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CLIMATE CONTROL AND LIGHT CONTROL IN A SMART HOME

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Abstract
This article examines "Management models of smart homes based on human functions" and provides information about the intelligent system of the "smart home". Currently, based on the development of technologies, many residential buildings are being automated, that is, "smart houses" are being built. Today, in the creation of a "smart home" system, technologies for controlling indicators such as air temperature, humidity level, atmospheric pressure and lighting level, as well as the level of home security are widely used.

Keyword. smart home, information, dimmers, motion sensors, ventilation, air purification.

Among all smart home concepts, one of the most popular is custom lighting control. By organizing such an important component of home life as lighting, you create comfort and many conveniences for your family, safety and economical energy consumption.

A smart home system controls indoor lighting based on the purpose of the room, interior color and design ideas. It also controls the level of street lighting, because the neighborhood is an integral part of the house by its design and requires security.

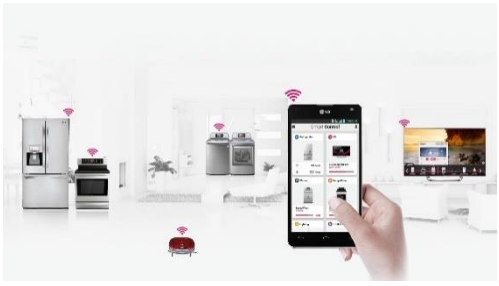
Often, the system includes lighting of the approach to the house, gates, entrance doors and the house itself, as well as small architectural forms, playgrounds, flower beds, fountains. The management system also performs the following important tasks:

- management and control of lighting in different areas of the house;
- regulation of lighting depending on the time of day and year;
- providing comfortable, economical and safe lighting in passageways - stairs between floors, corridors, porch;
- organization of special lighting scenarios inside the house while relaxing, welcoming guests, watching TV;
- performing security functions: simulating the presence of people living in the house by periodically turning on the lights in different rooms;
- monitor loads and disconnect a part of the network when they significantly exceed;
- if necessary, connect backup power;
- voltage stabilization;
- automatically turn on the lighting of the house from the outside at the beginning of the evening;
- enter a certain location on the site when a person approaches;
- lighting the interior of the house when opening the front door.

The operation algorithm of all the listed functions can be easily programmed at the request of the home owner, who then controls the system manually or from a pocket computer.

Let's look at the possibilities of control in the example of such a part of the system as electrical outlets. To control one outlet and the device included in it, it is enough to buy a special outlet with an antenna and a miniature remote control.

Control of groups of sockets in a smart home system means data exchange using bus technology: sockets (switches) are connected via a trunk line (24 V cable) and receive commands from the controller, setting and controlling light power, switching on and off. This technology allows you to save wires, change the functions of sockets and switches with the addition of new devices. At the same time, relays are placed on the shield, which are routed to email addresses like sockets. When executing a lighting scenario, multiple relays can be turned on with one button.



By programming the system and connecting kitchen appliances to a controlled socket, you can set a time in the evening to turn on the toaster, electric kettle or coffee maker in the morning before you wake up. And also, after going to work, all devices are centrally disabled.

Automation allows you to forget about the need to constantly turn off lights, open curtains and blinds. The energy saving management system helps to monitor the amount of electricity consumption.

Energy saving is an important component of a smart home system.

An intelligent system that monitors power consumption at all stages performs the following functions:

- ✓ turn on some household appliances only at night, when electricity is cheaper (for example, dishwashers and washing machines);
- ✓ turn on powerful equipment and devices (for example, underground heating, heater) in heating mode in order not to overload the network;
- ✓ control the power consumed by devices in the whole house with real-time output of indicators to a computer or smartphone. If the limit is exceeded, the controller disables lower priority loads. This takes 0.5 seconds, which is not available for the input machine. For this, it is necessary to set the order of priorities in system programming. When the power supply is restored, the controller automatically reconnects the equipment.

Light control devices - dimmers and motion sensors. Dimmers are special devices that are installed instead of a traditional switch and regulate the brightness of the light by changing the power consumed by the lamps. They come with manual settings, but programmable ones are used for the smart home, including twilight switches. By setting maximum and minimum brightness times on the display, you can achieve a gradual decrease in brightness during this period.

Dimmers are universal and suitable for all lighting lamps or only for halogen lamps or incandescent lamps. Special dimmers are produced for fluorescent lamps with a different internal device. Modern sensor dimmers can be controlled from a remote control, brightness can be changed, lighting scenarios can be adjusted.

Motion sensors are devices that respond to a person entering a room. They can automatically turn on or off the light at a certain brightness for a certain time. Thanks to this, the lamps work according to a soft program, their service life is almost doubled, and energy is significantly saved.

Xiaomi introduced an automatic motion sensor night light. A distinctive feature of the novelty: a built-in motion sensor operating at a distance of up to 7 m and a 120° light angle allow the night light to instantly respond to a moving object and smoothly increase the brightness. At the

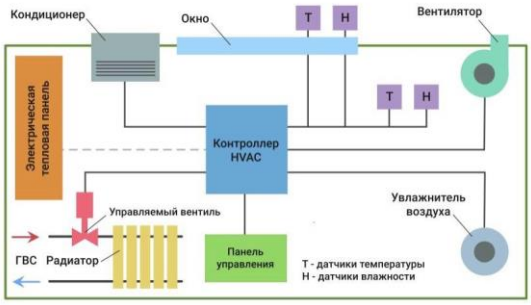
same time, energy consumption is saved and human injury is excluded when walking around the house at night.

New Belkin (USA) has developed a WeMo Motion motion sensor, which provides power to another device from this WeMo Switch manufacturer when a person passes by the sensor. The smart socket works and turns on programmed devices, for example, when you come home, a pleasant tone turns on. And vice versa, if you leave the house, the sensor will send a signal to turn off the current.

With the purchase of the new WeMo WiFi Switch smart socket from the American manufacturer Belkin, your worries about the rest of the devices will be left behind. It is plugged into a regular outlet, and household appliances are built into the device itself and controlled remotely. You can not only turn off the forgotten iron, but also turn on the TV, fan, floor lamp. Setting up the WeMo WiFi Switch is quick thanks to the manufacturer's detailed instructions. If you specify your city in the app, the smart device will automatically turn on the lights when it gets dark.

OORTSmart Socket helps you monitor the power consumption of your appliances by measuring the power consumption of any connected home appliance. To do this, it is enough to download the application and control household appliances at a distance of up to 30 m, turn them on and off. You can schedule their working hours a week in advance.

Climate control: ventilation and air purification. The function of a smart home system includes an important component - climate control and microclimate control. This is ensured by the integration of three systems: heating, air conditioning and ventilation. We discussed heating systems above, so we will focus on the last two. Although these three systems coexist comfortably.



Many manufacturers strive to ensure that the structure of engineering networks controlled from the main controller is universal and that it retains its functions even if the central control unit fails. Thus, "intelligent control" implies the possibility of individual adjustment for each part of the system.

That is, if the user wants to remotely change the temperature of the warm floor or the mode of operation of the air conditioner, he can do it from the iPhone or iPad through the central unit, or only by controlling the floor. or air conditioning.

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The principle of operation of the climate control system is that the main unit collects data on the atmospheric conditions in the buildings with the help of built-in sensors, the level of carbon dioxide, humidity and air temperature are transmitted to the cloud server. Therefore, they can be used by any gadget with a special program installed.

The user who receives the information decides which function to use - air conditioning or ventilation - to change the climate in the house. All this is done by assistants, control devices: humidifiers, air conditioners, heaters, breathing devices (air purification, heating, a compact supply ventilation device controlled from a smartphone).

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