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**СПЕЦИАЛИЗИРОВАННЫЕ IOT-СЕТИ: МОДЕЛИ, СТРУКТУРЫ, АЛГОРИТМЫ, АППАРАТНО-ПРОГРАММНЫЕ СРЕДСТВА**

SPECIALISED IOT SYSTEMS: MODELS, STRUCTURES, ALGORITHMS, HARDWARE, SOFTWARE TOOLS

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Вишняков В.А. Специализированные IoT сети: модели, структуры, алгоритмы, программно-аппаратные средства. Монография / U. A. Vishniakou, – Minsk : BSUIR, 2022. – 184 с.

Монография включает анализ проблем, модели, алгоритмы и программно-аппаратные средства специализированных сетей интернета вещей (ИВ).

Рассмотрены результаты проектирования м моделирования сети ИВ мониторинга качества продукции, сети ИВ анализа звуковой информации окружающей среды, технологию распознавания голосовых маркеров для выявления кашля на базе нейронных сетей и машинного обучения.

Рассчитана на специалистов в области инфокоммуникаций, может быть полезна студентам соответствующих специальностей, слушателям факультетов повышения квалификации, магистрантам и аспирантам.

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**Introduction**

For the first time, the term «Internet of Things» (IoT) was used in 1999 by British engineer Kevin Ashton, who led the pioneering work on radio frequency identification networks. He proposed the presentation to the management of Procter & Gamble, which was devoted to how the mass introduction of radio frequency tags can change some markets, such as retail and logistics.

The IoT is the concept of a data transmission network between physical objects, called «things», which are equipped with built-in technologies and means designed to interact with each other or with the external environment in real time. Things are able to work in automatic mode, the administrator can manage them, including remotely. It is assumed that the organization of these networks is capable of reconstructing economic and social processes, as well as eliminating the need for human participation from part of operations and actions [1].

At the end of the 2000s, the IPSO Alliance organization appeared, which is aimed at developing and implementing solutions related to the Internet of things. In 2011, Gartner included the IoT in the list of the most promising developing technologies. In 2012, the whole world started talking about IoT. In January 2014, Google acquired Nest, a company engaged in the development of smart home systems, which became a landmark event and signaled that the future belongs to the Internet of Things.

Cloud platforms are platforms for cloud computing, which are ready–made software and hardware leased over the Internet for the deployment, development, testing of their applications. The first cloud platform appeared in 2006 – Amazon Web Services. Amazon has offered more than 50 different services in 14 geographical regions. Today, cloud platforms are more popular than ever. The main advantages of using cloud platforms are the speed of creating new applications, flexibility and scalability of the system [2].

Since the 2010s, the IoT networks have been a steady trend in information technology, thanks to the ubiquity of wireless networks, the constant growth of Internet connection bandwidth, the emergence of cloud computing, the development of technologies for machine-to-machine interaction and software-defined networks, a person has surrounded himself with a network infrastructure that helps him and solves tasks, which previously had to be solved independently. According to a variety of forecasts and reports from analytical companies, connected devices (machines, fitness trackers, solutions in the fields of smart cities, houses, etc.) will become more and more. At the same time, the concept of the IoT will expand. Already now, more than 10 years after the emergence of the IoT has become one of the main trends of high technologies.

The monograph is devoted to the development of IoT networks based on a cloud platform for product quality control, audio information analysis, voice (cough) detection.

Using the monograph, readers will get acquainted with the analysis in the field of IoT network, IoT cloud platforms, hardware-software IoT tools and using intelligent technologies (Chapter 1). They will study the processes of developing and modeling the IoT network of quality control systems (Chapter 2). They will get acquainted with the problems of building and programming the data base of the IoT network and product quality control (Chapter 3). They will study the developing and modeling the IoT network for the processing of sound information from the surrounding environment (Chapter 4). In chapter 5 readers can recognize with methods and tools of cough detection using deep leaning and neural nets technologies.

The monograph includes an analysis of the results in the field of construction and optimization of the IoT networks, as well as the author's developments obtained in the course of state-funded research, work with graduate students and undergraduates. The book is based on the author's work on scientific projects within the framework of the Informatization program in 2015-2022:

– «New technologies of information management and electronic marketing»;

– «Research and development of a distributed cloud computing and virtualization environment in order to introduce innovative information and communication technologies into the educational process.

In the process of writing the monograph, the articles material with my graduate student Bahaa Shaya (Chapter 4) was used. Chapter 5 is written with PhD student Bahaa Shaya.

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