a corresponding storage bin of the circulation box to complete commodity picking. Compared with the existing order picking scheme, the present application saves on time and labor, and improves the efficiency thereof.

8. 11202108244P ORDER PICKING METHOD AND DEVICE, AND STORAGE MEDIUM

SG - 30.08.2021

Int.Class G06Q 10/08  Appl.No 11202108244P Applicant SYRIUS ROBOTICS CO., LTD. Inventor YANG, Zhiqin

19 Abstract Order Picking Method and Device, and Storage Medium The embodiments of the present disclosure relate to an order picking method and device, and a storage medium. The method includes: acquiring at least one piece of order information [S101]; acquiring information of at least one storage bin in a circulation box, wherein a plurality of storage bins arranged the box associating at one of information with the information of the at least one storage bin, wherein the at least one piece of order information is in one-to-one correspondence with the information of the at least one storage bin acquiring information all corresponding the least piece of order information, in a commodity warehouse [S104]; determining an order picking path according commodity and position [S105]; moving circulation box in the commodity warehouse according to the order picking path for completing commodity [S106]. robot adopted achieve picking place a personnel, and the order picker only needs to wait, beside a commodity shelf, for the robot to bring the circulation box, then picks up commodities according to displayed commodity information and position of commodities be and the into corresponding storage bins of the circulation box to complete commodity picking. Compared with an order picking solution in the related art, the solution in the embodiments of the present disclosure saves on time and labor, and improves efficiency. Figure 1

9. 3885286 ROBOT-BASED RANDOM STORAGE METHOD AND APPARATUS, ELECTRONIC DEVICE AND STORAGE MEDIUM

EP - 29.09.2021

Int.Class B65G 1/04  Appl.No 18940569 Applicant SYRIUS ROBOTICS CO LTD Inventor WAN QI



A robot-based random warehousing method includes that: randomly allocated goods position information is acquired, and a shelving robot is controlled according to the goods position information to carry goods to goods position corresponding to the randomly allocated goods position information [S10]; a prompt is given to a picker in the vicinity of the goods position, and goods information and goods position information of the goods are synchronized to an unshelving order, wherein the prompt is used for prompting the picker in the vicinity of the goods position to take the goods and place the goods at the goods position [S11]; and order information of the unshelving order is acquired and a picking robot in the vicinity of the goods position is controlled to move to the goods position to instruct a picker in the vicinity of the goods position to pick the goods at the goods position and pass the goods to the picking robot [S12]. In such a manner, goods can be randomly shelved and placed, and the placed goods can also be connected with picking robots. Therefore, the goods can be shelved rapidly after received, goods can be shelved and picked at the same time, the goods warehousing picking efficiency is improved, and a purpose of improving the overall logistics efficiency is further achieved.

10. 3886015 ROBOT-BASED INVENTORY ORDER PICKING METHOD, APPARATUS, SYSTEM, AND ELECTRONIC DEVICE, EP - 29.09.2021 AND STORAGE MEDIUM

Int.Class G06Q 10/08  Appl.No 18940891 Applicant SYRIUS ROBOTICS CO LTD Inventor YANG ZHIQIN

A robot-based warehouse order picking method includes that: a circulation box and a robot are bound by means of acquiring box body identity information of the circulation box including at least one circulation position, wherein a tag and a goods placement mark are correspondingly arranged at the circulation position, and the box body identity information includes information of the tag and information of the goods placement mark [S10]; warehouse order information is acquired and the warehouse order information is associated with the box body identity information to obtain order binding information [S11]; and an interaction terminal of the robot is controlled according to the order binding information to display an interaction interface to instruct a picker to pick goods at a corresponding goods position and place the goods at the circulation position according to the goods placement mark [S 12]. In such a manner, a picking region is directly connected with a packaging region, and arrangement of an additional sorting region is avoided, so that not only technical effects of simplifying logistics procedures and improving the logistics efficiency are achieved, but also a purpose of reducing the logistics cost is achieved.

11. 3120401 ROBOT-BASED WAREHOUSE ORDER PICKING METHOD, APPARATUS AND SYSTEM, ELECTRONIC DEVICE, CA - 28.05.2020 AND STORAGE MEDIUM

Int.Class G06Q 10/08  Appl.No 3120401 Applicant SYRIUS ROBOTICS CO., LTD. Inventor

A robot-based inventory order picking method, comprising: binding a turnover box with a robot by means of acquiring box identity information of a turnover box having at least one turnover position, the turnover position being correspondingly provided thereon with a label and a release mark, and the box identity information comprising information of the label and information of the release mark [S10]; acquiring inventory order information and associating same with the box identity information to obtain order binding information [S11]; and controlling an interactive end of the robot according to the order binding information to display an interactive interface, and instructing goods picking personnel to pick goods at a corresponding goods location and place the goods at the turnover position according to the release mark [S12] so that a picking zone directly docks to a packing zone without additionally disposing a sorting zone, thereby simplifying the logistics process, improving the technical effect of logistics efficiency, and reducing the costs of logistics.

12. 11202105210Y ROBOT-BASED WAREHOUSE ORDER PICKING METHOD, APPARATUS AND SYSTEM, ELECTRONIC DEVICE, AND STORAGE MEDIUM SG - 29.06.2021

Int.Class G06Q 10/08  Appl.No 11202105210Y Applicant SYRIUS ROBOTICS CO., LTD. Inventor YANG, Zhiqin



18 Abstract Robot-based Warehouse Order Picking Method, Apparatus and System, Electronic Device, and Storage Medium A robot-based warehouse order picking method includes that: a circulation box and a robot are bound by means of acquiring box body identity information of the circulation box including at least one circulation position, wherein a tag and a goods placement mark are correspondingly arranged at the circulation position, and the box body identity information includes information of the tag and information of the goods placement mark [S10]; warehouse order information is acquired and the warehouse order information is associated with the box body identity information to obtain order binding information [S11]; and an interaction terminal of the robot is controlled according to the order binding information to display an interaction interface to instruct a picker to pick goods at a corresponding goods position and place the goods at the circulation position according to the goods placement mark [S12]. In such a manner, a picking region is directly connected with a packaging region, and arrangement of an additional sorting region is avoided, so that not only technical effects of simplifying logistics procedures and improving the logistics efficiency are achieved, but also a purpose of reducing the logistics cost is achieved. Figure 2

13. 11202105188T ROBOT-BASED RANDOM WAREHOUSING METHOD AND APPARATUS, ELECTRONIC DEVICE, AND STORAGE MEDIUM SG - 29.06.2021

Int.Class B65G 1/04 (?) **Appl.No** 11202105188T **Applicant** SYRIUS ROBOTICS CO., LTD. **Inventor** WAN, Qi

17 Abstract Robot-based Random Warehousing Method and Apparatus, Electronic Device, and Storage Medium A robot-based random warehousing method includes that: randomly allocated goods position information is acquired, and a shelving robot is controlled according to the goods position information to carry goods to goods position corresponding to the randomly allocated goods position information [S10]; a prompt is given to a picker in the vicinity of the goods position, and goods information and goods position information of the goods are synchronized to an unshelving order, wherein the prompt is used for prompting the picker in the vicinity of the goods position to take the goods and place the goods at the goods position [S11]; and order information of the unshelving order is acquired and a picking robot in the vicinity of the goods position is controlled to move to the goods position to instruct a picker in the vicinity of the goods position to pick the goods at the goods position and pass the goods to the picking robot [S12]. In such a manner, goods can be randomly shelved and placed, and the placed goods can also be connected with picking robots. Therefore, the goods can be shelved rapidly after received, goods can be shelved and picked at the same time, the goods warehousing picking efficiency is improved, and a purpose of improving the overall logistics efficiency is further achieved. Figure 2

14. 3120198 ROBOT-BASED RANDOM STORAGE METHOD AND APPARATUS, ELECTRONIC DEVICE AND STORAGE MEDIUM CA - 28.05.2020

Int.Class B65G 1/04 (?) **Appl.No** 3120198 **Applicant** SYRIUS ROBOTICS CO., LTD. **Inventor**

Disclosed is a robot-based random storage method, comprising: acquiring goods position information which is randomly allocated, and controlling, according to the goods position information, a robot for putting goods on shelves to carry goods to a corresponding goods position [S10]; prompting goods-picking personnel nearby the goods position to take away the goods and place same at the goods position, and synchronizing goods information of the goods and the goods position information to an off-shelf order [S11]; and acquiring order information of the off-shelf order, so as to control a goods-picking robot nearby the goods position to head for the goods position to instruct the goods-picking personnel nearby the goods position to take away the goods on the goods position and give same to the goods-picking robot [S12]. According to the method, goods can be randomly placed on shelves, and the placed goods can also be associated with and attach with the goods-picking robot, so that goods are quickly put on the shelves after being received, and putting the goods on shelves and picking the goods are simultaneously carried out, thereby improving goods storage and picking efficiency, and achieving the purpose of improving the overall logistics efficiency.



15. 3120403 ROBOT SENSOR ARRANGEMENT SYSTEM

Int.Class B25J 9/16 (?) Appl.No 3120403 Applicant SYRIUS ROBOTICS CO., LTD. Inventor

A robot sensor arrangement system. At least one sensor assembly is arranged on a robot body [20], and the sensor assembly comprises image sensors [1001, 1002] and a first inertial sensor [1007]. Positions of the image sensors [1001, 1002] relative to the first inertial sensor [1007] are determined such that the image sensors and the first inertial sensor [1007] will not move as external physical conditions, such as vibration and temperature, change. An included angle between the positions of the image sensors [1001, 1002] and a vertical axis is in a first angular range so as to ensure the robot can autonomously sense the surrounding environment to improve the capability of autonomous obstacle avoidance and the robustness of a robotic system.

16. 11202105248Q ROBOT SENSOR ARRANGEMENT SYSTEM

SG - 29.06.2021

Int.Class B25J 9/16 (?) Appl.No 11202105248Q Applicant SYRIUS ROBOTICS CO., LTD. Inventor YANG, Zhiqin

15 PN156107 Abstract ROBOT SENSOR ARRANGEMENT SYSTEM A sensor system. least sensor is arranged on a robot body [20], wherein the sensor assembly comprises image sensors [1001, 1002] and a first inertial sensor [1007], and the positions of the image sensors [1001, 1002] relative to the first inertial sensor [1007] are fixed such that the image sensors and the first inertial sensor [1007] do not move as external conditions, as and change. included angle between the positions of the image sensors [1001, 1002] and a vertical axis is in a first angle range so as to ensure the robot can autonomously sense surrounding to the of obstacle avoidance and the robustness of a robot system. Figure 1

17. 3885077 ROBOT SENSOR ARRANGEMENT SYSTEM

EP - 29.09.2021

Int.Class B25J 9/16 (?) Appl.No 18940501 Applicant SYRIUS ROBOTICS CO LTD Inventor YANG ZHIQIN

A robot sensor arrangement system. At least one sensor assembly is arranged on a robot body [20], wherein the sensor assembly comprises image sensors [1001, 1002] and a first inertial sensor [1007], and the positions of the image sensors [1001, 1002] relative to the first inertial sensor [1007] are fixed such that the image sensors and the first inertial sensor [1007] do not move as external physical conditions, such as vibration and temperature change. The included angle between the positions of the image sensors [1001, 1002] and a vertical axis is in a first angle range so as to ensure the robot can autonomously sense the surrounding environment to improve the capability of autonomous obstacle avoidance and the robustness of a robot system.

18. WO/2021/068699 ROBOT CONTROL METHOD, ELECTRONIC APPARATUS, AND COMPUTER READABLE STORAGE MEDIUM

WO - 15.04.2021

Int.Class B25J 9/16 (?) Appl.No PCT/CN2020/114017 Applicant SYRIUS ROBOTICS CO., LTD Inventor YANG, Zhiqin

The present application provides a robot control method, applicable to a first robot. The method comprises: controlling, in response to a local communication event, information of a local communication request to be sent to a second robot [S110]; receiving communication response information fed back by the second robot according to the local communication request [S120]; and determining that the communication response information meets a communication requirement condition, and controlling the first robot and the second robot to establish local dynamic communications [S130], wherein the communication requirement condition is a condition determined according to operation environment information of the first robot. The present application further provides an electronic apparatus and a computer readable storage medium. The implementation manner above enables a robot to quickly establish local dynamic communications related to an operation task and share information with another robot during an operation running process, thereby effectively reducing delay, accelerating transmission, and improving overall information sharing efficiency of robots.



19. WO/2021/129345 SCENE MAP BUILDING METHOD, DEVICE, AND STORAGE MEDIUM

WO - 01.07.2021

Int.Class G01C 21/32 (?) Appl.No PCT/CN2020/133735 Applicant SYRIUS ROBOTICS CO., LTD. Inventor GAO, Bo

A scene map building method, an electronic device [1] and a storage medium. The method comprises: collecting, by using a robot, a corresponding current image in a scene of a map to be built, identifying coordinates respectively corresponding to four corners of a preset picture present in the collected current image, and also recording a current pose of the robot [S10]; acquiring three-dimensional coordinates, under a scene map coordinate system, of the four corners of the preset picture according to the identified coordinates respectively corresponding to the four corners of the preset picture [S20]; when the robot collects the preset picture again, calculating current coordinates of the robot according to the acquired three-dimensional coordinates of the preset picture, and obtaining current position information of the robot according to the current coordinates of the robot [S30]; and taking the acquired current position information of the robot as closed-loop information for building a scene map, and building the scene map with reference to the closed-loop information and the acquired three-dimensional coordinates corresponding to the four corners of the preset picture [S40]. The accuracy of a closed loop and the map building precision of a scene map are improved.

20. WO/2020/259170 ROBOT POWER SUPPLY SYSTEM AND ROBOT

WO - 30.12.2020

Int.Class H02J 7/00 (?) Appl.No PCT/CN2020/092165 Applicant SYRIUS ROBOTICS CO., LTD. Inventor GUO, Weiwei

The present application discloses a robot power supply system and a robot. The robot power supply system comprises an adapter, a battery, a first switch, a second switch, a third switch and a microcontroller. A power supply port of the adapter is connected to a charging port of the battery by means of the first switch, the power supply port of the adapter is further connected to the robot by means of the second switch, and a discharging port of the battery is connected to the robot by means of the third switch. Control ends of the first switch, the second switch and the third switch are connected to the microcontroller, and the microcontroller is configured to control the first switch, the second switch and the third switch to be turned on or turned off. In the present application, the first switch, the second switch and the third switch are controlled to be turned on or turned off by the microcontroller, so that the robot is powered by means of the battery in a normal operating state, and is powered by means of the adapter in a maintenance state, thereby ensuring the normal operation of the robot, and guaranteeing that the robot can perform self-inspection and fault inspection.

21. WO/2021/139819 METHOD FOR DYNAMIC SELECTION OF NETWORK CONNECTION POINT, DEVICE, AND STORAGE MEDIUM

WO - 15.07.2021

Int.Class H04W 48/16 (?) Appl.No PCT/CN2021/071983 Applicant SYRIUS ROBOTICS CO., LTD Inventor WANG, Xiangyu

Disclosed in the present invention are a method for the dynamic selection of a network connection point, a device, and a storage medium; the method comprises: a robot obtains a network quality map; when the robot needs to connect to a network, according to the network quality map, a network communication point that allows for communication is selected and the robot goes to the selected network communication point; at the selected network communication point, the robot attempts to form a communication connection with a server, and it is determined whether the communication connection with the server succeeded; the robot executes a corresponding operation according to a determination result for whether the communication connection with the server succeeded. The present method allows for a robot within an area of operation only needing local network signal strength to be able to connect to a server, saving network deployment costs.



22. WO/2021/129346 METHOD AND DEVICE FOR ROBOT TO AUTONOMOUSLY MANAGE EXECUTION CAPABILITY, AND STORAGE MEDIUM WO - 01.07.2021

Int.Class G05D 3/12 (?) **Appl.No** PCT/CN2020/133742 **Applicant** SYRIUS ROBOTICS CO., LTD **Inventor** YANG, Zhiqin

A method and device for a robot to autonomously manage an execution capability, and a storage medium. The method comprises: a robot acquiring a working task to be executed, and acquiring an initial state and a completion state of the working task, and state information of the robot itself [S10]; according to the initial state and the completion state of the working task and in combination with the state information of the robot itself, calculating an execution plan corresponding to the working task [S20]; and executing the working task according to the execution plan obtained by means of calculation [S30]. The aim of enabling, by means of an operational capability of a robot, the robot to autonomously manage an execution capability thereof is achieved, the operating efficiency of the robot is improved, the cost is saved, and moreover, the robot is smarter and more flexible.

23. 112146662 GUIDED MAPPING METHOD AND DEVICE AND COMPUTER READABLE STORAGE MEDIUM CN - 29.12.2020

Int.Class G01C 21/20 (?) **Appl.No** 202011049140.X **Applicant** SYRIUS ROBOTICS (SHENZHEN) CO., LTD. **Inventor** YANG ZHIQIN

The invention discloses a guided mapping method and device and a computer readable storage medium. The method comprises the steps that a to-be-mapped region is divided into a plurality of circulation subareas, and the circulation paths of the plurality of circulation subareas are marked through ground identification; then, in the ground identification, color identification used for indicating the adjacent circulation subareas, arrow identification used for determining the moving direction in the circulation paths and circulation closing points used for determining the circulation paths are determined; and finally, a mapping robot is pushed to advance along the arrow identification in the circulation path of the same color identification by taking the circulation closing points as driving starting points and driving ending points of a mapping robot until the mapping operation of the circulation subareas is completed. According to the method, a low-difficulty robot-assisted mapping guide scheme is realized, the accuracy and availability of a mapping result are improved, the mapping cost is reduced, and the production efficiency is improved.

24. WO/2021/203852 ROBOT MAPPING METHOD AND DEVICE, AND STORAGE MEDIUM WO - 14.10.2021

Int.Class G05D 1/02 (?) **Appl.No** PCT/CN2021/077345 **Applicant** SYRIUS ROBOTICS CO., LTD **Inventor** YANG, Zhiqin

Disclosed are a robot mapping method and device, and a storage medium. The method comprises: a robot management system receiving waypoints inputted by a robot and recorded by the robot during the travelling and mapping process of the robot, and numbering, according to the travelling sequence of the robot, the waypoints inputted by the robot [S10]; when the robot completely travels through all drivable passages, sequentially connecting adjacent waypoints according to the sequence of serial numbers corresponding to the waypoints, so as to obtain a preliminary path corresponding to a topological map [S20]; and optimizing, according to a pre-set optimization rule, the waypoints and the preliminary path to obtain a corresponding topological map [S30]. The aim of automatically inputting waypoints and paths in batches is achieved, the labor cost and the time cost of topological map inputting are reduced, and the error rate is reduced.

25. WO/2021/104412 CLUSTER ROBOT SCHEDULING METHOD, APPARATUS, SYSTEM AND DEVICE, AND COMPUTER READABLE STORAGE MEDIUM WO - 03.06.2021

Int.Class G06Q 10/04 (?) **Appl.No** PCT/CN2020/132025 **Applicant** SYRIUS ROBOTICS CO., LTD **Inventor** ZHENG, Xiaokun



A cluster robot scheduling method, apparatus, system and device, and a computer readable storage medium. The method comprises: receive and decompose a task issued by a server, and obtain an execution demand [S1]; each robot obtains a static attribute and a dynamic attribute of the robot, and inputs the static attribute, the dynamic attribute and the execution demand to an evaluation model of the robot to obtain a capability evaluation score of each robot for executing the task [S2]; and upload the capability evaluation score to the server, and receive a task allocation instruction generated by the server according to the capability evaluation score [S3]. A cluster robot scheduling solution having high timeliness and accuracy is realized, task scheduling is more reasonable, task execution time is saved, and the overall health degree of a robot is improved.

26. WO/2020/259168 TASK SCHEDULING METHOD, APPARATUS AND SYSTEM, ELECTRONIC DEVICE AND STORAGE WO - 30.12.2020
MEDIUM

Int.Class B25J 9/16 (?) Appl.No PCT/CN2020/092163 Applicant SYRIUS ROBOTICS CO., LTD. Inventor LIU, Junbin

A task scheduling method, apparatus and system, an electronic device and a storage medium, the method comprising: acquiring a sample task record, the sample task record comprising sample task information, and robot information, personnel information and sample environment information which correspond to the sample task information, the robot information comprising robot position information, and the personnel information comprising personnel position information; according to the sample task record, analyzing a variable corresponding to a task scheduling scheme which meets preset optimal conditions; and establishing a correspondence between the variable and a task planning scheme so as to obtain a scheduling model. By means of the described method, a robot executes tasks on the basis of a scheduling scheme planned by a scheduling center, which may increase task execution efficiency and shorten the task execution time.

27. WO/2020/103680 DATA COMMUNICATION METHOD, AND HUMAN-MACHINE INTERACTION SYSTEM WO - 28.05.2020

Int.Class H04L 29/06 (?) Appl.No PCT/CN2019/115261 Applicant SYRIUS ROBOTICS CO., LTD. Inventor XIAO, Yuke

A human-machine interaction system and a data communication method for the same. The human-machine interaction system comprises: a smart terminal apparatus for user interaction; and a main robot control apparatus controlling operations of one or more robots and connected to the smart terminal apparatus via a USB interface. In an AOA mode, the main robot control apparatus is switched to be a master apparatus side, and the smart terminal apparatus is switched to be a slave apparatus side, thereby forming a bi-directional data transmission channel, and uplink data from the smart terminal apparatus and downlink data from the main robot control apparatus are packaged in a pre-determined protocol format and transmitted on the data transmission channel. The invention enables a user to use a smart mobile terminal to interact with the main robot control apparatus conveniently, achieves direct and visible control, and is easy to use, thereby having a superior application potential.

28. WO/2021/068701 LASER MAP UPDATE METHOD, ROBOT, AND SWARM ROBOTICS SYSTEM WO - 15.04.2021

Int.Class G01C 21/00 (?) Appl.No PCT/CN2020/114058 Applicant SYRIUS ROBOTICS CO., LTD Inventor LIU, Junbin

A laser map update method, a robot, and a swarm robotics system. The method comprises: determining, according to a result of combining a laser point cloud and a map laser point cloud, a point cloud for performing updating, wherein the map laser point cloud is a group of multiple point clouds having a specific relationship with the laser point cloud [10]; updating a laser map using information of the point cloud for performing updating [20]; and if a difference obtained by comparing the updated laser map against an original map exceeds a preset first threshold, discarding the updated laser map, and if not, keeping the updated laser map [30]. The method ensures that rotation, translation, and scaling differences are not present between the updated map and the map before the update, thus enabling the normal operation of upper-level business logic.



29. WO/2021/104415 ROBOT AUTONOMOUS EXPLORATION MAPPING METHOD, DEVICE AND STORAGE MEDIUM

WO - 03.06.2021

Int.Class G01C 21/20 (?) Appl.No PCT/CN2020/132033 Applicant SYRIUS ROBOTICS CO., LTD Inventor ZHANG, Miling

Provided are a robot autonomous exploration mapping method, a device and a storage medium, wherein the method comprises: acquiring environment data collected by a sensor, building an SLAM algorithm through synchronous positioning and a map, identifying an area to be accessed on a currently estimated SLAM initial environment map [S10]; regarding the identified access area, performing path planning based on an active exploration mode, and selecting an exploration path from planned paths according to a principle of highest utility, executing a path exploration operation [S20]; establishing an environment map corresponding to autonomous exploration according to a path exploration result [S30]; the purpose of selecting the moving path through autonomous exploration of the robot and establishing the environment map, the positioning uncertainty caused by purely utilizing the SLAM algorithm is reduced, the construction quality and the construction efficiency of the environment map are improved, and the autonomy of the robot is further enhanced.

30. WO/2020/156147 CHARGING SOCKET CONNECTION STRUCTURE, CHARGING PILE, ROBOT, AND AUTOMATIC CHARGING SYSTEM THEREOF

WO - 06.08.2020

Int.Class H01R 13/631 (?) Appl.No PCT/CN2020/072021 Applicant SYRIUS ROBOTICS CO., LTD. Inventor SU, WenLi

Disclosed in the present invention are a charging socket connection structure, a charging pile, a robot, and an automatic charging system thereof. A structure [110] comprises a supporting base [111], a flexible platen [112], and a socket panel [113] arranged on the flexible platen [112]; the flexible platen [112] is mounted on the supporting base [111] by means of a plurality of elastic pieces that are evenly distributed in a circumferential direction, and the flexible platen [112] forms elastic displacement in the circumferential direction perpendicular to the socket direction; the socket panel [113] is provided with a socket [1132]; and the socket [1132] is provided with a plurality of female joint through holes [1133]. According to the structure, the flexible platen [112] is arranged, 360-degree circumferential stable limitation is formed on the plane perpendicular to the socket direction by using the elastic piece, the allowance of a butt joint error can be increased by means of the flexible platen [112], the difficulty of automatic alignment is lowered, and the practicability and adaptability of the automatic charging system are remarkably improved.

31. WO/2020/103298 DISTRIBUTED ROBOT DISPATCH DECISION-MAKING METHOD, DEVICE AND SYSTEM, ELECTRONIC DEVICE AND STORAGE MEDIUM

WO - 28.05.2020

Int.Class G05B 19/418 (?) Appl.No PCT/CN2018/125150 Applicant SYRIUS ROBOTICS CO., LTD. Inventor YANG, Zhiqin

A distributed robot dispatch decision-making method, comprising: receiving a task package comprising at least one task and transmitting the same to other robots in a robot group [S10], determining, according to a claim decision variable, to claim a task suitable for execution in the task package [S11], and executing the task suitable for execution [S12], such that the robots in the robot group can communicate with one another and perform task transmission, and can claim, according to the claim decision variable, the task suitable for execution in the task package and execute the task, thereby enabling independent decision-making of robots in a robot group and avoiding dependence on centralized decision-making and control schemes, effectively preventing overloading of a server and enabling smart selection and execution of tasks, improving execution efficiency.

32. WO/2021/135813 ROBOT JOINT MAPPING METHOD AND DEVICE, AND COMPUTER-READABLE STORAGE MEDIUM

WO - 08.07.2021

Int.Class G05D 1/02 (?) Appl.No PCT/CN2020/133753 Applicant SYRIUS ROBOTICS CO., LTD. Inventor CHEN, Shiyu



A robot joint mapping method and device, and a computer-readable storage medium. The robot joint mapping method comprises: obtaining a mapping segmentation line according to a logic area feature and/or a functional feature of a mapping area, and segmenting the mapping area into a plurality of sub-images by means of the mapping segmentation line [S1]; expanding the mapping segmentation line to form seam areas between the sub-images, and at the same time, carrying out mapping on the sub-images to generate sub-image maps [S2]; and identifying localization identifiers of the seam areas, and combining the sub-image maps according to the localization identifiers to generate a full map of the mapping area [S3]. A more efficient and more accurate multi-robot joint mapping scheme is realized, a mapping flow is optimized, and the collaboration between all robots in a mapping process is improved.

33. WO/2020/259167 ROBOT PATH UPDATING METHOD, ELECTRONIC DEVICE AND COMPUTER-READABLE STORAGE MEDIUM WO - 30.12.2020

Int.Class B25J 9/16 (?) Appl.No PCT/CN2020/092162 Applicant SYRIUS ROBOTICS CO., LTD. Inventor ZHENG, Xiaokun

A robot path updating method, which is applied to a first robot and comprises: according to initial place information, determining an initial path to control a first robot to work; acquiring place updating information, and optimizing the initial path according to the place updating information to obtain an optimized path, wherein the place updating information is shared information of a second robot, and the second robot is configured to move according to a corresponding moving path and may obtain current scene information; and controlling the first robot to work according to the optimized path. By means of the described means, the first robot may learn in advance about abnormal information that may be present in the initial path, and determine an optimized path capable of avoiding the abnormal information, so as to save the time wasted in the prior art due to reporting abnormal information only after encountering same and waiting for processing results after reporting, which thereby increases the working efficiency. A robot path updating method, an electronic device and a computer-readable storage medium are also related to.

34. WO/2020/211565 RAPID WAREHOUSE CONFIGURATION METHOD, APPARATUS, AND STORAGE MEDIUM WO - 22.10.2020

Int.Class G06Q 10/08 (?) Appl.No PCT/CN2020/078047 Applicant SYRIUS ROBOTICS CO., LTD. Inventor YANG, Zhiqin

A rapid warehouse configuration method, comprising: after obtaining warehouse information of a warehouse, determining rack layout information in the warehouse according to the warehouse information and preconfigured warehouse deployment rules [S101]; after arranging multiple sets of racks in the warehouse according to the rack layout information, using a robot to draw a depositary map in the warehouse [S102]; and establishing a correspondence between preconfigured depositary place identifications of depositary places and each depositary place in the depositary map [S103]. The method can implement the rapid deployment of racks in a warehouse; and after the racks are deployed, a depositary map can be drawn quickly. After the deployment of the warehouse, it is only needed to put goods into depositary places of the racks, and then the depositary map and the correspondence between depositary place identifications and depositary places are used to complete robot picking; and a surge in demand for goods from e-commerce companies during an event can be rapidly responded. Furthermore, the present invention further relates to an apparatus and a storage medium.

35. 212391223 DRIVING WHEEL DETECTION MODULE AND ASSEMBLY DETECTION PLATFORM COMPRISING DETECTION MODULE CN - 22.01.2021

Int.Class G01M 99/00 (?) Appl.No 202021543335.5 Applicant SYRIUS ROBOTICS (SHENZHEN) CO., LTD. Inventor YANG ZHIQIN

The utility model discloses a driving wheel detection module and an assembly detection platform comprising the same, and belongs to the technical field of automatic mobile robots. The driving wheel detection module comprises a main body support, a first testing module and a second testing module, the first testing module is installed on the main body support and used for detecting the braking function of a driving wheel, the second testing module is used for detecting the rotating speed and positive and negative rotation of the driving wheel, and the first testing module comprises a first friction wheel and a torque



motor which can drive the first friction wheel to rotate. The second test module comprises a second friction wheel and a rotary encoder; the rotary encoder is connected with the second friction wheel; the assembly detection platform comprises a driving wheel assembly position and a driving wheel detection module installed at the driving wheel assembly position or the next station of the driving wheel assembly position. The assembly detection platform provided by the utility model can be used for detecting the quality of the driving wheel in the production process, so that the problems can be checked more quickly and timely, and the time and the labor are saved.

36. WO/2021/139727 SOFTWARE UPGRADE METHOD FOR ROBOT, AND UPGRADE SERVER, ROBOT AND STORAGE MEDIUM WO - 15.07.2021

Int.Class G06F 8/65 (?) **Appl.No** PCT/CN2021/070669 **Applicant** SYRIUS ROBOTICS CO., LTD **Inventor** YANG, Zhiqin

A software upgrade method for a robot, and an upgrade server, a robot and a storage medium. The method comprises: when a preset software upgrade trigger condition is detected, sending a robot all-platform application software upgrade package of the latest version in an upgrade server to an application program construction server of a client, such that the construction server constructs a client APK according to the all-platform application software upgrade package [S201]; if the client APK returned by the application program construction server of the client is received within a preset period of time, according to the client APK and the all-platform application software upgrade package, generating a complete package for robot upgrade, and sending the complete package to a robot, such that the robot performs software upgrade according to the complete package [S202]; and/or, terminating a software upgrade flow of the robot if the client APK returned by the construction server of the client is not received within the preset period of time [S203]. A robot all-platform and client software can be simultaneously upgraded, thereby improving the robot software upgrade efficiency, and saving on labor costs.

37. WO/2021/129344 TASK EXECUTION METHOD FOR ROBOTS CAPABLE OF FORMING AD HOC NETWORK, APPARATUS, AND STORAGE MEDIUM WO - 01.07.2021

Int.Class G05B 19/418 (?) **Appl.No** PCT/CN2020/133720 **Applicant** SYRIUS ROBOTICS CO., LTD **Inventor** YANG, Zhiqin

A task execution method for robots capable of forming an ad hoc network, an apparatus, and a storage medium. The method comprises: a server partitioning an entire region of a warehouse to obtain local regions corresponding to the partitioned warehouse [S10]; receiving self-capability feature information reported by robots moving freely within a current warehouse range after the robots come online [S20]; determining, according to the self-capability feature information reported by the robots, a local center robot, and assigning a corresponding task to be executed to a local region obtained via the partitioning, such that the robots forming an ad hoc local network execute the task [S30]; and after the robots have completed the execution of the task, receiving task completion information reported by the robots, and releasing the robots that have reported the task completion information to be free moving robots [S40]. In this way, the invention enables robots distributed at different locations in a warehouse to have a highly efficient operation state, and improves overall task execution efficiency without additional costs.

38. WO/2020/215901 PATH PLANNING METHOD, ELECTRONIC DEVICE, ROBOT AND COMPUTER-READABLE STORAGE MEDIUM WO - 29.10.2020

Int.Class G01C 21/34 (?) **Appl.No** PCT/CN2020/078040 **Applicant** SYRIUS ROBOTICS CO., LTD. **Inventor** CHEN, Shiyu

Provided are a path planning method, an electronic device, a robot and a computer-readable storage medium. The method comprises the following steps: acquiring a navigation path for an electronic device to move from the current location to a target location [S101]; during the process of the electronic device moving according to the navigation path, acquiring, in real time, image information of the environment where the electronic device is located [S102];



detecting, according to the image information, whether the electronic device meets a path update condition [S103]; and when it is detected that the electronic device meets the path update condition, adjusting the navigation path [S104]. During the travel process of a robot, a navigation path for the robot is adjusted according to image information of the surrounding environment of the robot, positioning information of the robot and dynamic obstacles, such that the navigation path for the robot is adjusted in time, thereby preventing collisions between the robot and the dynamic obstacles during the travel process, so that the robot can move to a target location efficiently and safely, and the service life of the robot can be prolonged.

39. WO/2020/259166 TASK EXECUTION METHOD, ROBOT, SCHEDULING SYSTEM, ELECTRONIC DEVICE AND STORAGE MEDIUM WO - 30.12.2020

Int.Class B25J 9/16 (?) Appl.No PCT/CN2020/092152 Applicant SYRIUS ROBOTICS CO., LTD. Inventor HUANG, Hua

A task execution method, a robot, a scheduling system, an electronic device and a storage medium, the method comprising: acquiring first task information and a first scheduling plan, the first scheduling plan being generated according to task information and comprising an instruction required to complete a first task [S11]; performing an operation according to the first scheduling plan [S12]; when the occurrence of a preset event is monitored, generating a second scheduling plan according to the preset event, the first task information and task progress information [S13]; and performing an operation according to the second scheduling plan [S14]. The robot may generate a scheduling plan by itself to complete a task without needing to communicate with a dispatching center. In the foregoing manner, the robot may continuously work in complex scenarios, thereby improving the scheduling stability of the robot.

40. WO/2020/062688 CIRCULATION BOX TRACKING SYSTEM, METHOD AND APPARATUS BASED ON WALKING ROBOT, AND TERMINAL AND STORAGE MEDIUM WO - 02.04.2020

Int.Class G06Q 10/08 (?) Appl.No PCT/CN2018/125217 Applicant SYRIUS ROBOTICS CO., LTD. Inventor WAN, Qi

A circulation box tracking system based on a walking robot. Providing a walking robot [10] for walking in a logistics warehouse to transport circulation boxes, then providing a recognizer [20] and enabling the recognizer [20] to recognize labels of the circulation boxes so as to generate circulation box identity information and send same, then configuring a user side [30], enabling the user side [30] to acquire the circulation box identity information and packaging the circulation box identity information and preset robot identity information to generate a binding request message and then send same, and then configuring a cloud [40] to receive the binding request message, performing pairing determination on the circulation box identity information and registered circulation box information and feeding back a binding success result to the user side [30] after binding paired circulation box identity information to the robot identity information not only realize the transparency of a transport state of a circulation box and achieve the effect of monitoring an update state of goods in the circulation box in real time, but also realize that a walking robot transports the circulation box, thereby improving transport efficiency.

41. 212258677 ROBOT CN - 29.12.2020

Int.Class H02K 7/106 (?) Appl.No 202021076006.4 Applicant SYRIUS ROBOTICS (SHENZHEN) CO., LTD. Inventor SU WENLI

The utility model discloses a robot and belongs to the technical field of robots. The robot comprises a hub motor and a brake combination, the brake combination comprises an electromagnetic brake anda standby battery, the standby battery can supply power to the electromagnetic brake, and the electromagnetic brake is installed on the hub motor. If the robot needs to be pushed to move, power is supplied to the electromagnetic brake through the standby battery, after the electromagnetic brake is powered on, the electromagnetic brake loosens the hub motor, the robot can be pushed to move, power supply is cut off again after the robot arrives at the destination, and the electromagnetic brake returns to the brake state again; according to the robot, through the arrangement of the standby battery, the requirement that a cart is needed under the condition that a main power source cannot be used or no battery exists is well met.



42. WO/2021/129347 AUXILIARY POSITIONING COLUMN AND NAVIGATION ASSISTANCE SYSTEM OF SELF-TRAVELING ROBOT WO - 01.07.2021

Int.Class G01S 7/48 (?) **Appl.No** PCT/CN2020/133747 **Applicant** SYRIUS ROBOTICS CO., LTD **Inventor** YANG, Zhiqin

An auxiliary positioning column [1] and a navigation assistance system of a self-traveling robot [2]. The auxiliary positioning column [1] is vertically provided on a support object. Multiple contour feature parts [11] used for increasing the degree of navigation radar recognition are provided on a column body of the positioning column [1]. The contour feature parts [11] respectively face different directions. When a laser radar [21] on the robot [2] scans the contour of the positioning column [1], recognition speed and recognition rate can be increased; hence, the robot [2] itself can be accurately positioned by comparing with a corresponding obstacle contour in navigation data on the basis of a recognition result. Because the auxiliary positioning column [1] is provided with the contour feature parts [11] facing multiple directions for increasing the degree of navigation radar recognition, a positioning reference can be provided to the robot [2] in any direction.

43. WO/2020/103299 ROBOT-BASED LOGISTICS ZONING PICKING METHOD, DEVICE, TERMINAL AND SYSTEM, AND STORAGE MEDIUM WO - 28.05.2020

Int.Class G06Q 10/08 (?) **Appl.No** PCT/CN2018/125156 **Applicant** SYRIUS ROBOTICS CO., LTD. **Inventor** WAN, Qi

The present invention provides a robot-based logistics zoning picking method. The method comprises: obtaining order information of goods, the goods being placed in a warehouse zone, and the order information comprising position information of the goods [S10]; obtaining picking position information of a robot mapped by the position information [S11]; calculating according to the picking position information to obtain a planned path of the guidance robot to guide same to a corresponding picking position so as to carry the goods picked by a picking person to a packing area [S12]. Therefore, not only can the warehouse space occupancy rate be reduced and the flexibility of the planning and use of the warehouse space be improved, but also the man-machine configuration can be flexibly performed, so as to meet the requirements of high efficiency and flexibility of zoning picking for orders with small batch, high frequency, and sharp change of peak value under the e-commerce environment.

44. 112256044 METHOD FOR REDUCING MAN-MACHINE INTERACTION WAITING TIME, EQUIPMENT AND STORAGE MEDIUM CN - 22.01.2021

Int.Class G05D 1/02 (?) **Appl.No** 202011537863.4 **Applicant** SYRIUS ROBOTICS (SHENZHEN) CO., LTD. **Inventor** HUANG HUA

The invention discloses a method for reducing man-machine interaction waiting time, equipment and a storage medium. The method comprises the steps: obtaining a to-be-executed task through a robot, planning an optimal navigation path according to the task place of the to-be-executed task, and going to a first position to execute a corresponding task according to the planned optimal navigation path; judging whether a worker capable of performing man-machine cooperation exists in the first position or not; if the workers capable of performing man-machine cooperation exist in the first position, the robot sending prompt information and waiting for the cooperation of the workers in the first position to complete a task corresponding to the first position; if the worker capable of performing man-machine cooperation does not exist in the first position, the robot going to the next place according to the optimal navigation path. The man-machine interaction waiting time between workers and the robot is shortened, and the working efficiency of man-machine interaction is effectively improved.



**45. 2020087420 DISPERSED ROBOT SCHEDULING DETERMINATION METHOD, DEVICE, SYSTEM, AND ELECTRONIC
DEVICE AND STORAGE DEVICE**

JP - 06.04.2020

Int.Class G05D 1/02 (?) **Appl.No** 2019107161 **Applicant** SYRIUS ROBOTICS CO LTD **Inventor** YANG ZHIQIN

PROBLEM TO BE SOLVED: To provide a dispersed robot scheduling determination method which permits a cluster robot to make independent determination, which realizes technical effect of effectively preventing a server from being likely to have excessive load without depending on concentrated determination and a centrally controlled determination method, which selects and executes intelligent for a task, and which realizes technical effect of improving execution efficiency.

SOLUTION: A dispersed robot scheduling determination method includes: receiving a task packet including at least one task and transferring the task packet to another robot in a cluster robot [S10]; further determining a task suitable for execution in the task packet received based on a reception determination variable [S11]; and further executing the task suitable for the execution [S12], whereby the cluster robot makes mutual communication to transfer the task and also determines and executes the task suitable for the execution in the task packet received based on the reception determination variable.

SELECTED DRAWING: Figure 1

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46. 2020172400 WAREHOUSE HIGH SPEED ARRANGEMENT METHOD, MACHINE AND MEMORY MEDIUM

JP - 07.08.2020

Int.Class B65G 1/00 (?) **Appl.No** 2020072112 **Applicant** SYRIUS ROBOTICS CO LTD **Inventor** YANG ZHIQIN

PROBLEM TO BE SOLVED: To complete picking by a robot using correspondence relation between a storage space mark of a warehouse storage map and a storage space only by arranging cargo shelves in the warehouse at a high speed, creating the warehouse storage map at a high speed, and placing commodities in the storage spaces of the cargo shelves, which enables addressing surging demand of commodities by an electronic commerce enterprise during an event.

SOLUTION: A method is related to a machine and a memory medium including: a step [S101] of determining cargo shelf layout information of a warehouse in accordance with warehouse information and pre-set warehouse arrangement rules after obtaining the warehouse information of the warehouse; a step [S102] of creating a warehouse storage map in the warehouse using a robot after installing a plurality of sets of cargo shelves in the warehouse in accordance with the cargo shelf layout information; and a step [S103] of establishing correspondence relation between a pre-set storage space mark in a storage space and the respective storage spaces in the warehouse storage map.

SELECTED DRAWING: Figure 3

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**47. 2020181572 ROUTE PLANNING METHOD, ELECTRONIC DEVICE, ROBOT, AND COMPUTER-READABLE STORAGE
MEDIUM**

JP - 05.11.2020

Int.Class **Appl.No** 2020070320 **Applicant** SYRIUS ROBOTICS CO LTD **Inventor** CHEN SHIYU

PROBLEM TO BE SOLVED: To provide an efficient and accurate navigation route planning method.



SOLUTION: According to one embodiment, the method includes the steps of: acquiring a navigation route through which the electronic device moves from a current position to a target position; acquiring, in real-time during movement of the electronic device along the navigation route, image information of an environment where the electronic device is located; detecting, based on the image information, whether or not the electronic device satisfies route update condition; and adjusting the navigation route upon detection that the electronic device satisfies the route update condition. A navigation route of a robot is timely adjusted in accordance with robot positioning information and a dynamic obstacle based on image information of an environment around the robot during travel of the robot. Consequently, it is possible to avoid collision with the dynamic obstacle during the travel of the robot and cause efficient and safe movement of the robot to a target place.

SELECTED DRAWING: Figure 1

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48. WO/2020/156149 ORDER PICKING METHOD AND DEVICE, AND STORAGE MEDIUM

WO - 06.08.2020

Int.Class G06Q 10/08 (?) Appl.No PCT/CN2020/072025 Applicant SYRIUS ROBOTICS CO., LTD. Inventor YANG, Zhiqin

The embodiments of the present invention relate to an order picking method and device, and a storage medium. The method comprises: acquiring at least one piece of order information [S101]; acquiring information of storage bins in a circulation box, wherein multiple storage bins are arranged in the circulation box [S102]; associating the order information with the information of storage bins, wherein the order information is in one-to-one correspondence with the information of storage bins [S103]; acquiring position information of all commodities, corresponding to multiple pieces of order information, in a commodity warehouse [S104]; determining an order picking path according to commodity information and the position information [S105]; and moving the circulation box in the commodity warehouse according to the order picking path in order to complete commodity picking [S106]. A robot is used as a replacement for manual order picking, and an order picker only needs to wait, beside a commodity shelf, for the robot to bring a circulation box, wherein same then picks up commodities according to the displayed commodity information and position information of the commodities to be picked, and places the commodities into a corresponding storage bin of the circulation box to complete commodity picking. Compared with the existing order picking scheme, the present application saves on time and labor, and improves the efficiency thereof.

49. WO/2020/211564 METHOD AND APPARATUS FOR QUICKLY DETERMINING DEPOSITARY MAP, STORAGE MEDIUM AND ROBOT

WO - 22.10.2020

Int.Class B25J 9/16 (?) Appl.No PCT/CN2020/078041 Applicant SYRIUS ROBOTICS CO., LTD. Inventor LIU, Junbin

A method and apparatus for quickly determining a depositary map, a storage medium and a robot. The method comprises: generating a warehouse map of a warehouse [S101]; acquiring a movement pose of the robot, and acquiring identification information of an identification on a rack, the identification information being collected by an image acquisition sensor on the robot [S102]; determining the identification position of the identification [S103]; determining the rack position of the rack and the positions of depositary places on the rack [S104]; and determining a depositary map of the warehouse [S105]. The method can quickly create a depositary map of a warehouse, and the positions of depositary places in the depositary map have high precision.

50. 2020055690 TURN OVER BOX TRACKING SYSTEM, METHOD AND DEVICE BY TRAVELING ROBOT, AND TERMINAL AND RECORDING MEDIUM

JP - 03.02.2020

Int.Class B65G 1/137 (?) Appl.No 2019107208 Applicant SYRIUS ROBOTICS CO LTD Inventor WAN QI



PROBLEM TO BE SOLVED: To provide a tracking system that enhances the transportation efficiency of a turn over box by a traveling robot and monitors the transportation condition of the turn over box and the update condition of an article.

SOLUTION: A traveling robot 10 that travels and transports a turn over box inside a distribution warehouse is provided, and an identification device 20 sends identification information of the label at the turn over box, thereby a client terminal 30 obtains the identification information and makes the identification information of the turn over box and preliminarily provided identification information of the robot into a package. A binding request message is generated and sent, which is received by a cloud terminal 40, thereby matching determination is made between the identification information of the turn over box and the registered identification information of the turn over box. The identification information of the turn over box and the robot are bound and fed back to the client terminal 30 as a binding success result.

SELECTED DRAWING: Figure 1

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51. 112147954 TASK EXECUTION METHOD, ROBOT, SCHEDULING SYSTEM, ELECTRONIC EQUIPMENT AND STORAGE MEDIUM CN - 29.12.2020

Int.Class G05B 19/418  Appl.No 201910576653.7 Applicant SYRIUS ROBOTICS [SHENZHEN] CO., LTD. Inventor HUANG HUA

The invention relates to a task execution method, a robot, a scheduling system, electronic equipment and a storage medium. The method comprises the steps that first task information and a first scheduling scheme are obtained, wherein the first scheduling scheme is generated according to the task information and comprises an instruction needed for completing a first task; an operation is executed according to the first scheduling scheme; when it is monitored that a preset event occurs, a second scheduling scheme is generated according to the preset event, the first task information and the task progress information; and an operation is executed according to a second scheduling scheme. According to the technical scheme, the robot can generate a scheduling scheme without communicating with a scheduling center, and complete a task; and therefore, the continuous work of the robot in a complex scene can be realized, and the stability of robot scheduling is improved.

52. WO/2020/103295 ROBOT-BASED RANDOM STORAGE METHOD AND APPARATUS, ELECTRONIC DEVICE AND STORAGE MEDIUM WO - 28.05.2020

Int.Class B65G 1/04  Appl.No PCT/CN2018/125121 Applicant SYRIUS ROBOTICS CO., LTD. Inventor WAN, Qi

Disclosed is a robot-based random storage method, comprising: acquiring goods position information which is randomly allocated, and controlling, according to the goods position information, a robot for putting goods on shelves to carry goods to a corresponding goods position [S10]; prompting goods-picking personnel nearby the goods position to take away the goods and place same at the goods position, and synchronizing goods information of the goods and the goods position information to an off-shelf order [S11]; and acquiring order information of the off-shelf order, so as to control a goods-picking robot nearby the goods position to head for the goods position to instruct the goods-picking personnel nearby the goods position to take away the goods on the goods position and give same to the goods-picking robot [S12]. According to the method, goods can be randomly placed on shelves, and the placed goods can also be associated with and attach with the goods-picking robot, so that goods are quickly put on the shelves after being received, and putting the goods on shelves and picking the goods are simultaneously carried out, thereby improving goods storage and picking efficiency, and achieving the purpose of improving the overall logistics efficiency.



53. WO/2021/068700 WAREHOUSING GOODS UPDATE METHOD AND APPARATUS, AND LOGISTICS SYSTEM

WO - 15.04.2021

Int.Class G06Q 10/08 (?) Appl.No PCT/CN2020/114046 Applicant SYRIUS ROBOTICS CO., LTD Inventor YANG, Zhiqin

A warehousing goods update method and apparatus, and a logistics system, which belong to the technical field of logistics and warehousing. The method comprises: receiving an order sent by a first warehouse end [S100]; according to order information, generating a goods pickup task of a tray and a shelf placement task of each transport case on the tray, and issuing the tasks to a second warehouse end [S200]; and generating a transportation task according to inventory information of a first warehouse, and issuing the transportation task to the first warehouse end [S300]. According to the method and apparatus and the logistics system, shelf placement of the first warehouse is moved forwards to a second warehouse for shelf placement, which not only optimizes shelf placement and warehousing flows of the first warehouse, but also improves the efficiency of the first warehouse, such that goods pickup efficiency of subsequent goods dispensing can be effectively ensured by the first warehouse, and efficiency of the whole supply chain is effectively improved, and the overall cost is reduced.

54. WO/2020/103296 ROBOT-BASED INVENTORY ORDER PICKING METHOD, APPARATUS, SYSTEM, AND ELECTRONIC DEVICE, AND STORAGE MEDIUM

WO - 28.05.2020

Int.Class G06Q 10/08 (?) Appl.No PCT/CN2018/125142 Applicant SYRIUS ROBOTICS CO., LTD. Inventor YANG, Zhiqin

A robot-based inventory order picking method, comprising: binding a turnover box with a robot by means of acquiring box identity information of a turnover box having at least one turnover position, the turnover position being correspondingly provided thereon with a label and a release mark, and the box identity information comprising information of the label and information of the release mark [S10]; acquiring inventory order information and associating same with the box identity information to obtain order binding information [S11]; and controlling an interactive end of the robot according to the order binding information to display an interactive interface, and instructing goods picking personnel to pick goods at a corresponding goods location and place the goods at the turnover position according to the release mark [S12] so that a picking zone directly docks to a packing zone without additionally disposing a sorting zone, thereby simplifying the logistics process, improving the technical effect of logistics efficiency, and reducing the costs of logistics.

55. WO/2021/129349 LASER POINT CLOUD MAP MERGING METHOD, APPARATUS, AND COMPUTER READABLE STORAGE MEDIUM

WO - 01.07.2021

Int.Class G06T 3/40 (?) Appl.No PCT/CN2020/133821 Applicant SYRIUS ROBOTICS CO., LTD. Inventor MU, Xingyuan

A laser point cloud map merging method, an apparatus, and a computer readable storage medium. The method comprises: performing a stitching and matching operation on a first local point cloud and a second local point cloud containing a public region so as to obtain a first pose transformation matrix [S1]; projecting, by means of the first pose transformation matrix, all point clouds in a second point cloud map to a reference coordinate system of point clouds in a first point cloud map [S2]; performing another matching and stitching operation on all projected point clouds in the second point cloud map and all point clouds in the first point cloud map so as to obtain a second pose transformation matrix [S3]; and re-projecting, by means of the second pose transformation matrix, all of the point clouds in the second point cloud map to the reference coordinate system of the point clouds in the first point cloud map, and merging all re-projected point clouds in the second point cloud map and all of the point clouds in the first point cloud map [S4]. The invention provides an efficient laser point cloud map merging solution, and improves error tolerance during map building processes.

56. WO/2021/190220 ROBOT NETWORK MONITORING METHOD, DEVICE, AND STORAGE MEDIUM

WO - 30.09.2021

Int.Class H04W 4/70 (?) Appl.No PCT/CN2021/077344 Applicant SYRIUS ROBOTICS CO., LTD Inventor WANG, Xiangyu

Disclosed are a robot network monitoring method, a device, and a storage medium. The method comprises: a robot body acquires network health information of the robot body, and simultaneously shares network health information with other robots in a preset range in a robot cluster on the basis of the near field communication technology [S10]; a robot performs real-time analysis and determination on a network state of the robot according to a preset rule on the basis of the acquired network health information and the shared network health information to recognize the quality of a network where the robot is currently positioned [S20]; and the robot performs data communication with a server at the same time, so that the server acquires corresponding network health data of the robot and/or receives network health data reported by the robot in a real-time manner and performs analysis and determination on the network health state of the robot according to the network health data of the robot to recognize the network health state of the robot [S30]. The purpose of monitoring the network state of the robot body in real time is achieved.

57. WO/2020/103297 ROBOT SENSOR ARRANGEMENT SYSTEM

WO - 28.05.2020

Int.Class B25J 9/16 (?) **Appl.No** PCT/CN2018/125146 **Applicant** SYRIUS ROBOTICS CO., LTD. **Inventor** YANG, Zhiqin

A robot sensor arrangement system. At least one sensor assembly is arranged on a robot body [20], and the sensor assembly comprises image sensors [1001, 1002] and a first inertial sensor [1007]. Positions of the image sensors [1001, 1002] relative to the first inertial sensor [1007] are determined such that the image sensors and the first inertial sensor [1007] will not move as external physical conditions, such as vibration and temperature, change. An included angle between the positions of the image sensors [1001, 1002] and a vertical axis is in a first angular range so as to ensure the robot can autonomously sense the surrounding environment to improve the capability of autonomous obstacle avoidance and the robustness of a robotic system.

58. WO/2021/218553 NET-SHAPED SUPPLY CHAIN DECISION METHOD AND DEVICE BASED ON ROBOT, AND STORAGE MEDIUM

WO - 04.11.2021

Int.Class G06Q 10/06 (?) **Appl.No** PCT/CN2021/084526 **Applicant** SYRIUS ROBOTICS CO., LTD **Inventor** YANG, Zhiqin

A net-shaped supply chain decision method and device based on a robot, and a storage medium. The method comprises: analyzing the operation efficiency of robots respectively corresponding to a supplier and a retailer, and establishing warehousing capability evaluation models operating on the basis of the robots [S10]; obtaining transaction record information corresponding to the retailer, dynamically evaluating and predicting, on the basis of the warehousing capability evaluation models, goods replenishment information corresponding to the retailer, and obtaining productivity information corresponding to the supplier [S20]; and in combination with the transaction record information and the goods replenishment information corresponding to the retailer and the productivity information corresponding to the supplier, intelligently matching corresponding supplier and retailer on the basis of the corresponding warehousing capability evaluation models [S30]. According to the present invention, the real-time visualization and rapid response of the whole supply chain are implemented, the transportation and stock costs in a supply chain process are reduced, the daily planning and management of personnel are reduced, and the in-out stock service level of a user is improved.

59. 112150257 ORDER PROCESSING METHOD, CLOUD SYSTEM, ELECTRONIC EQUIPMENT AND STORAGE MEDIUM

CN - 29.12.2020

Int.Class G06Q 30/06 (?) **Appl.No** 202011345645.0 **Applicant** SYRIUS ROBOTICS (SHENZHEN) CO., LTD.
Inventor THE INVENTOR HAS WAIVED THE RIGHT TO BE MENTIONED

The invention discloses an order processing method, a cloud system, electronic equipment and a storage medium. The method comprises the following steps: an order combining strategy and an execution priority related to an order set by a user are obtained through a client; the orders are divided into a plurality of order sets with execution priorities according to the set order combining strategy and execution priorities; the client sends an order set containing the execution priority to a cloud system, so that the cloud system sends a corresponding execution command to a corresponding



execution terminal; the purpose of flexibly processing the execution of the order according to the requirements of the user is achieved, and the flexibility and intelligence of order processing are improved; for the user side, the interaction experience of the user is improved.

60. 2020172401 HIGH SPEED ESTABLISHING METHOD OF WAREHOUSE STORAGE MAP, MACHINE, MEMORY MEDIUM AND ROBOT JP - 07.08.2020

Int.Class B65G 1/00 (?) **Appl.No** 2020072116 **Applicant** SYRIUS ROBOTICS CO LTD **Inventor** LIU JUNBIN

PROBLEM TO BE SOLVED: To create a warehouse storage map of the inside of a warehouse at a high speed and heighten the positional accuracy of a storage space in the warehouse storage map.

SOLUTION: A method includes: a step [S101] of creating a warehouse map of a warehouse; a step [S102] of obtaining the movement azimuth attitude of a robot, and obtaining marking information marked on a cargo shelf that image collection sensors of the robot have collected; a step [S103] of specifying a marking position of a mark; a step [S104] of specifying a cargo shelf position of the cargo shelf and a storage space position of a storage space on the cargo shelf; and a step [S105] of specifying a warehouse storage map of the warehouse.

SELECTED DRAWING: Figure 3

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61. 112149936 ROBOT SCHEDULING METHOD AND SYSTEM, ROBOT, ELECTRONIC EQUIPMENT AND STORAGE MEDIUM CN - 29.12.2020

Int.Class G06Q 10/06 (?) **Appl.No** 201910578681.2 **Applicant** SYRIUS ROBOTICS (SHENZHEN) CO., LTD. **Inventor** WANG XIANGYU

The invention relates to a robot scheduling method and system, a robot, electronic equipment and a storage medium. The method comprises the steps: receiving task information; selecting execution equipment according to the task information; splitting the task into sub-tasks corresponding to the execution equipment according to the task information, and generating sub-task information; and issuing the sub-task information to the execution device. According to the technical scheme, the robots serve as the dispatching center of the robot cluster, planning, dispatching, executing and other calculation are conducted according to the complex tasks of the dispatching server, the calculation amount of the dispatching server is reduced, and the situation that the robots cannot receive dispatching information and accordingly execute mistakes or stop running due to the insufficient calculation amount of the dispatching server is avoided; and the cost of the scheduling server is reduced.

62. 2020083653 ROBOT-BASED WAREHOUSE ORDER PICKING METHOD, APPARATUS, AND SYSTEM, AND ELECTRONIC DEVICE AND STORAGE MEDIUM JP - 03.02.2020

Int.Class B65G 1/137 (?) **Appl.No** 2019106950 **Applicant** SYRIUS ROBOTICS CO LTD **Inventor** YANG ZHIQIN

PROBLEM TO BE SOLVED: To provide a robot-based warehouse order picking method, apparatus, and system, and an electronic device and a storage medium for solution of problems such as a low warehouse shipping efficiency of conventional picking methods and non-adaptation to "high frequency small lot" picking requirements in an electronic commerce environment.

SOLUTION: The robot-based warehouse order picking method comprises: acquiring box identification information of a turnover box having one or more turnover positions to associate the turnover box with a robot and providing a label associated with a cargo handling mark at the turnover position, the box



identification information including label information and cargo handling mark information [S10]; associating warehouse order information with the box identification information such that order association information can be obtained [S11]; and displaying and controlling a user interface on an interactive terminal of the robot by way of the order association information, picking a cargo from the relevant cargo position, and making an instruction for placement at the turnover position to a picker according to the cargo handling mark [S12], so that a picking area directly docks to a packing area without separately disposing a cargo sorting area.

SELECTED DRAWING: Figure 2

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63. 2020083654 ROBOT-BASED RANDOM WAREHOUSE STORAGE METHOD AND APPARATUS, AND ELECTRONIC DEVICE AND STORAGE MEDIUM

JP - 04.06.2020

Int.Class B65G 1/137  Appl.No 2019107106 Applicant SYRIUS ROBOTICS CO LTD Inventor WAN QI

PROBLEM TO BE SOLVED: To provide a warehouse storage method for improving the warehouse picking efficiency of cargo to improve the efficiency of the entire logistics.

SOLUTION: The robot-based random warehouse storage method comprises: acquiring randomly allocated cargo position information, and controlling a shelving robot for transporting the cargo to a corresponding cargo position [S10] according to the cargo position information; prompting a picker near the cargo position to take the cargo and place it at the cargo position, and synchronizing cargo information of the cargo and the cargo position information to an off-shelf order [S11]; and acquiring order information of the off-shelf order so as to control a cargo-picking robot near the cargo position to move the robot to the cargo position, and instructing the picker near the cargo position to take the cargo at the cargo position and pass the cargo to the cargo-picking robot [S12], so that the cargo can be randomly placed on shelves, and the placed cargo can also be associated with the cargo-picking robot.

SELECTED DRAWING: Figure 2

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