been designed to have a friendly appearance while providing user-friendly interactivity.

Summary of the Invention

According to an aspect of the present invention, there is provided a human interaction system for interaction by a user comprising social systems comprising at least a social robot and one or more virtual robot systems, and a coordination system, wherein: the social robot is controlled by a robot processing system and is configured to provide interaction with a user, said interaction including output means and input means, the ~~one or more~~ one or more virtual robot systems are configured to controllably present an avatar representation of the social robot, and further configured to receive inputs, the coordination system is configured to coordinate operation of the social robot and the one or more virtual robots such that, at any one time, either the social robot or one of the virtual robot systems is active, such that, in operation, a user perceives a robot personality associated with the social robot and the avatar as associated with the active social robot or virtual robot system.

The social robot may comprise one or more cameras and/or a microphone as input means, and/or the social robot may comprise a speaker and/or one or more lights as output means.

The coordination system may be in data communication with the social robot and the one or more virtual robot systems.

The social robot may comprise a first portion, such as a head, moveable with respect to a second portion, such as a body.

The coordination system may be configured to: determine a location of the user and to determine a corresponding social system to the location of the user; and communicate a message to the corresponding social system configuring it as active. The coordination system may be further configured to: communicate a message to the one or more other social systems configuring each as inactive. The coordination

The claims defining the invention are as follows:

1. A human interaction system for interaction by a user comprising social systems comprising at least a social robot and one or more virtual robot systems, and a coordination system, wherein:

the social robot is controlled by a robot processing system and is configured to provide interaction with a user, said interaction including output means and input means,

the ~~one or more~~ one or more virtual robot systems are configured to controllably present an avatar representation of the social robot, and further configured to receive inputs,

the coordination system is configured to coordinate operation of the social robot and the one or more virtual robots such that, at any one time, either the social robot or one of the virtual robot systems is active,

such that, in operation, a user perceives a robot personality associated with the social robot and the avatar as associated with the active social robot or virtual robot system.

2. A system as claimed in claim 1, wherein the social robot comprises at least one of:

one or more cameras and/or a microphone as input means~~, and/or wherein the social robot comprises~~;

a speaker and/or one or more lights as output means; and

a first portion, such as a head, moveable with respect to a second portion, such as a body.

~~3. A system as claimed in claim 1 or claim 2, wherein the coordination system is in data communication with the social robot and the one or more virtual robot systems.~~

~~4. A system as claimed in any one of claims 1 to 3, wherein the social robot comprises a first portion, such as a head, moveable with respect to a second portion, such as a body.~~

~~5~~3. A system as claimed in any one of claims 1 to ~~4~~2, wherein the coordination system is configured to:

determine a location of the user and to determine a corresponding social system to the location of the user; and

communicate a message to the corresponding social system configuring it as active.

~~6~~4. A system as claimed in claim ~~5~~3, wherein the coordination system is further configured to:

in response to determining the corresponding social system is the location of the user, communicate a message to the one or more other social systems configuring each as inactive.

~~7. A system as claimed in either claim 5 or claim 6, wherein the coordination system is configured to receive a present communication from each social system, wherein the present communication is generated in response to an input means of the social system indicating the presence of the user at a physical location associated with the social system.~~

~~8~~5. A system as claimed in any one of claims 1 to ~~7~~4, wherein the one or more virtual robot systems are configured to animate the avatar, and wherein at least one animation is equivalent to a movement of the social robot.

~~9. A system as claimed in any one of claims 1 to 8, wherein the one or more virtual robot systems are configured to animate the avatar, and wherein at least one animation is not equivalent to a movement of the social robot.~~

~~10~~6. A system as claimed in any one of claims 1 to ~~9~~5, wherein the robot processing system is configured to control, at least in part, the operation of an active virtual robot system.

~~11~~7. A system as claimed in claim ~~10~~6, wherein the active virtual robot system is configured to interpret commands received from the robot processing system and adapt said commands for display on a display of the virtual robot system.

~~12~~8. A system as claimed in any one of claims 1 to ~~11~~7, where at least one virtual robot system is configured with at least two predefined avatar appearances, and wherein one of said predefined avatar appearances is selected in dependence on an application.

~~13~~9. A system as claimed in claim ~~12~~8, wherein one of the predefined avatar appearances is a neutral appearance.

~~14. A system as claimed in any one of claims 1 to 13, where at least one virtual robot system is configured with at least two predefined virtual environments over which the avatar is presented.~~

~~15~~10. A system as claimed in any one of claims 1 to ~~14~~9, further comprising one or more interaction devices in data communication with the social robot and/or virtual robot system(s), the interaction devices enabling the user to provide inputs and receive outputs.

~~16~~11. A system as claimed in claim ~~15~~10, wherein at least one virtual robot system is configured to present a virtual object corresponding to an interaction device.

~~17. A system as claimed in any one of claims 1 to 16, wherein the social robot and/or at least one virtual robot system is configured for data communication with one or more auxiliary devices.~~

~~18~~12. A system as claimed in any one of claims 1 to ~~17~~11, wherein the avatar appearance is controllable in response to a user command to perform a verbal communication and/or a visual action.

~~20~~13. A human interaction system for interaction by a user comprising social systems comprising at least a social robot and one or more virtual robot systems, wherein:

the social robot is controlled by a robot processing system and is configured to provide interaction with a control user, said interaction including output means and input means,

the one or more one or more virtual robot systems are configured to controllably present an avatar representation of the social robot, and further configured to receive inputs, wherein the, or each, virtual robot system is associated with a user,

such that, in operation, the, or each, user perceives a robot personality associated with the social robot and the avatar as associated with the active social robot or virtual robot system.

~~21. A system as claimed in claim 20, wherein the social robot comprises one or more cameras and/or a microphone as input means, and/or wherein the social robot comprises a speaker and/or one or more lights as output means.~~

~~22. A system as claimed in claim 20 or claim 21, wherein the social robot comprises a first portion, such as a head, moveable with respect to a second portion, such as a body.~~

~~23~~14. A system as claimed in claim 13~~any one of claims 20 to 22~~, wherein the one or more virtual robot systems are configured to animate the avatar, and wherein at least one animation is equivalent to a movement of the social robot and at least one animation is not equivalent to a movement of the social robot.

~~24. A system as claimed in any one of claims 20 to 23, wherein the one or more virtual robot systems are configured to animate the avatar, and wherein at least one animation is not equivalent to a movement of the social robot.~~

~~25. A system as claimed in any one of claims 20 to 24, wherein the robot processing system is configured to control, at least in part, the operation of an active virtual robot system.~~

~~26. A system as claimed in any one of claims 20 to 25, where at least one virtual robot system is configured with at least two predefined avatar appearances, and wherein one of said predefined avatar appearances is selected in dependence on an application.~~

~~27. A system as claimed in claim 26, wherein one of the predefined avatar appearance is a neutral appearance.~~

~~28. A system as claimed in any one of claims 20 to 27, where at least one virtual robot system is configured with at least two predefined virtual environments over which the avatar is presented.~~

~~29~~15. A system as claimed in any one of claims ~~20~~ 13 to ~~28~~14, further comprising one or more interaction devices in data communication with the social robot and/or virtual robot system(s), the interaction devices enabling the user to provide inputs and receive outputs.

~~30~~16. A system as claimed in claim ~~29~~15, wherein at least one virtual robot system is configured to present a virtual object corresponding to an interaction device.

~~31. A system as claimed in any one of claims 20 to 30, wherein the social robot and/or at least one virtual robot system is configured for data communication with one or more auxiliary devices.~~

~~32~~17. A system as claimed in claim ~~31~~13, wherein the social robot is configured to receive voice commands from the control user, wherein at least one voice command corresponds to a request for information from a particular virtual robot system, and wherein the social robot is further configured to:

communicate said command to said particular virtual robot system.

~~33. A system as claimed in claim 32, wherein the social robot is further configured to:~~

~~receive a response to said command from the particular virtual robot system.~~

~~34~~18. A system as claimed in claim ~~32~~ 17~~or claim 33~~, wherein at least one virtual robot system is further configured to:

receive a directed command;

undertake an associated action; and

communicate a response to the social robot.

~~35~~19. A system as claimed in claim ~~34~~18, wherein at least one associate action comprises obtaining a result from an associated auxiliary device in communication with the associated virtual robot system.

~~36. A system as claimed in any one of claims 20 to 35, wherein the avatar appearance is controllable in response to a user command to perform a verbal communication and/or a visual action.~~

~~37~~20. A human interaction method for allowing interaction by a user with a social system comprising at least a social robot and one or more virtual robot systems, comprising:

controlling the social robot to provide interaction with a user, said interaction including output means and input means,

controllably presenting an avatar representation of the social robot on one or more displays, such that when an avatar representation is displayed on a display it is active, and

coordinating operation of the social robot and the one or more virtual robots such that, at any one time, either the social robot or one of the virtual robot systems is active,

such that, in operation, a user perceives a robot personality associated with the social robot and the avatar as associated with the active social robot or virtual robot system.