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Energy Savings Using Virtual Assistants and Smart Home Appliances

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ABSTRACT

This disclosure describes techniques to monitor and control smart home devices through virtual assistants. Use of the techniques can result in substantial energy savings.

KEYWORDS

- Smart home
- Smart appliance
- Smart speaker
- Virtual assistant
- HVAC
- Energy savings
- Energy optimization
- Power consumption

BACKGROUND

Energy is often wasted or used sub-optimally in homes and offices. For example, appliances such as lights, HVACs (heating/ventilation/air-conditioning), etc. may be left on when there is nobody in the room. Devices such as computers, televisions, game consoles, etc. are frequently left on stand-by mode in which such devices waste sizeable amounts of power.

DESCRIPTION

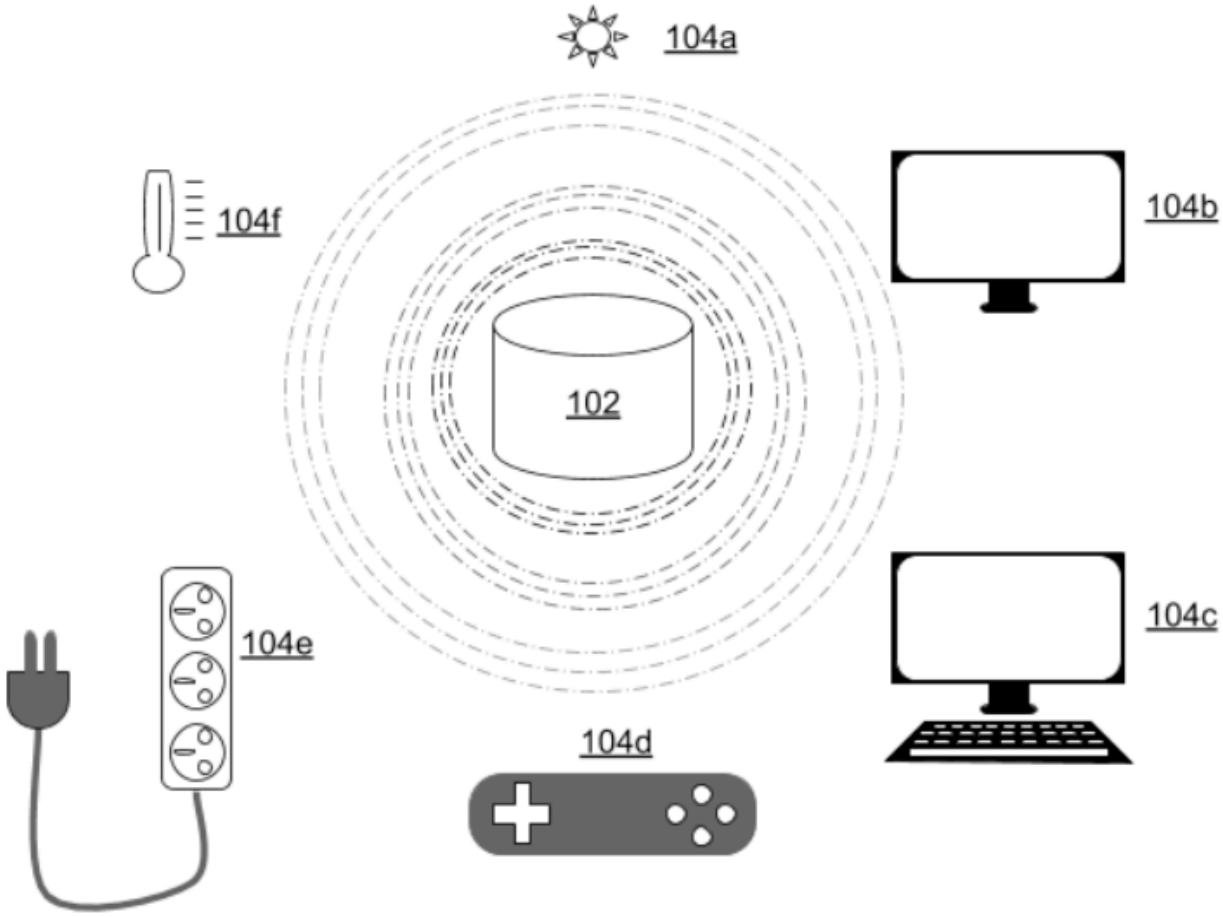

Fig. 1: Control of smart-home appliances by virtual assistant

Fig. 1 illustrates the control of smart-home appliances by a virtual assistant, per techniques of this disclosure. A device such as a smart speaker or a mobile device that executes a virtual assistant (102) is communicatively coupled to various smart home devices (104a-f), e.g., lights, televisions, computers, game consoles, smart power strips/plugs/switches, thermostats, etc. With user permission, the virtual assistant manages such devices to optimize power consumption by performing operations such as, e.g.,

- turning off lights in a room if it is detected (with user permission) that there is no one in the room;

- taking a device off stand-by mode, e.g., by switching the device off, if a user does not re-activate the device within a certain period of time;
- putting devices in a room back into stand-by mode if it is detected that a user has entered a room;
- reducing HVAC intensity in a room upon detection that there is no one in the room;
- Adjusting the brightness of lights in a room depending on ambient light conditions; etc.

With user permission, the virtual assistant can also maintain power-consumption logs and use machine-learning techniques to detect patterns in energy consumption. Such logs, and detected patterns if any, can be used to further optimize energy consumption. For example, patterns in energy usage can help the user understand the composition of their energy usage. It can enable the targeting of appliances, time-of-day, day-of-week, etc. where energy savings are likely to be obtained; etc.

Further to the descriptions above, a user may be provided with controls allowing the user to make an election as to both if and when systems, programs or features described herein may enable collection of user information (e.g., information about a user's social network, social actions or activities, profession, a user's preferences, or a user's current location), and if the user is sent content or communications from a server. In addition, certain data may be treated in one or more ways before it is stored or used, so that personally identifiable information is removed. For example, a user's identity may be treated so that no personally identifiable information can be determined for the user, or a user's geographic location may be generalized where location information is obtained (such as to a city, ZIP code, or state level), so that a particular location of a user cannot be determined. Thus, the user may have control over what information is collected about the user, how that information is used, and what information is provided to the user.

CONCLUSION

This disclosure describes techniques to monitor and control smart-home devices through virtual assistants. Use of the techniques can result in substantial energy savings.