

SYSTEM AND METHOD FOR HOSPITALITY ASSISTANCE

Technical Field

[001] The present invention generally relates to assistance of guests in a hospitality establishment, and in particular to assistance of guests in a hospitality establishment by detection of guest activities.

Background

[002] Several services offered by hospitality establishments require guests to initiate requests for any desired service. For example, in the case of a hotel, it is the guest who, upon waking from sleep must take necessary steps to order breakfast through room service or even by physically travelling to a dining area.

[003] Typically, such service requests have to be placed with a human operator or assistant of the hospitality establishment. This can lead to inconvenient delays, particularly during periods of high guest activity.

[004] In any case, this arrangement places a burden on the guest, who may find the experience frustrating and who may therefore avoid requesting the services of the hospitality establishment, causing it to lose business.

[005] There is a need for new or improved systems and/or new or improved methods or processes for assisting guests in a hospitality establishment.

[006] The reference in this specification to any prior publication (or information derived from the prior publication), or to any matter which is known, is not, and should not be taken as an acknowledgment or admission or any form of suggestion that the prior publication (or information derived from the prior publication) or known matter forms part of the common general knowledge in the field of endeavour to which this specification relates.

Summary

[007] This summary is provided to introduce a selection of concepts in a simplified form that are further described below in the preferred Embodiments. This summary is not intended to identify key features or essential features of the claimed subject matter, nor is it intended to be used to limit the scope of the claimed subject matter.

[008] According to one example aspect, there is provided a system for assisting a guest in a guest area of a hospitality establishment, the system comprising: sensors located in the guest area for detecting activities of the guest; and a processing system interconnected to the sensors; wherein the processing system is configured to: interpret signals received from the sensors; and trigger a response relevant to a future activity based on the interpreted signals.

[009] According to another example aspect, there is provided a method for assisting a guest in a guest area of a hospitality establishment, the method comprising the steps of: detecting, through RFID readers, activities of the guest; interpreting signals received from the RFID readers, the signals being an indication of utility usage; and triggering a response relevant to a future activity based on the interpreted signals.

Brief Description of Figures

[010] Example embodiments are apparent from the following description, which is given by way of example only, of at least one preferred but non-limiting embodiment, described in connection with the accompanying figures.

[011] Figure 1 illustrates an example system for assisting a guest in a guest area of a hospitality establishment.

[012] Figure 2 illustrates an example processing system for use in the system of Figure 1.

[013] Figure 3 illustrates an example network infrastructure to which the example system of Figure 1 may be connected.

[014] Figure 4 illustrates an example method for assisting a guest in a guest area of a hospitality establishment.

Detailed Description

[015] There is provided a system relying on use of IOT sensors to provide a more customised and convenient hospitality experience to guests or patrons. In some embodiments, the IOT sensors are able to track activities of guests or patrons, without being intrusive to the guests or patrons. The system can also be configured to provide predictive capabilities for meeting future needs and/or wants of guests or patrons. In addition, the system also can facilitate billing for usage of utilities and/or services in real time. The system is based on interpreting the signal obtained by the IOT sensors during activities and tasks carried out by the guests or patrons.

[016] The following modes, given by way of example only, are described in order to provide a more precise understanding of the subject matter of a preferred embodiment or embodiments. In the figures, incorporated to illustrate features of an example embodiment, like reference numerals are used to identify like parts throughout the figures.

[017] To the extent that a method or individual steps of a method is/are described in this description, the method or individual steps of the method can be executed by an appropriately configured system and/or an individual device of the system. Analogous remarks apply to the elucidation of the operation mode of a system and/or individual devices of the system that execute(s) method steps. To this extent, apparatus features and method features of this description are equivalent.

[018] Referring to Figure 1, there is provided a system 100 for assisting a guest, or guests, in a guest area 105 of a hospitality establishment. System 100 comprises sensors 110 located in the guest area for detecting activities of the guest, and a processing system 120 interconnected to the sensors. Processing

system 120 is configured to interpret signals received from sensors 110 and to trigger a response relevant to a future activity based on the interpreted signals.

[019] System 100 may be deployed in hospitality establishments providing accommodation, such as hotels, hostels, motels, inns, resorts, serviced apartments, or bed and breakfasts. Alternatively, system 100 may be deployed in hospitality establishments providing entertainment or catering such as nightclubs, cafes, pubs, bars, restaurants, and cruise liners. System 100 may further be deployed in any other type of hospitality establishment servicing guests or patrons.

[020] The type of guest area 105 of system 100 may vary depending on the hospitality establishment or setting in which system 100 is deployed. In general, the guest area is any area, space, room, location, or zone where guest or patron activity may occur, or where guests or patrons may be present.

[021] In some examples, the guest area is a hotel suite, comprising one or more rooms (e.g. bathroom, bedroom, walk-in wardrobe). In some examples, the guest area is a single room (e.g. a single room in a hotel suite). In other examples, the guest area may be any other area, space, room, location, or zone where guest activities may occur or where guests may be present, such as a swimming pool area, an entertainment room, an eating area, an elevator area, or a hotel lobby.

[022] System 100 may include any number (e.g. one, two, three, or more) of sensors or detectors 110. Furthermore, system 100 may include various types of sensors, such as temperature sensors, proximity (or presence) sensors, pressure sensors, light sensors, tactile sensors, sound sensors, voice sensors, chemical sensors, electric sensors, magnetic sensors, or any other type of sensor for detecting one or more activities which may be monitored by system 100. In some examples, system 100 includes radio-frequency identification (RFID) sensors or readers.

[023] In some examples, sensors 110 are configured to detect activities of one or more guests. The activities may be present activities, occurring at the time of

detection. Detection may comprise detecting, discovering, recognising, or identifying variations in some parameter at a single point in time, or at a single time period (e.g. a time period when a guest activity commences). In other examples, sensors 110 are configured to monitor activities of one or more guests. Monitoring may comprise repeated detection of variations in some parameters at two or more points in time, or at two or more time periods (e.g. multiple time periods during which a guest activity occurs).

[024] The number of sensors, the type of sensors, and the location of the sensors may vary or it may be fixed for a given system 100. Sensors 110 may be inserted, embedded, attached, or added to existing devices, furniture, or appliances of the hospitality establishment. In some examples, some or all facilities in a hospitality establishment, or guest area, may be provided with sensors. The range of activities monitored, or detected, by system 100 may vary depending on the type of guest area 105 where system 100 is deployed, as well as on preferences of guests and management of the hospitality establishment.

[025] In some examples, the activity being detected is a hotel guest rising from a bed, for example, by means of a pressure sensor located under a mattress. In some examples, the activity being detected is a hotel guest finishing a meal, for example, by means of a sound or voice sensor. In some examples, the activity being detected is housekeeping or cleaning services within a hotel room, for example, by means of an RFID sensor reading an RFID tag carried by the hotel's housekeeping personnel. In some examples, the activity being detected is usage of water and/or electricity in a hotel room, for example, by means of water and electricity sensors, respectively.

[026] The functionality of sensors 110 may either be managed by an administration or personnel of the hospitality establishment, or by a computer system of the hospitality establishment. In some examples, guests may be able to select the functionality of sensors 110, such as by turning off one or more sensors 110 in their allocated hotel room.

[027] System 100 may detect one or more different types of activities, and it may detect one or more instances or occurrences of such activities in the guest space at any time (e.g. detect activities by multiple guests in the guest space). Moreover, more than one type of sensor 110 may be used to detect any activity. For example, the activity of a guest rising from a bed may be detected by the combination of a pressure sensor in the bed and by a light sensor in the room.

[028] Sensors 110 may be connected, or be able to connect, to a network, either wirelessly or through wired means. In some examples, sensors 110 may be connected to the Internet. One or more sensors 110 may further be connected to other sensors 110 of system 100. In some examples, sensors 110 are interconnected to other sensors and are able to communicate with the other sensors. The other sensors may be in the same guest area or in a different guest area.

[029] Sensors 110 are connected or interconnected to processing system 120, such that processing system 120 is able to receive signals, data, and/or information collected by sensors 110. Sensors 110 may either be directly or indirectly interconnected to processing system 120. Furthermore, the interconnection between sensors 110 and processing system 120 may occur through additional components, such as routers, transmitters, receivers, amplifiers or any other component required to establish transmittance of signals from sensors 110 to processing system 120.

[030] Various arrangements, architectures, or infrastructures, exist by which sensors 110 may be interconnected to processing system 120. In one example, sensors 110 and processing system 120 are interconnected through a cloud computing infrastructure, whereby processing system 120 comprises a network of remote servers. Processing system 120 may be hosted on the Internet or on any other network. In this first example, sensors 110 and processing system 120 form an example embodiment of the Internet of Things.

[031] In another example, sensors 110 and processing system 120 are interconnected through a local server infrastructure. Processing system 120 may be hosted on a local area network.

[032] In other examples, sensors 110 and processing system 120 may be interconnected through a combination of cloud computing and local server infrastructure. In some examples, most of the processing is carried out remotely, on remote servers.

[033] Processing system 120 is configured to interpret signals received from sensors 110. Interpreting the signals received from sensors 110 includes determining an activity being carried out or a facility being used in guest area 105. In some examples, processing system 120 relies on signals received from a single sensor 110 to determine the activity or facility in use. In other examples, processing system may combine signals received from two or more sensors 110 to determine the activity or facility being used.

[034] The signals received from sensors 110 may be measurements of certain parameters, depending on the sensors 110 from which the signals are received. For example, the signals may be measurements of a volume level, or of a pressure level. In some examples, the signals may have representative or quantised values, such as in binary signals, where a "1" indicates the detection of some activity, and a "0" indicates a lack of the activity, or vice versa. The modulation scheme and protocol of the signals may vary between sensors.

[035] Processing system 120 may further rely on additional information to interpret the received signals. For example, detecting whether a hotel guest has woken may involve interpreting a signal from a pressure sensor located in a bed in addition to the local time. If the guest is sensed to have left the bed but the local time indicates that it is night-time, then the interpretation of the processing system 120 may be that the guest intends to return to bed shortly and they have therefore not yet woken.

[036] In some examples, sensors 110 and/or processing system 120 are configured to communicate with the guest and/or an administration, management, or personnel of the hospitality establishment. For example, processing system 120 may send the guest up-to-date billing information, recommendations, or any order pending. This information may be sent to a terminal device of the guest (e.g. a mobile phone, tablet, smart-watch, or any other device capable of receiving and displaying information) through a network, which is preferably, though not necessarily, a wireless network. The information may be displayed on the terminal device through software application (e.g. a mobile app) which may be specific or dedicated to the hospitality establishment, or may be a generic software application. The software application may allow for interaction and customisation of system 100 by the guest and/or the administration of the hospitality establishment.

[037] Interpreting the signals received from sensors 110 may further include identifying the guest carrying out the activity, or identifying an account corresponding to the guest carrying out the activity. Therefore, processing system 120 may be configured to identify the guest, or an account relating to the guest. Preferably, though not necessarily, the guest is identified through an RFID tag carried by the guest. RFID readers located in the guest area may then read a code on the tag and convey the information to processing system 120. The code may be linked to personal information of the guest (e.g. name, address, schedule) or it may be linked to an account of the guest, such as a billing account, to mask or conceal the identity of the guest. Alternatively, other means for recognising guests may be used, such as biometric scanners or face-recognition means.

[038] In some examples, processing system 120 may simply presume that activities occurring in a certain guest area are associated with a particular guest, or guest account, without explicitly identifying the guest. For example, for sensors 110 located solely in a given hotel suite, processing system 120 may presume that any activity detected by the sensors is associated with the guest hiring that particular suite. In this way, processing system 120 may not need to identify who is carrying out the activity.

[039] In some examples, the signals received by processing system 120 are indicative of utility usage. The utility may be electricity, water, gas, or any other service provided by the hospitality establishment. The future activity in this case may be the issuing of an invoice for the guest (e.g. at checkout) and the response triggered by processing system 120 may be to update the invoice or billing information of the guest by adding charges related to the detected utility usage. The response may further include sending a notification to the guest (e.g. to the guest's mobile phone or email account) regarding the updated invoice and, in some examples, providing suggestions to the guest to reduce usage and save costs (e.g. using buckets instead of a shower).

[040] In one example, the water supply line to a hotel room is equipped with a sensor which detects water usage. The sensor may be configured to detect certain key events, such as turning on and off of the water, and the processing system calculates water usage based on the difference in timings between these events. Alternatively, the sensor may monitor water usage by continuously measuring water flow and the processing system calculates water usage through summation or integration of a water flow curve over time. In other examples, the sensor detects any parameter which enables calculation of total water usage for the given hotel room by the processing system. The processing system then updates an invoice of a guest staying in the room to include charges for the calculated water usage.

[041] Therefore, system 100 enables a more customised approach to billing for guests of a hospitality establishment, since guests are billed in proportion to their usage of utilities and/or services. An additional advantage of system 100 is that it is able to supply guests with updated billing information in real time (or on any other regular basis, such as daily). These factors can make guests more conscious as to their consumption, incentivising them to be more efficient in their usage of utilities and/or services, and preserving limited resources (such as water) in the process.

[042] In some examples, processing system 120 is further configured to predict the future activity based on the interpreted signals. By interpreting the signals received from sensors 110, processing system 120 is able to determine a present activity of the guest. Processing system 120 may then access a general database which provides one or more future activities that may follow the determined present activity. Each possible future activity may be allocated a probability, or likelihood, of occurring. Processing system 120 may rely on computational heuristic intelligence, artificial intelligence, fuzzy logic prediction, or any other prediction system or process to predict the future activity. Processing system 120 may further rely on any other information, in addition to the received signals, for making its predictions.

[043] In some examples, processing system 120 may rely on machine learning algorithms to learn habits of guests so as to be able to make suggestions and/or place orders that are likely to be relevant to a future activity of guests based on the current activity detected. Therefore, processing system 120 may undergo a training or learning phase when a new guest enters guest area 105.

[044] The guest may be able to customise their preferences or input information which may aid processing system 120 in predicting the future activity. For example, a hotel guest may let the hotel know that they are on holiday, or that they do not eat breakfast, or that they have certain food allergies, or that they will need to travel the next day. The guest may provide this information to the hotel (e.g. at reception) or through a mobile phone application, or through any other means. This information is then stored, either in processing system 120 or any other memory unit, such that the information is accessible by processing system 120 for determining the triggered response and/or for predicting the future activity.

[045] In some examples, the response triggered by processing system 120 includes placing an order relevant to the future activity with the hospitality establishment on behalf of the guest. In other examples, the response includes sending a recommendation, or suggestion, relevant to the future activity to the

guest. The recommendation may be sent to a terminal device of the guest, such as a mobile phone, tablet, or laptop of the guest. In some examples, the recommendation includes a list of possible options or orders that the guest may place. The guest may then select one of the orders, for example, through the terminal device via a mobile phone application, with the selected order being transmitted or relayed to the hospitality establishment to act on. Processing system 120 may further update billing information of the guest based on the selected order. In some examples, the guest may select whether processing system 120 is set to automatically place an order, or if a recommendation is to be sent to the guest prior to the order being placed.

[046] In one example, tea or coffee is ordered or suggested by processing system 120 when a guest is sensed to have left the bed in the morning hours. In another example, breakfast is ordered or suggested when a guest is sensed to have left a bath or shower, prior to having left the room. Whether breakfast is ordered or suggested may be set by the guest according to their preference. Processing system 120 may also place orders or make recommendations on a future activity which may occur outside of the hospitality establishment. For example, a taxi or other transport external to the hospitality establishment may be booked when a guest is sensed to have finished breakfast. In another example, processing system 120 recommends a number of tourist attractions when it senses that the guest has finished breakfast.

[047] In some examples, the response triggered by processing system 120 is further configured to operate, or to send a command to operate, another system which may be used by the guest for the future activity. For example, processing system 120 may instruct a boiler to start heating hot water if processing system 120 determines that the future activity of the guest is to take a shower, or order a coffee. Alternatively, processing system 120 may turn on/off the lights in an area relevant to the future activity. For this, processing system 120 may be further connected, or able to send commands and/or information, to systems or machines which may be required for the future activity of the guest.

[048] In some examples, an administration, management, or personnel of the hospitality establishment is able to monitor sensors 110 and can further monitor any recommendation or order placed by processing system 120. The administration may be able to manually override any recommendation or order placed by processing system 120. In some examples, the administration may be able to manually interpret the signals received from sensors 110 and/or to trigger the response relevant to the future activity based on the interpreted signals. In some examples, the administration may be able to manually make suggestions and/or place orders for the guest through system 100.

[049] System 100 therefore is able to provide a more customised and convenient hospitality experience to guests or patrons. Another advantage of system 100 is that it facilitates checking on housekeeping or cleaning services. In some examples, using sensors rather than cameras for detecting activities is advantageous because it does not hinder the privacy of guests or patrons.

[050] Referring to Figure 2, there is illustrated an example embodiment of a processing system 200 for use in the system for assisting a guest in a guest area of a hospitality establishment as described above. In particular, processing system 200 generally includes at least one processor 202, or processing unit or plurality of processors, memory 204, at least one input device 206 and at least one output device 208, coupled together via a bus or group of buses 210. In certain embodiments, input device 206 and output device 208 could be the same device. An interface 212 can also be provided for coupling the processing system 200 to one or more peripheral devices, for example interface 212 could be a PCI card or PC card. At least one storage device 214 which houses at least one database 216 can also be provided. The memory 204 can be any form of memory device, for example, volatile or non-volatile memory, solid state storage devices, magnetic devices, etc. The processor 202 could include more than one distinct processing device, for example to handle different functions within the processing system 200.

[051] Input device 206 receives input data 218 and can include, for example, a keyboard, a pointer device such as a pen-like device or a mouse, audio receiving device for voice controlled activation such as a microphone, data receiver or antenna such as a modem or wireless data adaptor, data acquisition card, etc. Input data 218 could come from different sources, for example keyboard instructions in conjunction with data received via a network. Output device 208 produces or generates output data 220 and can include, for example, a display device or monitor in which case output data 220 is visual, a printer in which case output data 220 is printed, a port for example a USB port, a peripheral component adaptor, a data transmitter or antenna such as a modem or wireless network adaptor, etc. Output data 220 could be distinct and derived from different output devices, for example a visual display on a monitor in conjunction with data transmitted to a network. A user could view data output, or an interpretation of the data output, on, for example, a monitor or using a printer. The storage device 214 can be any form of data or information storage means, for example, volatile or non-volatile memory, solid state storage devices, magnetic devices, etc.

[052] In use, the processing system 200 is adapted to allow data or information to be stored in and/or retrieved from, via wired or wireless communication means, the at least one database 216. The interface 212 may allow wired and/or wireless communication between the processing unit 202 and peripheral components that may serve a specialised purpose. The processor 202 receives instructions as input data 218 via input device 206 and can display processed results or other output to a user by utilising output device 208. More than one input device 206 and/or output device 208 can be provided. It should be appreciated that the processing system 200 may be any form of terminal, server, specialised hardware, or the like. Moreover, in some examples, a processing system to be used in a system for assisting a guest may include two or more processing systems 200, which may be interconnected together.

[053] The processing system 200 may be a part of a networked communications system 300, as shown in Fig. 3. Processing system 200 could connect to network 302, for example the Internet or a WAN. Input data 218 and output data 220 could

be communicated to other devices via network 302. Other terminals, for example, thin client 304, further processing systems 306 and 308, notebook computer 310, mainframe computer 312, PDA 314, pen-based computer 316, server 318, etc., can be connected to network 302. A large variety of other types of terminals or configurations could be utilised. The transfer of information and/or data over network 302 can be achieved using wired communications means 320 or wireless communications means 322. Server 318 can facilitate the transfer of data between network 302 and one or more databases 324. Server 318 and one or more databases 324 provide an example of an information source.

[054] Other networks may communicate with network 302. For example, telecommunications network 330 could facilitate the transfer of data between network 302 and mobile or cellular telephone 332 or a PDA-type device 334 or sensors (not shown), by utilising wireless communication means 336 and receiving/transmitting station 338. Satellite communications network 340 could communicate with satellite signal receiver 342 which receives data signals from satellite 344 which in turn is in remote communication with satellite signal transmitter 346. Terminals, for example further processing system 348, notebook computer 350 or satellite telephone 352, can thereby communicate with network 302. A local network 360, which for example may be a private network, LAN, etc., may also be connected to network 302. For example, network 302 could be connected with ethernet 362 which connects terminals 364, server 366 which controls the transfer of data to and/or from database 368, and printer 370. Various other types of networks could be utilised.

[055] The processing system 200 is adapted to communicate with other terminals, for example further processing systems 306, 308, by sending and receiving data, 218, 220, to and from the network 302, thereby facilitating possible communication with other components of the networked communications system 300.

[056] Thus, for example, the networks 302, 330, 340 may form part of, or be connected to, the Internet, in which case, the terminals 306, 312, 318, for

example, may be web servers, Internet terminals or the like. The networks 302, 330, 340, 360 may be or form part of other communication networks, such as LAN, WAN, ethernet, token ring, FDDI ring, star, etc., networks, or mobile telephone networks, such as GSM, CDMA or 3G, etc., networks, and may be wholly or partially wired, including for example optical fibre, or wireless networks, depending on a particular implementation.

[057] Referring to Figure 4, there is illustrated a method 400 for assisting a guest in a guest area of a hospitality establishment. Method 400 includes step 410 of detecting, through sensors, activities of the guest. Then, at step 420, interpreting signals received from the sensors. Then, at step 430, triggering a response relevant to a future activity based on the interpreted signals.

[058] In some examples, method 400 further comprises the step of identifying the guest. In some examples, method 400 further comprises the step of predicting the future activity based on the interpreted signals.

[059] Optional embodiments may also be said to broadly include the parts, elements, steps and/or features referred to or indicated herein, individually or in any combination of two or more of the parts, elements, steps and/or features, and wherein specific integers are mentioned which have known equivalents in the art to which the invention relates, such known equivalents are deemed to be incorporated herein as if individually set forth.

[060] Although a preferred embodiment has been described in detail, it should be understood that many modifications, changes, substitutions or alterations will be apparent to those skilled in the art without departing from the scope of the present invention.

[061] Throughout this specification and the claims which follow, unless the context requires otherwise, the word "comprise", and variations such as "comprises" or "comprising", will be understood to imply the inclusion of a stated

integer or step or group of integers or steps but not the exclusion of any other integer or step or group of integers or steps.

The claims:

1. A system for assisting a guest in a guest area of a hospitality establishment, the system comprising:
 - sensors located in the guest area for detecting activities of the guest; and
 - a processing system interconnected to the sensors;
 - wherein the processing system is configured to:
 - interpret signals received from the sensors; and
 - trigger a response relevant to a future activity based on the interpreted signals.
2. The system of claim 1, wherein the guest area is either a hotel suite or hotel room.
3. The system of any one of claims 1 to 2, wherein one or more sensors are RFID readers.
4. The system of any one of claims 1 to 3, wherein the sensors are connected to a network.
5. The system of any one of claims 1 to 4, wherein the processing system is interconnected to the sensors through a cloud computing infrastructure.
6. The system of any one of claims 1 to 5, wherein the processing system is interconnected to the sensors through a local server infrastructure.
7. The system of any one of claims 1 to 6, wherein the processing system is further configured to identify the guest.
8. The system of any one of claims 1 to 7, wherein the signals indicate utility usage.

9. The system of any one of claims 1 to 8, wherein the future activity is issuing an invoice and the response includes updating billing information of the guest.
10. The system of any one of claims 1 to 9, wherein the processing system is further configured to predict the future activity based on the interpreted signals.
11. The system of any one of claims 1 to 10, wherein the response includes at least one of: sending a recommendation relevant to the future activity to the guest, placing an order relevant to the future activity with the hospitality establishment on behalf of the guest, or updating billing information of the guest, the recommendation being sent to a terminal device of the guest.
12. A method for assisting a guest in a guest area of a hospitality establishment, the method comprising the steps of:
 - detecting, through RFID readers, activities of the guest;
 - interpreting signals received from the RFID readers, the signals being an indication of utility usage; and
 - triggering a response relevant to a future activity based on the interpreted signals.
13. The method of claim 12, wherein the guest area is either a hotel suite or a hotel room.
14. The method of any one of claims 12 to 13, wherein the readers are connected to a network.
15. The method of any one of claims 12 to 14, further comprising the step of identifying the guest.
16. The method of any one of claims 12 to 15, wherein the future activity is issuing an invoice and the response includes updating billing information of the guest.

17. The method of any one of claims 12 to 16, further comprising the step of predicting the future activity based on the interpreted signals.

18. The method of any one of claims 12 to 17, wherein the response includes at least one of: sending a recommendation relevant to the future activity to the guest, placing an order relevant to the future activity with the hospitality establishment on behalf of the guest, or updating billing information of the guest, the recommendation being sent to a terminal device of the guest.