

## **STRUCTURE AND ELEMENTS OF THE INTERNET OF THINGS NETWORK FOR MILK QUALITY CONTROL**

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The Internet of Things (IoT) network is a level of development of devices that can be connected to a network via the Internet or using wireless technologies. The devices exchange data in real time both directly and via remote online servers.

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*СОВРЕМЕННЫЕ СРЕДСТВА СВЯЗИ – 2021*

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These devices are capable of operating in automatic mode, but the user can control them, including remotely. The simplest explanation of what IoT is sounds like this: it is a network in which devices, not users, communicate with each other.

Within the framework of "Automation 4.0", it is proposed to use the Internet of Things technology for remote monitoring and control of milk quality of dairy farms distributed throughout the district.

A model of such an IoT network based on multi-agent technology is presented. The structure of this IoT network is proposed, including milk analyzers, gateways-converters, a cloud structure in which a server platform is rented [2].

The structure of the IoT network includes milk analyzers, gateways-converters, a cloud platform, and mobile devices. The cloud platform rents a server that hosts knowledge and data bases, special software (solver) for processing and making decisions on milk quality, and a farm website. The database of the cloud structure server stores milk quality characteristics, and the knowledge base stores the rules for processing them. The solver outputs deviations from the current milk quality indicators from the standards. The site is used for communication of specialists in milk quality control. Monitoring of milk quality characteristics is implemented from mobile devices of specialists with access to the site components.

The server database stores milk quality indicators based on critical control points. From mobile devices, these indicators are sent through the controller and gateway to the cloud platform and recorded in the database. Through special mobile applications connected to the site of the cloud platform, farm managers can quickly monitor indicators for time, herd, etc. Monitoring of these indicators is provided in case of exceeding the control values. In the future, the IoT network will be able to solve the issues of optimizing these indicators.

The most popular cloud platforms are considered. The 4th generation LTE network using the technology for the IB-NB – IoT network was chosen as the network for transmitting information from dairy farms to the cloud environment.

It is proposed to use a cloud platform (a managed service hosted in the cloud, which acts as a message center for two-way communication between the Internet of Things application and devices) to implement the milk quality control network.

The Google Cloud IoT platform allows user to create IoT networks using machine learning on end devices and implementing services such as Cloud IoT Core (collects data published in Cloud Pub/Sub for further analysis), Cloud IoT Edge (for secure connection of edge devices to the cloud) [3].

The procedure for connecting sensors to the Google Cloud IoT cloud platform is presented, including: configuring the local environment and installing the necessary components; creating an account; connecting a virtual device and viewing telemetry.

#### REFERENCES

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