Title

System for customizing energy consumption caused by devices

Cross-References

The present application is related to United States Patent Application Serial Number 12/345,678 filed May 1, 2010

Abstract

This invention provides a novel system for customizing the amount of energy caused to be consumed by devices by determining energy consumption necessity based on information available through detecting the RF fingerprints of wireless communication devices that approximate human user proximity, which makes necessary energy consumption caused by devices

Drawings

Fig. 1

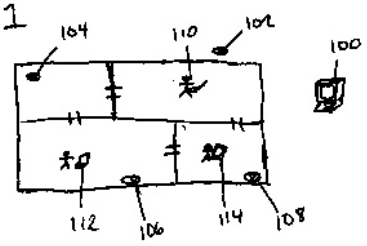


Fig. 2

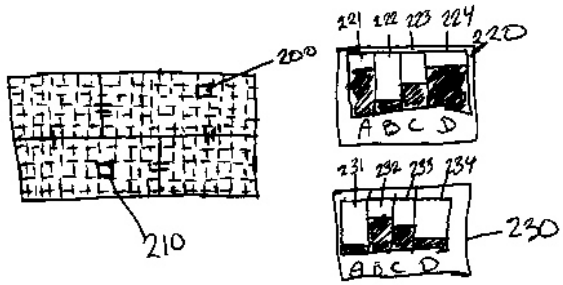


Fig. 3

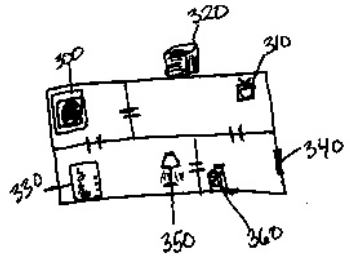
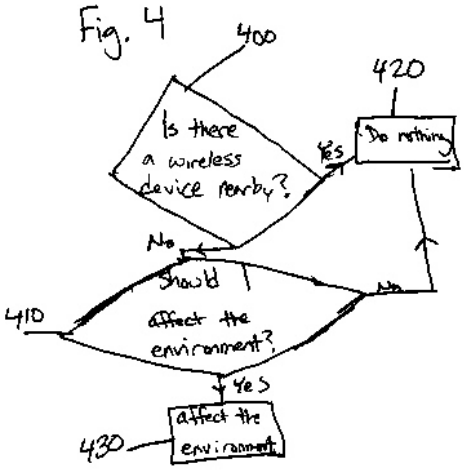


Fig. 4



Background of the Invention

Field of the Invention

The following invention relates in general to energy consumption reduction and in particular to improvements in determining where energy consumption reductions are available

Scope of the Prior Art

The prior art discloses methods for determining the location of devices capable of wireless communication by assigning unique "fingerprints" to different locations that depend on the respective signal strengths of signals that can reach each location.

The prior art discloses methods for changing the amount of energy caused to be consumed by devices using mechanisms such as timers, motion sensors, and heat sensors.

Brief Summary of the Invention

This invention provides a novel system for customizing the amount of energy caused to be consumed by devices by determining the necessity of energy consumption based on information made available through detecting the RF fingerprints of wireless communication devices (such as cellular phones, PDAs, or any such device) that approximate the proximity of human users, whose presence or absence in the proximity of a device causing energy to be consumed increases or decreases the necessity of energy caused to be consumed by devices.

Brief Description of the Drawings

Figure 1 is an aerial view of a building with people who carry wireless communication devices inhabiting it.

Figure 2 is an aerial view of the same building conceptually partitioned into distinct cells.

Figure 3 is an aerial view of the same building and the devices causing energy consumption within it.

Figure 4 is a high-level flow chart which illustrates how determinations as to the necessity of energy consumption may be made.

Detailed Description of the Invention

The invention is a system of devices causing energy consumption that communicates with a computer server that determines how and when to change these devices' energy consumptions, where the determinations are made based on information made available by comparing the RF fingerprint of wireless communication devices reasonably believed to indicate the presence of a human being whose

absence from the vicinity of a device that causes energy consumption indicates that the device may be permitted to cause less energy to be consumed.

Figure 1 is an aerial view of a building with people who carry wireless communication devices inhabiting it. Computer server 100 is networked to smartphone 110, laptop 112, and personal data assistant 114 via wireless access point 102, wireless access point 104, wireless access point 106, and wireless access point 108.

Figure 2 is an aerial view of the same building conceptually partitioned into distinct cells, such as distinct cell 200 and distinct cell 210, each of which corresponds to a unique vicinity of the building. Distinct cell 200 has a unique "fingerprint" 220, which is a function of the signal strength 221 whose signal comes from wireless access point 102 as measured from a wireless communication device located within distinct cell 200, the signal strength 222 whose signal comes from wireless access point 104 as measured from a wireless communication device located within distinct cell 200, the signal strength 223 whose signal comes from wireless access point 106 as measured from a wireless communication device located within distinct cell 200, and the signal strength 224 whose signal comes from wireless access point 108 as measured from a wireless communication device located within distinct cell 200. Distinct cell 210 has a unique "fingerprint" 230, which is a function of the signal strength 231 whose signal comes from wireless access point 102 as measured from a wireless communication device located within distinct cell 210, the signal strength 232 whose signal comes from wireless access point 104 as measured from a wireless communication device located within distinct cell 210, the signal strength 233 whose signal comes from wireless access point 106 as measured from a wireless communication device located within distinct cell 210, and the signal strength 234 whose signal comes from wireless access point 108 as measured from a wireless communication device located within distinct cell 210. Because the signal strengths vary from cell to cell for at least one of the wireless access points, "fingerprint" 220 is different from "fingerprint" 230.

Figure 3 is an aerial view of the same building and the devices causing energy consumption within it, such as washing machine 300, television 310, air conditioner 320, vending machine 330, window 340, lamp 350, and oven 360.

Figure 4 is a high-level flow chart which illustrates how determinations as to the necessity of energy consumption may be made, beginning with decision block 400, which compares the locations of wireless communication devices to the locations of devices causing energy consumption and advances to decision block 410 if no wireless communication devices are in the vicinity of devices causing energy consumption and advances to state block 420 if at least one wireless communication device is in the vicinity of a device causing energy consumption. Decision block 410 compares the detected ability to reduce energy consumption with energy consumption preferences that have been communicated to the computer server 100 and if the preference permits a change in energy consumption advances to state block 430 and if the preference does not permit a change in energy consumption advances to state block 420. State block 420 ends the determination with a decision to make no changes to any devices. State block 430 ends the determination with a decision to change the device causing energy consumption in a manner consistent with the preference communicated to the computer server 100.

A person having ordinary skill in the art will appreciate that changes in energy consumption are not limited to switching electronic devices on or off and may include switching the device into a different mode, moving the device into a different position, and repositioning components of the device. A person having ordinary skill in the art will also appreciate that energy consumption is not limited to energy consumed by electronic devices, and may include energy caused to be consumed by the device's operation (for example, the position of window blinds does not consume energy in the form of electric power, but open window blinds causes more heat energy to be consumed by the air conditioning unit than closed window blinds). A person having ordinary skill in the art will appreciate that determinations need not be limited to mere presence or absence of portable wireless communication transceivers but can also take into account the rates of change of their locations that make more likely or less likely that energy ought to be managed, particular traffic patterns that make more likely or less likely that energy ought to be managed, particular transceivers that make more likely or less likely that energy ought to be managed, and any such combination of information and inferences that the means for determining location may make available. Finally, a person having ordinary skill in the art will appreciate that devices need not be initially equipped with a means of communicating with a computer server but rather can be later equipped with such a means of communication.

Claims

We claim:

1. A method for managing the energy caused to be used by one or more structures having a data processing system coupled to one or more fixed position wireless communication transceivers disposed at different points where signals may reach one or more of said structures, said method comprising the steps of:

    detecting the presence of one or more portable wireless communication devices in the same vicinity as one or more of said structures;

    determining an approximate physical location for each of said one or more portable wireless communication devices relative to said structures in response to a determination of relative wireless signal strength detected at each of said one or more portable wireless communication devices from each of said fixed position wireless communication transceivers; and

    managing the energy caused to be used by said structures in response to said determined approximate physical location of each of said one or more portable wireless communication devices.

2. A system for managing energy caused to be used by one or more structures, said system comprising:

One or more of fixed position wireless communication transceivers disposed at different points where signals may reach one or more of said structures;

at least one portable wireless communication device in the same vicinity as one or more of said structures;

means for determining an approximate physical location of said at least one portable wireless communication device within said physical facility in response to a determination of relative wireless signal strength detected at said at least one portable wireless communication device from each of said plurality of fixed position wireless communication transceivers; and

means for managing energy caused to be used by structures in response to said determination of approximate physical location of said at least one portable wireless communication device within said physical facility.