

ALLNAMES:(Advanced Intelligent Systems Inc)

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Machine translation

1. [20220143847](#) AGRICULTURAL ROBOT FOR A VERTICAL FARMING UNIT

US - 12.05.2022

Int.Class [B25J 19/00](#) Appl.No 17435522 Applicant ADVANCED INTELLIGENT SYSTEMS INC. Inventor Farhang Bidram

An agricultural robot is disclosed, the agricultural robot comprising a chassis comprising a plurality of ground-engaging mechanisms for propelling the robot in a direction of travel; a supply module mounted on the chassis and comprising a fluid providing unit, a power providing unit, a supply interface operatively connected to the fluid providing unit and to the power providing unit and for providing at least one of fluid and power; and a controller for operating the plurality of ground-engaging mechanisms and the supply interface.

2. [3132481](#) AGRICULTURAL ROBOT FOR A VERTICAL FARMING UNIT

CA - 10.09.2020

Int.Class [A01G 9/00](#) Appl.No 3132481 Applicant ADVANCED INTELLIGENT SYSTEMS INC. Inventor BIDRAM, FARHANG

An agricultural robot is disclosed, the agricultural robot comprising a chassis comprising a plurality of ground-engaging mechanisms for propelling the robot in a direction of travel; a supply module mounted on the chassis and comprising a fluid providing unit, a power providing unit, a supply interface operatively connected to the fluid providing unit and to the power providing unit and for providing at least one of fluid and power; and a controller for operating the plurality of ground-engaging mechanisms and the supply interface.

3. [WO/2020/178696](#) AGRICULTURAL ROBOT FOR A VERTICAL FARMING UNIT

WO - 10.09.2020

Int.Class [A01G 9/00](#) Appl.No PCT/IB2020/051729 Applicant ADVANCED INTELLIGENT SYSTEMS INC. Inventor BIDRAM, Farhang

An agricultural robot is disclosed, the agricultural robot comprising a chassis comprising a plurality of ground-engaging mechanisms for propelling the robot in a direction of travel; a supply module mounted on the chassis and comprising a fluid providing unit, a power providing unit, a supply interface operatively connected to the fluid providing unit and to the power providing unit and for providing at least one of fluid and power; and a controller for operating the plurality of ground-engaging mechanisms and the supply interface.

4. [20200156868](#) SYSTEMS, METHODS, AND STORAGE UNITS FOR ARTICLE TRANSPORT AND STORAGE

US - 21.05.2020

Int.Class [B65G 1/10](#) Appl.No 16704019 Applicant Advanced Intelligent Systems Inc. Inventor Farhang Bidram

Provided are systems, methods, and devices for storing and transporting articles with a multi-shelf storage unit. A system for article handling includes a multi-shelf storage unit and a robotic unit. The multi-shelf storage unit includes a plurality of shelves disposed on a frame, the plurality of shelves including at least one vertically moveable shelf configured to move in first and second vertical directions relative to the frame, and a lift mechanism configured to automatically drive, in response to receiving a drive input, the at least one vertically moveable shelf in the first or second vertical direction. The robotic unit includes an end effector disposed on a robotic manipulator for engaging an article and a lift mechanism actuator that is connectable to the lift mechanism and configured to provide the drive input to actuate the lift mechanism.

5. [3093710](#) SYSTEM AND METHOD FOR CONFIGURING AND SERVICING A ROBOTIC HOST PLATFORM

CA - 19.09.2019

Int.Class [B25J 9/08](#) Appl.No 3093710 Applicant ADVANCED INTELLIGENT SYSTEMS INC. Inventor BIDRAM, FARHANG

A robotic method and system for providing robotic functions associated with performing an automated task is disclosed. The system includes a host platform operably configured to provide at least some of the robotic functions for performing the automated task and having at least one interface operably configured to receive a modular component operable to provide additional robotic functions for performing the automated task. The system also includes a processor circuit disposed on at least one of the host platform and the modular component. The at least one interface includes a mechanical interface having mounting features that correspond to mounting features on the modular component for removably mounting the modular component, a signal interface for transmitting signals between the modular component and the host platform, and a data interface implemented on the processor circuit and operable to provide functionality for exchanging at least one of commands for performing the additional functions or data associated with the additional functions between the modular component and the processor circuit.

6. [3883428](#) SYSTEMS, METHODS, AND STORAGE UNITS FOR ARTICLE TRANSPORT AND STORAGE

EP - 29.09.2021

Int.Class [A47B 51/00](#) Appl.No 19886642 Applicant ADVANCED INTELLIGENT SYSTEMS INC Inventor BIDRAM FARHANG

Provided are systems, methods, and devices for storing and transporting articles with a multi-shelf storage unit. A system for article handling includes a multi-shelf storage unit and a robotic unit. The multi-shelf storage unit includes a plurality of shelves disposed on a frame, the plurality of shelves including at least one vertically moveable shelf configured to move in first and second vertical directions relative to the frame, and a lift mechanism configured to automatically drive, in response to receiving a drive input, the at least one vertically moveable shelf in the first or second vertical direction. The robotic unit includes an end effector disposed on a robotic manipulator for engaging an article and a lift mechanism actuator that is connectable to the lift mechanism and configured to provide the drive input to actuate the lift mechanism.

7. [3120717](#) SYSTEMS, METHODS, AND STORAGE UNITS FOR ARTICLE TRANSPORT AND STORAGE

CA - 28.05.2020

Int.Class A47B 51/00 Appl.No 3120717 Applicant ADVANCED INTELLIGENT SYSTEMS INC. Inventor

Provided are systems, methods, and devices for storing and transporting articles with a multi-shelf storage unit. A system for article handling includes a multi-shelf storage unit and a robotic unit. The multi-shelf storage unit includes a plurality of shelves disposed on a frame, the plurality of shelves including at least one vertically moveable shelf configured to move in first and second vertical directions relative to the frame, and a lift mechanism configured to automatically drive, in response to receiving a drive input, the at least one vertically moveable shelf in the first or second vertical direction. The robotic unit includes an end effector disposed on a robotic manipulator for engaging an article and a lift mechanism actuator that is connectable to the lift mechanism and configured to provide the drive input to actuate the lift mechanism.

8. 20210016433 SYSTEM AND METHOD FOR CONFIGURING AND SERVICING A ROBOTIC HOST PLATFORM US - 21.01.2021

Int.Class B25J 9/08 Appl.No 16980052 Applicant ADVANCED INTELLIGENT SYSTEMS INC. Inventor Farhang Bidram

A robotic method and system for providing robotic functions associated with performing an automated task is disclosed. The system includes a host platform operably configured to provide at least some of the robotic functions for performing the automated task and having at least one interface operably configured to receive a modular component operable to provide additional robotic functions for performing the automated task. The system also includes a processor circuit disposed on at least one of the host platform and the modular component. The at least one interface includes a mechanical interface having mounting features that correspond to mounting features on the modular component for removably mounting the modular component, a signal interface for transmitting signals between the modular component and the host platform, and a data interface implemented on the processor circuit and operable to provide functionality for exchanging at least one of commands for performing the additional functions or data associated with the additional functions between the modular component and the processor circuit.

9. WO/2020/102900 SYSTEMS, METHODS, AND STORAGE UNITS FOR ARTICLE TRANSPORT AND STORAGE WO - 28.05.2020

Int.Class A47B 51/00 Appl.No PCT/CA2019/051662 Applicant ADVANCED INTELLIGENT SYSTEMS INC. Inventor BIDRAM, Farhang

Provided are systems, methods, and devices for storing and transporting articles with a multi-shelf storage unit. A system for article handling includes a multi-shelf storage unit and a robotic unit. The multi-shelf storage unit includes a plurality of shelves disposed on a frame, the plurality of shelves including at least one vertically moveable shelf configured to move in first and second vertical directions relative to the frame, and a lift mechanism configured to automatically drive, in response to receiving a drive input, the at least one vertically moveable shelf in the first or second vertical direction. The robotic unit includes an end effector disposed on a robotic manipulator for engaging an article and a lift mechanism actuator that is connectable to the lift mechanism and configured to provide the drive input to actuate the lift mechanism.

10. WO/2019/173918 SYSTEM AND METHOD FOR CONFIGURING AND SERVICING A ROBOTIC HOST PLATFORM WO - 19.09.2019

Int.Class B25J 9/08 Appl.No PCT/CA2019/050311 Applicant ADVANCED INTELLIGENT SYSTEMS INC. Inventor BIDRAM, Farhang

A robotic method and system for providing robotic functions associated with performing an automated task is disclosed. The system includes a host platform operably configured to provide at least some of the robotic functions for performing the automated task and having at least one interface operably configured to receive a modular component operable to provide additional robotic functions for performing the automated task. The system also includes a processor circuit disposed on at least one of the host platform and the modular component. The at least one interface includes a mechanical interface having mounting features that correspond to mounting features on the modular component for removably mounting the modular component, a signal interface for transmitting signals between the modular component and the host platform, and a data interface implemented on the processor circuit and operable to provide functionality for exchanging at least one of commands for performing the additional functions or data associated with the additional functions between the modular component and the processor circuit.

11. WO/2022/087710 ULTRAVIOLET DISINFECTION ROBOT WITH ROTATING REFLECTOR WO - 05.05.2022

Int.Class A61L 2/10 Appl.No PCT/CA2021/050243 Applicant ADVANCED INTELLIGENT SYSTEMS INC. Inventor BIDRAM, Farhang

An apparatus for ultraviolet disinfection is disclosed. The apparatus includes a mobile base, a UV irradiation tower including a support structure mounted on the base, the support structure being aligned with a vertical axis extending upwardly from the base. The apparatus also includes a UV light source attached to the support structure for providing a disinfecting dose of UV radiation, and a reflector disposed on the support structure for directing the UV radiation provided by the UV light source. The apparatus further includes a reflector actuator for rotating the reflector about a rotation axis orthogonal to the vertical axis, and a controller configured to cause the reflector to rotate in response to receiving signals from a surface sensor indicating location information for a target surface to be disinfected.

12. 20200118222 SYSTEMS AND METHODS FOR AUTOMATED ARTICLE TRANSPORTATION AND MANAGEMENT THEREOF US - 16.04.2020

Int.Class G06Q 50/02 Appl.No 16506382 Applicant Advanced Intelligent Systems Inc. Inventor Farhang Bidram

A system for managing and tracking plant management at a site is provided. The system includes a device management server and a plant management device communicatively connected to the device management server via a network. The plant management device is configured to: receive a plant management task order including task instructions for performing a plant management task and automatically perform the plant management task according to the task instructions; send a task receipt notification to the device management server, the task receipt notification including task beneficiary data; and transmit task performance data to the device management server, the task performance data logged during performance of the plant management task. The device management server is configured to: generate a work report for the plant management device from the task performance data; generate a billing report for the plant management device from the task beneficiary data and billing rate data, the billing report including a billable amount; and generate a productivity profile for the plant management device.

13. 3115838 SYSTEMS AND METHODS FOR AUTOMATED ARTICLE TRANSPORTATION AND MANAGEMENT THEREOF CA - 16.04.2020

Int.Class G06Q 10/06 Appl.No 3115838 Applicant ADVANCED INTELLIGENT SYSTEMS INC. Inventor BIDRAM, FARHANG

A system for managing and tracking plant management at a site is provided that includes a device management server communicatively connected to a plant management device. The plant management device is configured to: receive a plant management task order including task instructions for performing a plant management task and automatically perform the plant management task according to the task instructions; send a task receipt notification including task beneficiary data to the device management server; and transmit task performance data that is logged during performance of the plant management task to the device management server. The device management server is configured to: generate a work report for the plant management device from the task performance data; generate a billing report including a billable amount for the plant management device from the task beneficiary data and billing rate data; and generate a productivity profile for the plant management device.



14. [WO/2020/073123](#) SYSTEMS AND METHODS FOR AUTOMATED ARTICLE TRANSPORTATION AND MANAGEMENT THEREOF WO - 16.04.2020

Int.Class [G06Q 10/06](#) Appl.No PCT/CA2019/051438 Applicant ADVANCED INTELLIGENT SYSTEMS INC. Inventor BIDRAM, Farhang

A system for managing and tracking plant management at a site is provided that includes a device management server communicatively connected to a plant management device. The plant management device is configured to: receive a plant management task order including task instructions for performing a plant management task and automatically perform the plant management task according to the task instructions; send a task receipt notification including task beneficiary data to the device management server; and transmit task performance data that is logged during performance of the plant management task to the device management server. The device management server is configured to: generate a work report for the plant management device from the task performance data; generate a billing report including a billable amount for the plant management device from the task beneficiary data and billing rate data; and generate a productivity profile for the plant management device.

15. [3864592](#) SYSTEMS AND METHODS FOR AUTOMATED ARTICLE TRANSPORTATION AND MANAGEMENT THEREOF EP - 18.08.2021

Int.Class [G06Q 10/06](#) Appl.No 19870257 Applicant ADVANCED INTELLIGENT SYSTEMS INC Inventor BIDRAM FARHANG

A system for managing and tracking plant management at a site is provided that includes a device management server communicatively connected to a plant management device. The plant management device is configured to: receive a plant management task order including task instructions for performing a plant management task and automatically perform the plant management task according to the task instructions; send a task receipt notification including task beneficiary data to the device management server; and transmit task performance data that is logged during performance of the plant management task to the device management server. The device management server is configured to: generate a work report for the plant management device from the task performance data; generate a billing report including a billable amount for the plant management device from the task beneficiary data and billing rate data; and generate a productivity profile for the plant management device.

16. [20200128757](#) METHOD AND APPARATUS FOR PERFORMING PRUNING OPERATIONS USING AN AUTONOMOUS VEHICLE US - 30.04.2020

Int.Class [A01G 3/04](#) Appl.No 16510070 Applicant ADVANCED INTELLIGENT SYSTEMS INC. Inventor Farhang Bidram

An autonomous vehicle apparatus and method for performing pruning operations on a plant being cultivated in a container is disclosed. The apparatus includes a wheeled chassis operably configured to autonomously navigate to a location of the container within a workspace. The apparatus also includes a plant support operable to receive and secure the container in an upright condition for rotation about a vertical axis extending generally vertically through the container and the plant. The apparatus further includes a manipulator mounted to the vehicle and operable to grasp and load the container onto the plant support, and a pruning tool mounted on the vehicle and disposed to prune the plant while the container is rotated on the plant support.

17. [WO/2020/087159](#) METHOD AND APPARATUS FOR PERFORMING PRUNING OPERATIONS USING AN AUTONOMOUS VEHICLE WO - 07.05.2020

Int.Class [A01G 3/08](#) Appl.No PCT/CA2019/051525 Applicant ADVANCED INTELLIGENT SYSTEMS INC. Inventor BIDRAM, Farhang

An autonomous vehicle apparatus and method for performing pruning operations on a plant being cultivated in a container is disclosed. The apparatus includes a wheeled chassis operably configured to autonomously navigate to a location of the container within a workspace. The apparatus also includes a plant support operable to receive and secure the container in an upright condition for rotation about a vertical axis extending generally vertically through the container and the plant. The apparatus further includes a manipulator mounted to the vehicle and operable to grasp and load the container onto the plant support, and a pruning tool mounted on the vehicle and disposed to prune the plant while the container is rotated on the plant support.

18. [WO/2021/035354](#) DEPLOYABLE SYSTEM FOR ENVIRONMENTAL HOMOGENIZATION WO - 04.03.2021

Int.Class [F24F 5/00](#) Appl.No PCT/CA2020/051170 Applicant ADVANCED INTELLIGENT SYSTEMS INC. Inventor AHMADI, Hamed

A system, apparatus and method for environmental homogenization of an operating space is disclosed. The system includes a plurality of environmental sensors distributed within the operating space. The system also includes an environmental mapper operably configured to generate a map of environmental parameters within the operating space, the environmental parameters being generated by the plurality of environmental sensors. The system further includes at least one mobile robot, the mobile robot including a wheeled chassis including a plurality of motorized wheels, a navigation sensor disposed on the chassis, and a controller disposed on the chassis operably configured to autonomously navigate the chassis based on information from the navigation sensor. The mobile robot also includes an environmental control module disposed on the chassis and operably configured to modify at least one environmental parameter associated with the operating space.

19. [3873191](#) METHOD AND APPARATUS FOR PERFORMING PRUNING OPERATIONS USING AN AUTONOMOUS VEHICLE EP - 08.09.2021

Int.Class [A01G 3/047](#) Appl.No 19879951 Applicant ADVANCED INTELLIGENT SYSTEMS INC Inventor BIDRAM FARHANG

An autonomous vehicle apparatus and method for performing pruning operations on a plant being cultivated in a container is disclosed. The apparatus includes a wheeled chassis operably configured to autonomously navigate to a location of the container within a workspace. The apparatus also includes a plant support operable to receive and secure the container in an upright condition for rotation about a vertical axis extending generally vertically through the container and the plant. The apparatus further includes a manipulator mounted to the vehicle and operable to grasp and load the container onto the plant support, and a pruning tool mounted on the vehicle and disposed to prune the plant while the container is rotated on the plant support.

20. [3115841](#) METHOD AND APPARATUS FOR PERFORMING PRUNING OPERATIONS USING AN AUTONOMOUS VEHICLE CA - 07.05.2020

Int.Class [A01G 3/08](#) Appl.No 3115841 Applicant ADVANCED INTELLIGENT SYSTEMS INC. Inventor

An autonomous vehicle apparatus and method for performing pruning operations on a plant being cultivated in a container is disclosed. The apparatus includes a wheeled chassis operably configured to autonomously navigate to a location of the container within a workspace. The apparatus also includes a plant support operable to receive and secure the container in an upright condition for rotation about a vertical axis extending generally vertically through the container and the plant. The apparatus further includes a manipulator mounted to the vehicle and operable to grasp and load the container onto the plant support, and a pruning tool mounted on the vehicle and disposed to prune the plant while the container is rotated on the plant support.



21. [WO/2020/061711](#) MANIPULATOR APPARATUS, METHODS, AND SYSTEMS

WO - 02.04.2020

Int.Class [B25J 9/02](#) Appl.No PCT/CA2019/051390 Applicant ADVANCED INTELLIGENT SYSTEMS INC. Inventor BIDRAM, Farhang

A manipulator apparatus disclosed. The apparatus includes an arm including a connecting end and a working end, an arm actuator coupled with the connecting end by an arm linkage, a lift actuator coupled with the connecting end, an end effector coupled with the working end by a rotatable connection, the end effector having an engagement orientation relative to the working end, and at least one cable coupled between the connecting end of the arm and the rotatable connection. The arm actuator is operable to cause the arm linkage to move the working end until the end effector engages an article in the engagement orientation; the lift actuator is operable to cause the connecting end to lift the working end, the end effector, and the article; and the at least one cable is coupled to transmit movement of the connecting end to the rotatable connection to maintain the engagement orientation of the end effector.

22. [20200102164](#) MANIPULATOR APPARATUS, METHODS, AND SYSTEMS WITH AT LEAST ONE CABLE

US - 02.04.2020

Int.Class [B65G 67/04](#) Appl.No 16510795 Applicant ADVANCED INTELLIGENT SYSTEMS INC. Inventor Farhang Bidram

A manipulator apparatus for manipulating an article is disclosed. The apparatus includes an arm including a connecting end and a working end, an arm actuator coupled with the connecting end by an arm linkage, a lift actuator coupled with the connecting end, an end effector coupled with the working end by a rotatable connection, the end effector having an engagement orientation relative to the working end, and at least one cable coupled between the connecting end of the arm and the rotatable connection. The arm actuator is operable to cause the arm linkage to move the working end until the end effector engages an article in the engagement orientation; the lift actuator is operable to cause the connecting end to lift the working end, the end effector, and the article; and the cable is coupled to transmit movement of the connecting end to the rotatable connection to maintain the engagement orientation of the end effector.

23. [3113372](#) MANIPULATOR APPARATUS, METHODS, AND SYSTEMS

CA - 02.04.2020

Int.Class [B25J 9/02](#) Appl.No 3113372 Applicant ADVANCED INTELLIGENT SYSTEMS INC. Inventor

A manipulator apparatus disclosed. The apparatus includes an arm including a connecting end and a working end, an arm actuator coupled with the connecting end by an arm linkage, a lift actuator coupled with the connecting end, an end effector coupled with the working end by a rotatable connection, the end effector having an engagement orientation relative to the working end, and at least one cable coupled between the connecting end of the arm and the rotatable connection. The arm actuator is operable to cause the arm linkage to move the working end until the end effector engages an article in the engagement orientation; the lift actuator is operable to cause the connecting end to lift the working end, the end effector, and the article; and the at least one cable is coupled to transmit movement of the connecting end to the rotatable connection to maintain the engagement orientation of the end effector.

24. [WO/2022/077093](#) DISINFECTING ROBOT WITH GEOMETRY-CONFORMING ARM

WO - 21.04.2022

Int.Class [A61L 2/10](#) Appl.No PCT/CA2021/050244 Applicant ADVANCED INTELLIGENT SYSTEMS INC. Inventor BIDRAM, Farhang

A method and apparatus for ultraviolet disinfection is disclosed. The apparatus includes a wheeled chassis, an articulated arm disposed on the chassis, the arm having one or more joints each having a joint actuator. The apparatus also includes an ultraviolet light source disposed on the arm, a surface sensor operably configured to generate shape signals representing a shape of a surface to be disinfected, and an arm controller operably configured to receive the shape signals and to actuate the arm actuators to conform the arm to the shape of the surface to be disinfected based on the shape signals such that the ultraviolet light is directed at the surface to be disinfected.

25. [20220236739](#) SYSTEM AND METHOD FOR OPTICAL LOCALIZATION

US - 28.07.2022

Int.Class [G05D 1/02](#) Appl.No 17621859 Applicant Advanced Intelligent Systems Inc. Inventor Farhang Bidram

A system and method for optical localization of an autonomous mobile robot. The system includes a number of movable stationary landmarks defining an operating space for the robot. The robot includes a self-propelled mobile chassis, an optical sensor [a LiDAR sensor or optical camera] disposed on a raised portion and configured to detect the landmarks, and a controller configured to determine the position and orientation of the chassis based on information from the optical sensor. The landmarks have an elevated portion extending vertically to a height level which is equal to or higher than the horizontal plane of the optical sensor. Each landmark may have a cross-sectional feature and/or a visually distinct portion, to enable determining the orientation [of the optical sensor/mobile robot] relative to the landmark; as well as an identifier for uniquely identifying the landmark from others.

26. [WO/2020/257948](#) SYSTEM AND METHOD FOR OPTICAL LOCALIZATION

WO - 30.12.2020

Int.Class [G01C 21/00](#) Appl.No PCT/CA2020/050903 Applicant ADVANCED INTELLIGENT SYSTEMS INC. Inventor BIDRAM, Farhang

A system and method for optical localization of an autonomous mobile robot. The system includes a number of movable stationary landmarks defining an operating space for the robot. The robot includes a self-propelled mobile chassis, an optical sensor [a LiDAR sensor or optical camera] disposed on a raised portion and configured to detect the landmarks, and a controller configured to determine the position and orientation of the chassis based on information from the optical sensor. The landmarks have an elevated portion extending vertically to a height level which is equal to or higher than the horizontal plane of the optical sensor. Each landmark may have a cross-sectional feature and/or a visually distinct portion, to enable determining the orientation [of the optical sensor/mobile robot] relative to the landmark; as well as an identifier for uniquely identifying the landmark from others.

27. [3144544](#) SYSTEM AND METHOD FOR OPTICAL LOCALIZATION

CA - 30.12.2020

Int.Class [G01C 21/00](#) Appl.No 3144544 Applicant ADVANCED INTELLIGENT SYSTEMS INC. Inventor BIDRAM, FARHANG

A system and method for optical localization of an autonomous mobile robot. The system includes a number of movable stationary landmarks defining an operating space for the robot. The robot includes a self-propelled mobile chassis, an optical sensor [a LiDAR sensor or optical camera] disposed on a raised portion and configured to detect the landmarks, and a controller configured to determine the position and orientation of the chassis based on information from the optical sensor. The landmarks have an elevated portion extending vertically to a height level which is equal to or higher than the horizontal plane of the optical sensor. Each landmark may have a cross-sectional feature and/or a visually distinct portion, to enable determining the orientation [of the optical sensor/mobile robot] relative to the landmark; as well as an identifier for uniquely identifying the landmark from others.

28. [3126405](#) SYSTEM AND METHOD FOR AUTOMATED FARMING OF POTTED PLANTS

CA - 23.07.2020

Int.Class [A01G 31/04](#) Appl.No 3126405 Applicant ADVANCED INTELLIGENT SYSTEMS INC. Inventor

A system for automated farming of potted plants is disclosed and includes a closed-loop conveyor system configured to facilitate gradual cyclic mobility and storage of a plurality of potted plants. The system also includes at least one centralized processing zone disposed along the conveyor system and configured to perform at least one operation such as fertilization, irrigation, treatment, instrumentation, repotting, seeding, and inspection on each individual pot. The processing zone includes at least one sensor configured to detect at least one property of a potted plant. The system also includes a processing unit in communication with the at least one sensor, the processing unit configured to determine a state of each potted plant based on the at least one detected property. The state describes a physical state of the potted plant. The system also includes at least one loading station coupled to the conveyor system and configured to feed [input] potted plants to the conveyor system, and at least one unloading station coupled to the conveyor system and configured to unload [output] potted plants from the conveyor system.

29. [20220110270](#) SYSTEM AND METHOD FOR AUTOMATED FARMING OF POTTED PLANTS

US - 14.04.2022

Int.Class [A01G 9/14](#) Appl.No 17422386 Applicant ADVANCED INTELLIGENT SYSTEMS INC. Inventor Farhang Bidram

A system for automated farming of potted plants is disclosed and includes a closed-loop conveyor system configured to facilitate gradual cyclic mobility and storage of a plurality of potted plants. The system also includes at least one centralized processing zone disposed along the conveyor system and configured to perform at least one operation such as fertilization, irrigation, treatment, instrumentation, repotting, seeding, and inspection on each individual pot. The processing zone includes at least one sensor configured to detect at least one property of a potted plant. The system also includes a processing unit in communication with the at least one sensor, the processing unit configured to determine a state of each potted plant based on the at least one detected property. The state describes a physical state of the potted plant. The system also includes at least one loading station coupled to the conveyor system and configured to feed [input] potted plants to the conveyor system, and at least one unloading station coupled to the conveyor system and configured to unload [output] potted plants from the conveyor system.

30. [3911145](#) SYSTEM AND METHOD FOR AUTOMATED FARMING OF POTTED PLANTS

EP - 24.11.2021

Int.Class [A01G 9/00](#) Appl.No 20741141 Applicant ADVANCED INTELLIGENT SYSTEMS INC Inventor BIDRAM FARHANG

A system for automated farming of potted plants is disclosed and includes a closed-loop conveyor system configured to facilitate gradual cyclic mobility and storage of a plurality of potted plants. The system also includes at least one centralized processing zone disposed along the conveyor system and configured to perform at least one operation such as fertilization, irrigation, treatment, instrumentation, repotting, seeding, and inspection on each individual pot. The processing zone includes at least one sensor configured to detect at least one property of a potted plant. The system also includes a processing unit in communication with the at least one sensor, the processing unit configured to determine a state of each potted plant based on the at least one detected property. The state describes a physical state of the potted plant. The system also includes at least one loading station coupled to the conveyor system and configured to feed [input] potted plants to the conveyor system, and at least one unloading station coupled to the conveyor system and configured to unload [output] potted plants from the conveyor system.

31. [WO/2020/146944](#) SYSTEM AND METHOD FOR AUTOMATED FARMING OF POTTED PLANTS

WO - 23.07.2020

Int.Class [A01G 9/00](#) Appl.No PCT/CA2020/050039 Applicant ADVANCED INTELLIGENT SYSTEMS INC. Inventor BIDRAM, Farhang

A system for automated farming of potted plants is disclosed and includes a closed-loop conveyor system configured to facilitate gradual cyclic mobility and storage of a plurality of potted plants. The system also includes at least one centralized processing zone disposed along the conveyor system and configured to perform at least one operation such as fertilization, irrigation, treatment, instrumentation, repotting, seeding, and inspection on each individual pot. The processing zone includes at least one sensor configured to detect at least one property of a potted plant. The system also includes a processing unit in communication with the at least one sensor, the processing unit configured to determine a state of each potted plant based on the at least one detected property. The state describes a physical state of the potted plant. The system also includes at least one loading station coupled to the conveyor system and configured to feed [input] potted plants to the conveyor system, and at least one unloading station coupled to the conveyor system and configured to unload [output] potted plants from the conveyor system.

32. [20200315099](#) METHOD AND APPARATUS FOR PERFORMING PRUNING OPERATIONS USING AN AUTONOMOUS VEHICLE

US - 08.10.2020

Int.Class [A01G 3/04](#) Appl.No 16859095 Applicant ADVANCED INTELLIGENT SYSTEMS INC. Inventor Farhang Bidram

An autonomous vehicle apparatus and method for performing pruning operations on a plant being cultivated in a container is disclosed. The apparatus includes a wheeled chassis operably configured to autonomously navigate to a location of the container within a workspace. The apparatus also includes a plant support operable to receive and secure the container in an upright condition with respect to a vertical axis extending generally vertically through the container and the plant. The apparatus further includes a manipulator mounted to the vehicle and operable to grasp and load the container onto the plant support, and a pruning tool mounted on the vehicle and disposed to prune the plant while causing rotational movement of at least one of the pruning tool and the container about the vertical axis.

33. [WO/2022/027141](#) AUTOMATIC ACTUATED VEHICLE HITCH WITH MECHANICAL CATCH

WO - 10.02.2022

Int.Class [B60D 1/36](#) Appl.No PCT/CA2021/051094 Applicant ADVANCED INTELLIGENT SYSTEMS INC. Inventor TARDIF, Alexandre David James

A method and apparatus for automated hitching of a trailer is disclosed. The apparatus includes a mounting plate, a pintle hitch mounted on the mounting plate having a portion movable between an open position and a closed position. The apparatus also includes an actuator that can move between a minimally actuated state and a maximally actuated state, a hitch linkage assembly connecting the moveable portion of the pintle hitch to the actuator, an actuator linkage connecting the actuator to the mounting plate, and a resilient member biased to hold the movable portion towards the closed position. The actuator holds the portion in the closed position when driven to one of the maximally or the minimally actuated states, and the actuator holds the portion in the open position when driven to the other of the maximally or minimally actuated states.

34. [20190283973](#) APPARATUS FOR SUPPORTING AN ARTICLE DURING TRANSPORT

US - 19.09.2019

Int.Class [B65G 25/08](#) Appl.No 16432755 Applicant ADVANCED INTELLIGENT SYSTEMS INC. Inventor Farhang Bidram

An apparatus and method for supporting an article during transport is disclosed. The apparatus includes a support surface oriented to support an underside of an article to be transported. The apparatus also includes a plurality of pins distributed over at least a portion of the support surface and movable between an extended position and a retracted position, the plurality of pins being urged into the extended position such that a lateral retaining portion of each pin protrudes above the support surface. The underside of the article, when received on the support surface, causes a first portion of the plurality of pins underlying the article to be depressed into the retracted position while a second portion of the plurality of pins remain in the extended position such that the lateral retaining portions of pins disposed adjacent to the article constrain the article to prevent movement of the article on the support surface while being transported.



35. [3090827](#) APPARATUS FOR SUPPORTING AN ARTICLE DURING TRANSPORT

CA - 22.08.2019

Int.Class [B65G 47/22](#) Appl.No 3090827 Applicant ADVANCED INTELLIGENT SYSTEMS INC. Inventor BIDRAM, FARHANG

An apparatus and method for supporting an article during transport is disclosed. The apparatus includes a support surface oriented to support an underside of an article to be transported. The apparatus also includes a plurality of pins distributed over at least a portion of the support surface and movable between an extended position and a retracted position, the plurality of pins being urged into the extended position such that a lateral retaining portion of each pin protrudes above the support surface. The underside of the article, when received on the support surface, causes a first portion of the plurality of pins underlying the article to be depressed into the retracted position while a second portion of the plurality of pins remain in the extended position such that the lateral retaining portions of pins disposed adjacent to the article constrain the article to prevent movement of the article on the support surface while being transported.

36. [3026002](#) MOBILE WORK STATION FOR TRANSPORTING A PLURALITY OF ARTICLES

CA - 15.03.2018

Int.Class [B25J 5/00](#) Appl.No 3026002 Applicant ADVANCED INTELLIGENT SYSTEMS INC. Inventor BIDRAM, FARHANG

An apparatus and method for transporting a plurality of articles is disclosed. The apparatus includes a wheeled chassis, and a platform disposed on the wheeled chassis. The apparatus also includes a manipulator coupled to the wheeled chassis and operably configured to load a first article of the plurality of articles at a first position on the platform, or unload the first article of the plurality of articles from the first position on the platform. The apparatus further includes at least one actuator operably configured to cause successive relative rotational movements between the manipulator and the platform to provide access to successive rotationally spaced apart positions on the platform for loading or unloading each subsequent article in the plurality of articles.

37. [3509800](#) MOBILE WORK STATION FOR TRANSPORTING A PLURALITY OF ARTICLES

EP - 17.07.2019

Int.Class [B25J 5/00](#) Appl.No 17847836 Applicant ADVANCED INTELLIGENT SYSTEMS INC Inventor BIDRAM FARHANG

An apparatus and method for transporting a plurality of articles is disclosed. The apparatus includes a wheeled chassis, and a platform disposed on the wheeled chassis. The apparatus also includes a manipulator coupled to the wheeled chassis and operably configured to load a first article of the plurality of articles at a first position on the platform, or unload the first article of the plurality of articles from the first position on the platform. The apparatus further includes at least one actuator operably configured to cause successive relative rotational movements between the manipulator and the platform to provide access to successive rotationally spaced apart positions on the platform for loading or unloading each subsequent article in the plurality of articles.

38. [20190248024](#) MOBILE WORK STATION FOR TRANSPORTING A PLURALITY OF ARTICLES

US - 15.08.2019

Int.Class [G06F 7/00](#) Appl.No 16393676 Applicant ADVANCED INTELLIGENT SYSTEMS INC. Inventor Farhang Bidram

An apparatus and method for transporting a plurality of articles is disclosed. The apparatus includes a wheeled chassis, and a platform disposed on the wheeled chassis. The apparatus also includes a manipulator coupled to the wheeled chassis and operably configured to load a first article of the plurality of articles at a first position on the platform, or unload the first article of the plurality of articles from the first position on the platform. The apparatus further includes at least one actuator operably configured to cause successive relative rotational movements between the manipulator and the platform to provide access to successive rotationally spaced apart positions on the platform for loading or unloading each subsequent article in the plurality of articles.

39. [20190168394](#) MOBILE WORK STATION FOR TRANSPORTING A PLURALITY OF ARTICLES

US - 06.06.2019

Int.Class [G05D 1/02](#) Appl.No 16303040 Applicant ADVANCED INTELLIGENT SYSTEMS INC. Inventor Farhang Bidram

An apparatus and method for transporting a plurality of articles is disclosed. The apparatus includes a wheeled chassis, and a platform disposed on the wheeled chassis. The apparatus also includes a manipulator coupled to the wheeled chassis and operably configured to load a first article of the plurality of articles at a first position on the platform, or unload the first article of the plurality of articles from the first position on the platform. The apparatus further includes at least one actuator operably configured to cause successive relative rotational movements between the manipulator and the platform to provide access to successive rotationally spaced apart positions on the platform for loading or unloading each subsequent article in the plurality of articles.

40. [WO/2018/045448](#) MOBILE WORK STATION FOR TRANSPORTING A PLURALITY OF ARTICLES

WO - 15.03.2018

Int.Class [B25J 5/00](#) Appl.No PCT/CA2017/000057 Applicant ADVANCED INTELLIGENT SYSTEMS INC. Inventor BIDRAM, Farhang

An apparatus and method for transporting a plurality of articles is disclosed. The apparatus includes a wheeled chassis, and a platform disposed on the wheeled chassis. The apparatus also includes a manipulator coupled to the wheeled chassis and operably configured to load a first article of the plurality of articles at a first position on the platform, or unload the first article of the plurality of articles from the first position on the platform. The apparatus further includes at least one actuator operably configured to cause successive relative rotational movements between the manipulator and the platform to provide access to successive rotationally spaced apart positions on the platform for loading or unloading each subsequent article in the plurality of articles.

41. [WO/2019/157587](#) APPARATUS FOR SUPPORTING AN ARTICLE DURING TRANSPORT

WO - 22.08.2019

Int.Class [B65G 47/22](#) Appl.No PCT/CA2019/000022 Applicant ADVANCED INTELLIGENT SYSTEMS INC. Inventor BIDRAM, Farhang

An apparatus and method for supporting an article during transport is disclosed. The apparatus includes a support surface oriented to support an underside of an article to be transported. The apparatus also includes a plurality of pins distributed over at least a portion of the support surface and movable between an extended position and a retracted position, the plurality of pins being urged into the extended position such that a lateral retaining portion of each pin protrudes above the support surface. The underside of the article, when received on the support surface, causes a first portion of the plurality of pins underlying the article to be depressed into the retracted position while a second portion of the plurality of pins remain in the extended position such that the lateral retaining portions of pins disposed adjacent to the article constrain the article to prevent movement of the article on the support surface while being transported.

42. [3107180](#) MOBILE WORK STATION FOR TRANSPORTING A PLURALITY OF ARTICLES

CA - 15.03.2018

Int.Class [B25J 5/00](#) Appl.No 3107180 Applicant ADVANCED INTELLIGENT SYSTEMS INC. Inventor BIDRAM, FARHANG

ABSTRACTA system and method for transporting a plurality of articles between a pickup location and an intended drop-off location is disclosed and includes a wheeled chassis having a pair of transceivers disposed spaced apart on the chassis. The system includes a pickup beacon positioned proximate the plurality



of articles at the pickup location, a left and a right drop-off beacon positioned on either side of the drop-off location for indicating a desired alignment of the articles at the drop-off location, each beacon including a transceiver. The transceivers on the beacons and the chassis receive location signals and process signals to determine a location and orientation of the chassis with respect to the beacons for navigating to pick up articles proximate the pickup location, to move to the drop-off location, and to place articles at the drop-off location in aligned relation with respect to the left and right drop-off beacons. Date Recue/Date Received 2021-01-25

43. [3142195](#) METHOD FOR TRANSPORTATION OF MULTIPLE ARTICLES USING A MOBILE ROBOT

CA - 03.12.2020

Int.Class [B65G 63/00](#) Appl.No 3142195 Applicant ADVANCED INTELLIGENT SYSTEMS INC. Inventor BIDRAM, FARHANG

A method for transportation of articles using a mobile robot. The mobile robot includes a mobile base, a manipulator which rotates relative to the mobile base, a storage platform on the base, and sensors, and has a navigation system. The method comprises: detecting articles at a pick-up area using the sensors; mapping the detected articles to a global map; selecting a set of articles according to predetermined parameters; determining a sequence for picking up the set of articles; loading the set of articles onto the mobile robot using the manipulator; determining a target position and orientation for the mobile base at the drop-off area optimal for unloading articles; the mobile robot travelling to the target position and orientation via the navigation system; unloading the set of articles using the manipulator according to predetermined settings. Also disclosed is a method for relocating the operation space of such a mobile robot.

44. [20220244735](#) METHOD FOR TRANSPORTATION OF MULTIPLE ARTICLES USING A MOBILE ROBOT

US - 04.08.2022

Int.Class [G05D 1/02](#) Appl.No 17615226 Applicant Advanced Intelligent Systems Inc. Inventor Farhang Bidram

A method for transportation of articles using a mobile robot. The mobile robot includes a mobile base, a manipulator which rotates relative to the mobile base, a storage platform on the base, and sensors, and has a navigation system. The method comprises: detecting articles at a pick-up area using the sensors; mapping the detected articles to a global map; selecting a set of articles according to predetermined parameters; determining a sequence for picking up the set of articles; loading the set of articles onto the mobile robot using the manipulator; determining a target position and orientation for the mobile base at the drop-off area optimal for unloading articles; the mobile robot travelling to the target position and orientation via the navigation system; unloading the set of articles using the manipulator according to predetermined settings. Also disclosed is a method for relocating the operation space of such a mobile robot.

45. [WO/2020/237367](#) METHOD FOR TRANSPORTATION OF MULTIPLE ARTICLES USING A MOBILE ROBOT

WO - 03.12.2020

Int.Class [B65G 63/00](#) Appl.No PCT/CA2020/050713 Applicant ADVANCED INTELLIGENT SYSTEMS INC. Inventor BIDRAM, Farhang

A method for transportation of articles using a mobile robot. The mobile robot includes a mobile base, a manipulator which rotates relative to the mobile base, a storage platform on the base, and sensors, and has a navigation system. The method comprises: detecting articles at a pick-up area using the sensors; mapping the detected articles to a global map; selecting a set of articles according to predetermined parameters; determining a sequence for picking up the set of articles; loading the set of articles onto the mobile robot using the manipulator; determining a target position and orientation for the mobile base at the drop-off area optimal for unloading articles; the mobile robot travelling to the target position and orientation via the navigation system; unloading the set of articles using the manipulator according to predetermined settings. Also disclosed is a method for relocating the operation space of such a mobile robot.

46. [WO/2020/069604](#) MANIPULATOR APPARATUS FOR OPERATING ON ARTICLES

WO - 09.04.2020

Int.Class [B25J 9/02](#) Appl.No PCT/CA2019/051366 Applicant ADVANCED INTELLIGENT SYSTEMS INC. Inventor BIDRAM, Farhang

A manipulator apparatus for operating on articles is disclosed. The apparatus includes a column having a mounting portion for securing the manipulator to a base and an extensible portion that is moveable over an extension range with respect to the mounting portion in response to an actuation force provided by a column actuator. The apparatus also includes an arm mounted to the extensible portion of the column at an arm joint and rotatable about the arm joint in response to an actuation torque provided by an arm rotation actuator. The apparatus further includes an end effector operably configured to perform an operation on the articles, the end effector being mounted at an end effector joint disposed at an end of the arm distal to the arm joint, the end effector being rotatable about the end effector joint in response to an actuation torque provided by an end effector rotation actuator. The rotation of the end effector occurs within an end effector movement plane and the rotation of the arm occurs within an arm movement plane, the respective movement planes being substantially parallel to each other, and the extensible portion of the column is moveable in a direction normal to the respective movement planes and the extensible portion of the column causes the arm joint to be disposed to permit clearance for a full 360° rotation of the arm over at least a portion of the extension range of the extensible portion of the column to provide an operating range within which the end effector is able to move for operating on the articles.

47. [20200108496](#) MANIPULATOR APPARATUS FOR OPERATING ON ARTICLES

US - 09.04.2020

Int.Class [B25J 18/02](#) Appl.No 16509900 Applicant ADVANCED INTELLIGENT SYSTEMS INC. Inventor Farhang Bidram

A manipulator apparatus for operating on articles is disclosed. The apparatus includes a column having a mounting portion for securing the manipulator to a base and an extensible portion that is moveable over an extension range with respect to the mounting portion in response to an actuation force provided by a column actuator. The apparatus also includes an arm mounted to the extensible portion of the column at an arm joint and rotatable about the arm joint in response to an actuation torque provided by an arm rotation actuator. The apparatus further includes an end effector operably configured to perform an operation on the articles, the end effector being mounted at an end effector joint disposed at an end of the arm distal to the arm joint, the end effector being rotatable about the end effector joint in response to an actuation torque provided by an end effector rotation actuator. The rotation of the end effector occurs within an end effector movement plane and the rotation of the arm occurs within an arm movement plane, the respective movement planes being substantially parallel to each other, and the extensible portion of the column is moveable in a direction normal to the respective movement planes and the extensible portion of the column causes the arm joint to be disposed to permit clearance for a full 360° rotation of the arm over at least a portion of the extension range of the extensible portion of the column to provide an operating range within which the end effector is able to move for operating on the articles.

48. [3114020](#) MANIPULATOR APPARATUS FOR OPERATING ON ARTICLES

CA - 09.04.2020

Int.Class [B25J 9/02](#) Appl.No 3114020 Applicant ADVANCED INTELLIGENT SYSTEMS INC. Inventor

A manipulator apparatus for operating on articles is disclosed. The apparatus includes a column having a mounting portion for securing the manipulator to a base and an extensible portion that is moveable over an extension range with respect to the mounting portion in response to an actuation force provided by a column actuator. The apparatus also includes an arm mounted to the extensible portion of the column at an arm joint and rotatable about the arm joint in response to an actuation torque provided by an arm rotation actuator. The apparatus further includes an end effector operably configured to perform an operation on the articles, the end effector being mounted at an end effector joint disposed at an end of the arm distal to the arm joint, the end effector being



rotatable about the end effector joint in response to an actuation torque provided by an end effector rotation actuator. The rotation of the end effector occurs within an end effector movement plane and the rotation of the arm occurs within an arm movement plane, the respective movement planes being substantially parallel to each other, and the extensible portion of the column is moveable in a direction normal to the respective movement planes and the extensible portion of the column causes the arm joint to be disposed to permit clearance for a full 360° rotation of the arm over at least a portion of the extension range of the extensible portion of the column to provide an operating range within which the end effector is able to move for operating on the articles..

49. [WO/2020/220118](#) SYSTEM AND METHOD FOR OPERATION OF COLLAPSIBLE MULTI-SHELF CARTS WO - 05.11.2020

Int.Class [B65G 1/06](#) Appl.No PCT/CA2020/050556 Applicant ADVANCED INTELLIGENT SYSTEMS INC. Inventor BIDRAM, Farhang

A multi-shelf storage apparatus for storage of articles, comprising a wheeled base; a frame disposed on the wheeled base; a plurality of vertically-spaced shelves on the frame for providing a storage area for articles, each shelf configured to move vertically. The apparatus includes a lift mechanism disposed on the frame, coupled to the shelves, and configured to cause collapse and extension of the shelves in a vertical direction. The apparatus has an actuator on the frame operable to drive the lift mechanism, and a power interface on the frame and electrically connected to the actuator. The apparatus has a mechanical connection for connecting to a towing device and a first power interface integral to the mechanical connection such that the actuator can receive electrical power from the towing device. Systems comprising one or more of the apparatuses and methods for loading/unloading articles utilizing the apparatuses are also disclosed.

50. [20200410609](#) SYSTEMS AND METHODS FOR AUTOMATED ARTICLE TRANSPORTATION AND MANAGEMENT THEREOF US - 31.12.2020

Int.Class [G06Q 50/02](#) Appl.No 17020273 Applicant Advanced Intelligent Systems Inc. Inventor Farhang Bidram

A system for managing and tracking plant management at a site is provided. The system includes a device management server and a plant management device communicatively connected to the device management server via a network. The plant management device is configured to: receive a plant management task order including task instructions for performing a plant management task and automatically perform the plant management task according to the task instructions; send a task receipt notification to the device management server, the task receipt notification including task beneficiary data; and transmit task performance data to the device management server, the task performance data logged during performance of the plant management task. The device management server is configured to: generate a work report for the plant management device from the task performance data; generate a billing report for the plant management device from the task beneficiary data and billing rate data, the billing report including a billable amount; and generate a productivity profile for the plant management device.

51. [20220204066](#) SYSTEM AND METHOD FOR OPERATION OF COLLAPSIBLE MULTI-SHELF CARTS US - 30.06.2022

Int.Class [B62B 5/00](#) Appl.No 17605924 Applicant Advanced Intelligent Systems Inc. Inventor Farhang Bidram

A multi-shelf storage apparatus for storage of articles, comprising a wheeled base; a frame disposed on the wheeled base; a plurality of vertically-spaced shelves on the frame for providing a storage area for articles, each shelf configured to move vertically. The apparatus includes a lift mechanism disposed on the frame, coupled to the shelves, and configured to cause collapse and extension of the shelves in a vertical direction. The apparatus has an actuator on the frame operable to drive the lift mechanism, and a power interface on the frame and electrically connected to the actuator. The apparatus has a mechanical connection for connecting to a towing device and a first power interface integral to the mechanical connection such that the actuator can receive electrical power from the towing device. Systems comprising one or more of the apparatuses and methods for loading/unloading articles utilizing the apparatuses are also disclosed.

52. [20220151156](#) METHOD AND APPARATUS AND SYSTEM FOR TRANSPORTING ITEMS USING A ROBOTIC VEHICLE US - 19.05.2022

Int.Class [A01D 90/16](#) Appl.No 17442307 Applicant ADVANCED INTELLIGENT SYSTEMS INC. Inventor Farhang Bidram

A robotic vehicle apparatus for transporting a harvested crop within a cultivation area is disclosed and includes a vehicle controller operably configured to receive a pickup signal indicating that a harvested crop portion is available for transport to a post-harvesting location and identifying a location of a worker within the cultivation area. The vehicle controller navigates the vehicle to the location of the worker for loading the harvested crop portion into a load carrying repository and generates an identifier attributing the harvested crop portion to the worker. A quantity sensor is operable to produce a quantity signal representative of a quantity of the harvested crop portion loaded and the vehicle controller transmits quantity data to a host controller including the quantity of the harvested crop portion and the identifier. A method for navigating a robotic vehicle within an area having items arranged in a plurality of generally longitudinally extending adjacent rows is also disclosed.

53. [3137977](#) SYSTEM AND METHOD FOR OPERATION OF COLLAPSIBLE MULTI-SHELF CARTS CA - 05.11.2020

Int.Class [B65G 1/06](#) Appl.No 3137977 Applicant ADVANCED INTELLIGENT SYSTEMS INC. Inventor BIDRAM, FARHANG

A multi-shelf storage apparatus for storage of articles, comprising a wheeled base; a frame disposed on the wheeled base; a plurality of vertically-spaced shelves on the frame for providing a storage area for articles, each shelf configured to move vertically. The apparatus includes a lift mechanism disposed on the frame, coupled to the shelves, and configured to cause collapse and extension of the shelves in a vertical direction. The apparatus has an actuator on the frame operable to drive the lift mechanism, and a power interface on the frame and electrically connected to the actuator. The apparatus has a mechanical connection for connecting to a towing device and a first power interface integral to the mechanical connection such that the actuator can receive electrical power from the towing device. Systems comprising one or more of the apparatuses and methods for loading/unloading articles utilizing the apparatuses are also disclosed.

54. [3134781](#) METHOD AND APPARATUS AND SYSTEM FOR TRANSPORTING ITEMS USING A ROBOTIC VEHICLE CA - 08.10.2020

Int.Class [A01D 90/16](#) Appl.No 3134781 Applicant ADVANCED INTELLIGENT SYSTEMS INC. Inventor BIDRAM, FARHANG

A robotic vehicle apparatus for transporting a harvested crop within a cultivation area is disclosed and includes a vehicle controller operably configured to receive a pickup signal indicating that a harvested crop portion is available for transport to a post-harvesting location and identifying a location of a worker within the cultivation area. The vehicle controller navigates the vehicle to the location of the worker for loading the harvested crop portion into a load carrying repository and generates an identifier attributing the harvested crop portion to the worker. A quantity sensor is operable to produce a quantity signal representative of a quantity of the harvested crop portion loaded and the vehicle controller transmits quantity data to a host controller including the quantity of the harvested crop portion and the identifier. A method for navigating a robotic vehicle within an area having items arranged in a plurality of generally longitudinally extending adjacent rows is also disclosed.



55. **WO/2020/198848** METHOD AND APPARATUS AND SYSTEM FOR TRANSPORTING ITEMS USING A ROBOTIC VEHICLE

WO - 08.10.2020

Int.Class A01D 90/16 Appl.No PCT/CA2020/050383 Applicant ADVANCED INTELLIGENT SYSTEMS INC. Inventor BIDRAM, Farhang

A robotic vehicle apparatus for transporting a harvested crop within a cultivation area is disclosed and includes a vehicle controller operably configured to receive a pickup signal indicating that a harvested crop portion is available for transport to a post-harvesting location and identifying a location of a worker within the cultivation area. The vehicle controller navigates the vehicle to the location of the worker for loading the harvested crop portion into a load carrying repository and generates an identifier attributing the harvested crop portion to the worker. A quantity sensor is operable to produce a quantity signal representative of a quantity of the harvested crop portion loaded and the vehicle controller transmits quantity data to a host controller including the quantity of the harvested crop portion and the identifier. A method for navigating a robotic vehicle within an area having items arranged in a plurality of generally longitudinally extending adjacent rows is also disclosed.

56. **109803795** MOBILE WORK STATION FOR TRANSPORTING A PLURALITY OF ARTICLES

CN - 24.05.2019

Int.Class B25J 5/00 Appl.No 201780062551.2 Applicant ADVANCED INTELLIGENT SYSTEMS INC Inventor BIDRAM FARHANG

An apparatus and method for transporting a plurality of articles is disclosed. The apparatus includes a wheeled chassis, and a platform disposed on the wheeled chassis. The apparatus also includes a manipulator coupled to the wheeled chassis and operably configured to load a first article of the plurality of articles at a first position on the platform, or unload the first article of the plurality of articles from the first position on the platform. The apparatus further includes at least one actuator operably configured to cause successive relative rotational movements between the manipulator and the platform to provide access to successive rotationally spaced apart positions on the platform for loading or unloading each subsequent article in the plurality of articles.

