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THE ROLE OF TECHNOLOGY OF PROFESSIONAL INTERACTION OF «INTERNET THINGS» WHEN MEASURING MECHANICAL QUANTITIES

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In our time, the need for separate use of measuring devices has significantly decreased.
This trend is characterized by two major changes in the world of electronic devices:
1. In modern devices, sensors have ceased to be independent systems or separate devices and are part of them (in their everyday life they are tablets and smartphones, and in the production they are sensory measuring networks).
2. Measurement systems themselves have ceased to be of interest. They are an integral part of the system, which also includes technologies for processing, measuring, storing and forecasting measurements.
An example of using such technologies is «Internet of Things», which can be considered as one of the IT-technologies that improve professional interaction, due to the shared use of this or that group of people.
Keywords: Internet things, measuring devices, mechanical values, professional interaction, sensors.

Formulation of the problem. Today there is a decisive transition from individual measuring instruments to intelligent measurement systems of the future generation. In such systems can simultaneously provide coordinate services, weather forecast, and calorie measurement (based on what distance people overcame and at what speed).

Over time, cloud service access for historical data analysis, processing, and creation of metrics has also been added for further research (for example, Microsoft Azure Cloud Services).

Among this diversity of services one important problem is highlighted: the need for the rapid implementation of a measuring system, which will include both a monitoring system, an information flow management system, and a system that will be responsible for collecting and processing data for them in a professional interaction (shared use for better coordination of actions).

A good solution for such different requirements is the computerized measurement system. They consist of geographically distributed autonomous devices and their intelligent sensors related to them: temperature, sound, vibration, time positioning, etc., they can freely compete with existing measurement systems, and also serve as an addition to any existing measurement system with a professional interactions.

Analysis of recent research and publications. One of the advantages of computerized measurement systems is that a cloud-based metering server collects data from multiple sensors located in a particular area [4-6, 9].

Thus, one can determine the measurement error of each of the sensors, relative to the average. If it is known that at present, there are no factors on certain areas of this territory that can affect the parameter under study.

The computerized system of measuring mechanical quantities makes it possible to construct a measuring space for the organization of a monitoring and management system, combining the possibility of removing indicators from sensors, unification of the interface of measuring devices, and the continuous monitoring of the state of those buildings of technical or strategic importance. Sensors measuring various chemical, biological and physical quantities use a wide range of methods of sensing.

The action of the probing creates an output signal, using the transduction process, which must be processed and transmitted to the network. Sensors that are able to recognize, measure and output data through a bus are commonly regarded as intelligent sensors in one package.

Selection of previously unsettled parts of the general problem. Possibilities of such intelligent sensors can be further increased taking into account functions: radio communication, remote control and intelligent sensor systems management. Sensors measuring various chemical, biological and physical quantities use a wide range of methods of sensing [4-6, 9].

Sensory computerized systems for measuring mechanical magnifications extend the capabilities of intelligent sensors by adding additional features such as communication (wired and wireless), display, cabinets and fasteners, remote control and security.

The purpose of the article. The main purpose of this work is to develop a concept for deploying technology «smart home» for professional interaction (family members).

Presenting main material. One of the most popular fields of technology «Internet of Things» is a computerized system for measuring mechanical quantities «Smart house» [1].

Any person in the house, apartment or office is important to feel comfortable and safe. It is these two tasks, plus the aesthetics of the appearance of devices – and there are the main target installations, which are oriented system «Smart Home». Intelligent automation controls all engineering systems in the house, allowing a person to centrally establish a comfortable one for him – temperature, humidity, illumination in rooms, zones, and provides security [8].

The Intelligent Home system provides a mechanism for centralized control and intellectual management in residential, office or public premises.

The Intelligent Home system should include the following automation objects.

- Lighting management.
- Electric drives.

· Climate control.
· Ventilation system management.

Fig. 1. Structure of the Smart House Technology

Centralized system management.
· Home theater.
· Multiroom.
· CCTV systems.
· Security and fire alarm.
· Access control systems.
· Load control and emergency conditions.
· Management of engineering equipment with touch panels.
· Management server.

The system should be able to.
· Manage the necessary system (lighting, climate, video surveillance, etc.).
· Get access to information on the status of all life support systems at home (inside or out).

The general scheme of the management system is as follows.
· Central control processor/main control unit.
· Sensors (temperature, illumination, smear, movement, etc.).
· Control devices (dimmers, relays, IR-emitters, etc.).
· Control Interfaces (push-button switches, IR and radio pulse panels, touch panels, web/wap interface).
· Own management network that combines the above elements.
· Controlled devices (fixtures, conditioners, home theater components, etc.).
· Auxiliary networks (Ethernet, telephone network, distribution of audio and video).
· Project software.

The main function of the central processor is to control the devices subordinate to it using the following interfaces: Ethernet, RS-232, RS-485, IR, analog and digital I/O, etc.

Also, the central processing unit contains a multi-tasking operating system, programming tools and in some cases a web server. The sensors are located in certain places of the apartment, which directly or through intermediate devices are connected by a single network. The control interfaces perform the general control of Smart House systems [10].

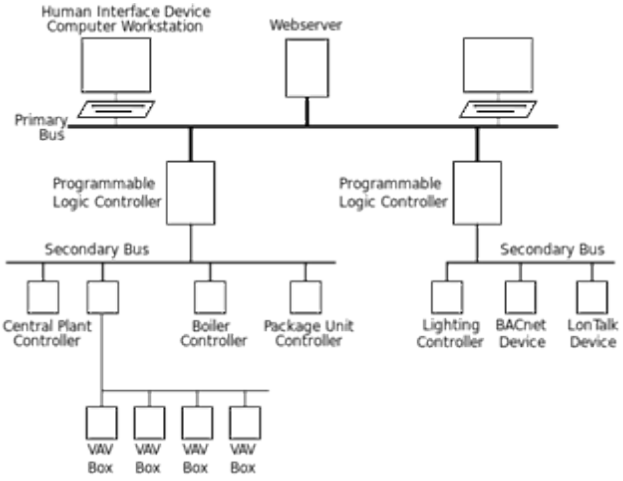

Fig. 2. Management system «Smart Home»

On its own network management information from sensors or interfaces comes to the central processing unit. The CPU software processes the information received and generates commands for the control devices [11].

Commands come from both your own network and the auxiliary. The methods for generating commands, as well as the form and composition of the displayed information about the state of the systems, are laid at the stage of software development taking into account the requirements of the project.

The management system is a combination of hardware and software that primarily targets cost-effectiveness, that is, to reduce the user's potential (electricity, heat), and also provides additional capabilities, such as presence control.

Sensors for measuring mechanical quantities

Motion sensors

Electronic sensors measure the level of illumination of the room and, when they reach the given value, issue a command to turn on or turn off the lighting (illumination sensors), or directly «see» that the man entered the room and turn on the light (motion sensors).

A light-sensitive element blocks the switching on of illumination with sufficient natural light. Since, unlike the time relay sensors, motion sensors turn on the light only at the time of the actual presence of the person in the room, and the electricity consumption for lighting can be reduced several times.

For staircases, corridors and lift halls, savings are further increased by the flow control of lighting devices. Infrared motion sensors are also used in energy saving switches of illumination, taking into account the planning of the premises. Other electronic sensors (sensors of presence) can determine the location of people in the room and only in this case keep the light on.

The infrared sensor «sees» only the moving person, although this movement may be small – for example, swinging his hand or nodding his head.

With large delay times, the infrared sensor operates in the presence sensor mode, that is, it supports lighting with a long presence in the room of people.

A short delay time is chosen when using infrared sensors as a motion sensor in passage rooms. Electronic light switches can be used both auton-

omously and in the automated control system, which is now called «intelligent home».

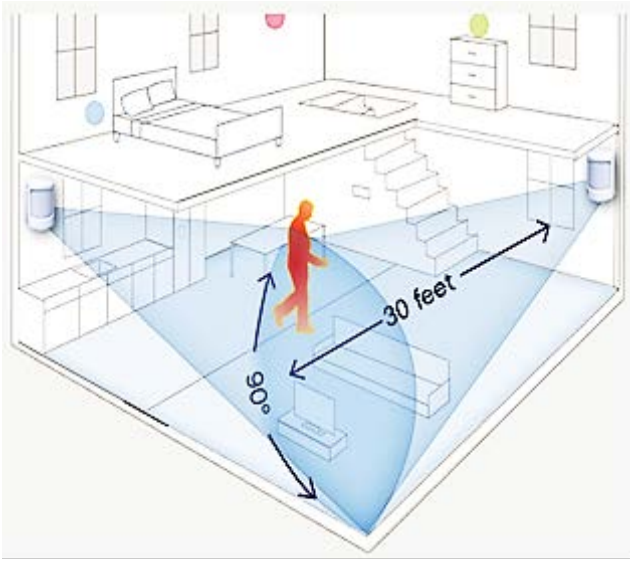

Fig. 3. Infrared motion sensor

Climate control system

Such a climate control system operates on the basis of its embedded algorithms, which allow maintaining the established parameters of the air and various climatic zones in the premises at a minimum cost of energy resources.

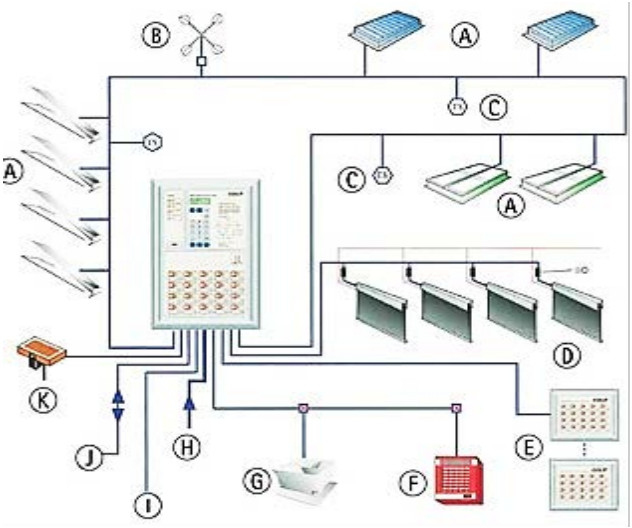

Fig. 4. Infrared motion sensor

· A – Ventilators for smoke exhaust and daily ventilation.
· B – Wind detector.
· C – Temperature sensors for daily ventilation.
· D – Automatically unrolling smoke barriers.
· E – Exterior fire alarm centers.
· F – Air heating.
· G – Mechanical smoke exhaust.
· H – Fire alarm signal.
· I – Modem connection.
· J – Signal for the building's central control system.
· K – Rain detector.

The considered system allows to provide execution of various operations. It uses heating or cooling. This eliminates the simultaneous operation of the air conditioner and the heating system. An exception here may be the presence of a warm floor, maintaining the set temperature in the lower part of the air conditioner room.

Such a system provides a reduction in temperature at night in deserted rooms and bedrooms, which allows you to create comfortable conditions for sleep, as well as to save energy. In addition, it gives the opportunity to minimize the work of equipment and equipment in the absence of owners using the modes of work «day absence» and «vacation» [10-12].

When the second mode is switched on, the system completely switches off the air conditioning and ventilation system, and the heating system is output to the minimum power level. Before returning home, it is possible to install in the premises a comfortable climate regime in advance by activating the climate control system by telephone or via the Internet [10-12].

Penetration control

Establishment and removal of apartments from the security are made using a code panel located in the vestibule. When opening the front door, a person has 30 seconds to enter the correct code. If the code is not entered, a smart home will turn on sirens and send SMS messages to several phone numbers.

Motion detectors located in the kitchen, bedroom and living room will detect penetration through the windows. When leaving the apartment it is enough to enter the code on the security panel and a smart home will not only turn on the alarm, but also turn off the lighting, will transfer the heating system to energy-saving.

Control of leakage of water

The breakthrough of water supply pipes is a very unpleasant event in connection with the damage not only of its own, but also of neighboring property. Identify and prevent leakage of water will also help a smart home.

Controlled areas include bathrooms and kitchens, that is, those rooms where water pipes pass. The breakthrough of the pipe or overflow of water through the edges of the shell is fixed with the help of special sensors. In case of leakage, a smart home will block the access of water to the apartment and send SMS messages to specified phones.

Conclusions and suggestions. A control system for a smart home was chosen, which is a set of control subsystems for individual parameters and groups of sensors/controllers.

The following control groups were analyzed:

· Lighting – is responsible for controlling the illumination of the house, interacting with the group of finding.

· Energy saving – optimizes device performance.

· Climate control – regulates temperature and humidity systems according to the needs of the user.

· Penetration – a subsystem of protection against physical unauthorized intrusion into the home.

· Find – a subsystem that determines which room the user is.

· Water leakage – a system for identifying and eliminating water leakage problems and, accordingly, alerting the user.

· Artificial Intelligence – a system that, based on the statistics, itself works on behalf of the user to work on all other systems.

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РОЛЬ ТЕХНОЛОГІЇ ПРОФЕСІЙНОЇ ВЗАЄМОДІЇ «ІНТЕРНЕТ-РЕЧЕЙ» ПРИ ВИМІРЮВАННІ МЕХАНІЧНИХ ВЕЛИЧИН

У наш час значно знизилась необхідність окремого використання вимірювальних приладів.
Ця тенденція характеризується двома основними змінами в світі електронних пристроїв:
1. У сучасних пристроях датчики перестали бути незалежними системами або окремими пристроями і є їх частиною (у побуті це планшети та смартфони, а у виробництві – це сенсорні вимірювальні мережі).
2. Самі по собі вимірювальні системи також перестали представляти інтерес. Вони є невід'ємною частиною системи, яка також включає технології для обробки, вимірювання, зберігання та прогнозування вимірювань.
Прикладом використання таких технологій є «Інтернет речей», яку можна розглядати, як одну із IT-технологій, що покращує професійну взаємодію, завдяки спільному використанню тією чи іншою групою людей.
Ключові слова: Інтернет речей, вимірювальні прилади, механічні величини, професійна взаємодія, датчики.

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РОЛЬ ТЕХНОЛОГИИ ПРОФЕССИОНАЛЬНОЙ ВЗАИМОДЕЙСТВИЯ «ИНТЕРНЕТ-ВЕЩЕЙ» ПРИ ИЗМЕРЕНИИ МЕХАНИЧЕСКИХ ВЕЛИЧИН

Аннотация
В наше время значительно снизилась необходимость отдельного использования измерительных приборов. Эта тенденция характеризуется двумя основными изменениями в мире электронных устройств:
1. В современных устройствах датчики перестали быть независимыми системами или отдельными устройствами, и является их частью (в быту это планшеты и смартфоны, а в производстве – это сенсорные измерительные сети).
2. Сами по себе измерительные системы также перестали представлять интерес. Они являются неотъемлемой частью системы, которая также включает технологии для обработки, измерения, хранения и прогнозирования измерений.
Примером использования таких технологий является «Интернет вещей», которую можно рассматривать как одну из IT-технологий, улучшающую профессиональное взаимодействие, благодаря совместному использованию той или иной группой людей.
Ключевые слова: Интернет вещей, измерительные приборы, механические величины, профессиональное взаимодействие, датчики.