CLAIMS

1. A system for performing a cleaning task, comprising:

a plurality of cleaning apparatus having respective robot information, at least one of the plurality of cleaning apparatus is configured to communicate with a processor unit; and

a user device configured to receive one or more instructions from a user and configured to communicate with the processor unit,

wherein the processor unit is a server and the processor unit comprises:

a control manager for generating a high-level control command based on the one or more instructions received from the user device;

an action generator for generating a device-specific control command for each of the plurality of cleaning apparatus from the high-level control command, wherein the processor unit is configured to transmit the device-specific control command to the corresponding cleaning apparatus for execution;

a hierarchy generation module for determining a hierarchy state for the plurality of cleaning apparatus based on the robot information; and

a task planning module for generating a cleaning operation plan based on at least the hierarchy state assigned to the plurality of cleaning apparatus and the cleaning task, wherein the cleaning operation plan comprises multiple cleaning operation layers with each operation layer comprising a plurality of operational protocols specified for at least one cleaning apparatus;

an authentication manager for receiving from a user the robot information of a cleaning apparatus, generating a passphrase based on the received robot information, providing the user with the generated passphrase, receiving a user provided passphrase from the user, and allowing the user to control the cleaning apparatus if the user provided passphrase matches the generated passphrase,

wherein providing the user with the generated passphrase comprises sending the generated passphrase to the cleaning apparatus for retrieval by the user.

2. The system according to claim 1, wherein providing the user with the generated passphrase comprises one of:

sending the generated passphrase to a user-registered email address of the user;

sending the generated passphrase to a user-registered phone number of the user; and

sending the generated passphrase to a user device of the user from which the authentication manager receives the robot information.

3. The system according to claim 1 or 2, wherein the processor unit further comprises a data clustering unit for managing the inflow and outflow of data between the processor unit and the plurality of cleaning apparatus.

4. The system according to any one of claims 1 to 3, wherein the plurality of cleaning apparatus comprises one or more cleaning apparatus, each cleaning apparatus is capable of performing one or more of the following cleaning actions: sweeping, vacuuming, scrubbing, mopping, window cleaning, table cleaning garbage collecting, arrangement of furniture for facilitating cleaning.

5. The system according to any one of claims 1 to 4, wherein the processor unit comprises at least a cloud server.

6. The system according to any one of claim 1 to 5, wherein the system is configured to track and record activities of the plurality of cleaning apparatus and/or of the user.

7. The system according to one of the claims 1 to 6, wherein the task planning module considers time factor and zone information for generating the cleaning operation plan.

8. The system according to one of the claims 1 to 7, wherein the hierarchy generation module determines a rank for the plurality of cleaning apparatus in the hierarchy state with each apparatus forming the operation layer based on the rank.

9. The system according to one of the claims 1 to 8, wherein the plurality of operational protocols are operation parameters such as an operation time period, a coverage area, and a robot navigation path for the plurality of cleaning apparatus to follow when performing the cleaning task.

10. The system according to one of the claims 1 to 9, wherein the cleaning operation plan generated by the task planning module is transmitted to the task execution module to execute the cleaning task.

11. The system according to claim 1, wherein the one or more instructions from the user comprises:

an operation time period;

a coverage area, and

a robot navigation path for each of the plurality of cleaning apparatus.

12. The system according to claim 1 or claim 11, wherein the high-level control command comprises overall goals of the plurality of cleaning apparatus.

13. The system according to claim 1, 11 or 12, wherein the device-specific control command comprises operations and actions to be performed by the plurality of cleaning apparatus.

14. The system according to claim 13, wherein the device-specific control command is in a low-level programming language.