RESEARCH AND DEVELOPMENT OF AN INTELLIGENT CONTROLLED AIR EXCHANGE SYSTEM FOR USE IN STANDARD CONDITIONS BASED ON IOT

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Abstract. The article discusses the basic principles of the Internet of Things (IoT) and embedded systems, as well as their interconnection and application in various fields such as smart homes, healthcare, industry and transport. The role of these technologies in improving the quality of life and increasing the efficiency of various processes is emphasized. Particular attention is paid to the prospects for the development of IoT in the context of the introduction of 5G technology, which is expected to contribute to a sharp increase in the number of connected devices and reduce energy consumption. It is expected that by 2021, the number of IoT devices in the world will reach 16 billion. The research is aimed at analyzing modern achievements in the field of IoT and identifying the challenges faced by these technologies, as well as considering their prospects in the context of digital transformation of society. The article also describes research methods, including theoretical analysis, comparative analysis, modeling and experimental testing. The results of the study show that the introduction of IoT and 5G technologies will lead to fundamental changes in society, business and production processes, opening up new opportunities for automation and optimization of various fields of activity.

Introduction. In the modern world, the Internet of things (IoT) has become an integral part of the daily life of society. As a result of the development and implementation of wireless networks, the constant increase in the bandwidth of Internet connections and the creation of new devices, a person surrounded himself with a network infrastructure that helps him with one click and performs tasks that previously had to be solved independently. According to research conducted by analytical companies [1], the number of connected devices is growing every year. The concept of the Internet of Things permeates all sectors of society and is in the process of continuous improvement. Now, 15 years after the birth of the IoT, the Internet of Things has become one of the main trends in high technology.

The purpose of the research. The purpose of this study is to analyze the principles of the Internet of Things (IoT) and embedded systems, to study their relationship, as well as to study the application of these technologies in various fields such as smart homes, healthcare, industry and transport. The study also

examines the advantages and challenges faced by these technologies, as well as their prospects for development and integration into everyday life.

Research methods. 1. Theoretical analysis of existing air exchange systems.

2. Comparative analysis of automation technologies and monitoring systems.

3. Modeling and development of a prototype of an intelligent air exchange system.

4. Experimental research and testing using air quality sensors and simulation software.

5. Comparative analysis

6. Expert analysis

7. Experimental research

Relevance. The relevance of the research is determined by the rapid development of IoT technologies and embedded systems, which are increasingly being used in various spheres of life, improving the quality and efficiency of processes. In the context of digital transformation, where IoT plays a key role in the creation of smart cities, autonomous vehicles and automation of production, understanding these technologies becomes necessary to develop solutions aimed at optimizing and improving the life of society.

Analysis of existing solutions

Modern Internet of Things (IoT) solutions cover a wide range of technologies and platforms that are used to automate, monitor and optimize various processes in various fields such as smart homes, healthcare, industry, transportation and energy conservation. This section will review the analysis of the most popular and in-demand technologies and solutions in the field of It. One of the most common applications of IoT is the creation of smart homes, where various devices – from lighting to heating and air conditioning systems — can be integrated into a single network and controlled via mobile devices or voice assistants.

Figure 1 - The impact of 5G technology on the Internet of Things

Popular solutions in this area include. Existing solutions in the field of the Internet of Things cover a wide range of areas, and IoT technologies continue to evolve and improve. They open up new opportunities for automation and efficiency improvement in various spheres of life. Nevertheless, despite significant progress, it is necessary to continue to work on solving the problems of security, standardization and energy efficiency for further successful implementation of IoT technologies.

Results. The Swedish telecommunications equipment manufacturer Ericsson has published a traditional report [8] on the use of mobile devices and mobile traffic in the world — Ericsson Mobility Report, which predicts the dynamic development of the Internet of Things with an average annual growth rate of 23% in the period from 2015 to 2021. By the end of the period, 16 billion IoT devices are expected to be connected to networks around the world. At the same time, in 2018 their number exceeded the total number of mobile phones.

Conclusion. Currently, with the help of the Internet of Things, automation of industrial production and housing and communal services is carried out; traffic management; formation of a list of purchases and a delivery schedule for trading enterprises; construction of deployed physical security systems; data collection and

management for marketing purposes and for general improvement of living standards, and much more.

The transition to a fundamentally new stage in the development of the Internet of Things will be the spread of 5G technology on the market. The large capacity of the 5G connection will increase the number of connected devices, reduce power consumption, and increase the battery life of network devices between charges by more than 10 times. These factors will be crucial for the growth of the IoT. According to the expectations of Ericsson analysts, 5G technology will be launched in 2020 and will be widely distributed worldwide by the end of 2021.

Thus, we are in the midst of tremendous changes, in the process of creating new patterns of behavior and self-organization. It will completely change the way we live, work and do business. Most modern companies are interested in implementing IoT solutions, considering them a worthy advantage in the competitive struggle in the market.

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