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Architecture of information monitoring system of oil and fat producing enterprise

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ABSTRACT: This article presents an architecture of the information monitoring system of oil and fat industry. The architecture is divided into four parts. Hardware, data collection, server, and client. It also provides access to information from the electronic weighing device via the RS-232 controller. The issue of integrating information monitoring systems into multiple software modules and devices has been addressed. As a result of the re-search, the integration of the information monitoring system has been described as a multistep architecture.

KEYWORDS: oil and fat, architecture, server, integration, IP camera, client.

I. INTRODUCTION

The information monitoring system for oil and fat enterprises is based on client-server technologies operating on the local network. All embedded systems, computers and software tools share and operate information over the network[1,2].With the help of the information monitoring system, each process in the oil company records the data on the server with the help of client monitoring software of the monitoring system. Client software of the information system is installed on computers, controllers. On the central server computer, server applications and DBMS are installed, which server applications receive, edit and transmit information from client computers[3,4].

II.METHODOLOGY

A. STRUCTURE OF INFORMATION MONITORING SYSTEM

The information monitoring system consists of hardware, software and developed software. The system architecture is divided into four parts (Fig.1):

- hardware support;
- data collection;
- server;
- customer

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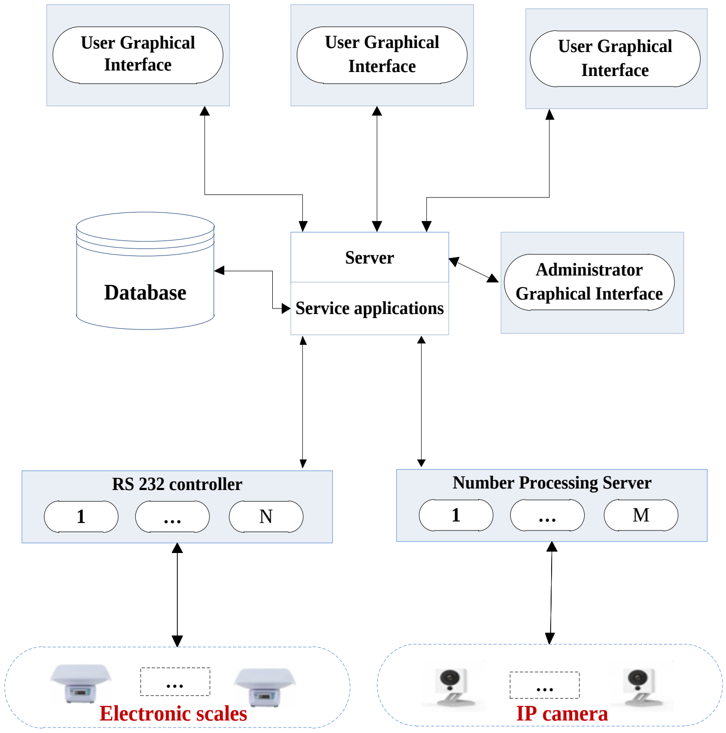

Fig.1. Oil and fat monitoring information system architecture

Hardware support consists of controlled devices, such as electronic devices, controllers, IP cameras, personal and server computers, network (TCP/IP) de-vices, and software applications. The devices use their drivers, operating systems and system software to keep them running[5].

The information monitoring system transmits the data in the system hardware to the measured raw mate-rials, camera images and process software installed in the process. This is done through parallel, consecutive ports, specially assembled boards and network devices to operate computers, electronic scales, controllers and surveillance cameras in one system[6].

The information monitoring system has been created a controller for data collection from electronic scales. The controller connects to the electronic scales with a 9-bit RS-232 port and stores the electronic scales in a specific file format in the memory of the controller. It transmits data through a TCP/IP protocol over a specific application installed on a controller[7].

The electronic weighing device used its average filter value to improve the accuracy of the cignals controller. Formula 1 was used to determine the ave-rage filter.

$$y(n)=\frac{1}{k-2}\left\{\sum_{i=1}^{k}u(t+i)-\max_{1\le i\le k}u(t+i)-\min_{1\le i\le k}u(t+i)\right\}(1)$$

Here $u(t)$ - controller module signals at t - time, k -average filter length, max () - maximum signal value, min() - minimum signal value.

This is done using a program written specifically for C ++. The software installed in the controller reads, filters, and transmits data from the electronic scales to the server computer, converting them to the database structure required. Data from controller devices are transmitted to the server computer at the time t^*.

Digital signaling servers transmit signals from IP cameras through the network protocol to the computer via image transfer. A special software tool created in the c # programming language reads the characters in the image using segmentation algorithms. In order to segregate color images from the camera, it is first converted to binary, and the binary algorithm separates the characters.

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Process data collection is done by means of software. Special software tools have been created to transfer data from one device to another and transfer data from one device to another. The logic of data collection is broken down into three parts:

1. Receives data from hardware using communi-cation protocols (drivers, special software tools, etc.);
2. the received data is pre-processed and forms the structure required for transfer to the server computer;
3. Transfer data to the server computer using network protocols.

Electronic scales used controllers and 9-contact COM (rs 232) protocols to read and aggregate data. The data collection program is written in visual c ++ and transmitted to the server via TCP / IP protocols locally or globally.

The core of the monitoring system is the server. Receive and centralize data from all processes through application programs on server computers.

B.THE INFORMATION MONITORING SYSTEM SERVER PERFORMS THE FOLLOWING FUNCTIONS

- collects data from a controller and stores it in a temporary buffer;
- Maintains data on each production process and buffer data in the tables of DBMS systems using software applications;
- generates monitoring analysis using Sql queries based on table data from customer requests;
- quickly generates daily, monthly and annual reports and makes suggestions for production planning;
- helps employees make decisions in production processes using application information using process information;

The DBMS system attached to the server stores all process information:

- users and their role in the information monitoring system;
- information on varieties, condition of oil seeds, raw materials received and transferred to production;
- information on raw vehicles;

From a network point of view - the information monitoring system performs data transfer and transmission over TCP / IP ports. Server computer controller devices create new connections to receive information from client applications. The server will automatically execute this process at $[t_0^*, \ldots, t_n^*], n > 0$ time interval.

It has hardware that works very reliably and securely, regardless of the parallel operation of the software connected to the server, and which can transmit and receive instantaneous information on the network. The server has optimized data processing and storage methods and data management systems.

C.INTEGRATION OF INFORMATION MONITORING SYSTEM

The issue of integrating information monitoring systems into multiple software modules and devices has been addressed. As a result of the research, the integration of the information monitoring system was described as a multi-step architecture[8,9]. Each stage of the monitoring system operates a specific task based on performance, hardware and software applications (Fig.2). Each layer has the following functions:

1. In the first phase, signals are measured through electronic scales and cameras;
2. In the second stage the signals are received and processed;
3. In the third step, the data is analyzed and implemented. Diagnosis of assignments and tasks;
4. In the fourth phase, an integrated data monitoring and decision-making support system will assist in providing the employees with the analyzed data and decision-making. It provides a simple and fast operation of the software.

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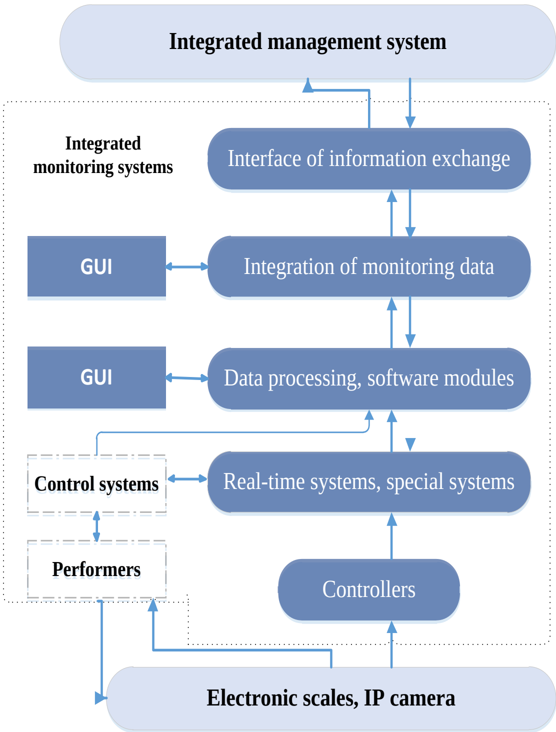

Fig. 2. The concept of multilayered model model for production processes

One of the most common ways of integrating systems is an ontological approach. In this approach, the various subject-area systems that are integrated are written as an ontology (Fig.3). The link between ontologies that represent information objects is then established. Ontology of the subject area consists of concepts (concepts, classes), their attributes, and the relationship between concepts. The structure of the ontology also includes abstract objects and their copies. System integration is commonly used when data ontologies are sought.

The most widely used methods of integrating ontologies are the use of syntactic, structured and semantic approaches. At the same time, we introduce an ontology integration approach to information monitoring systems based on semantic analysis.

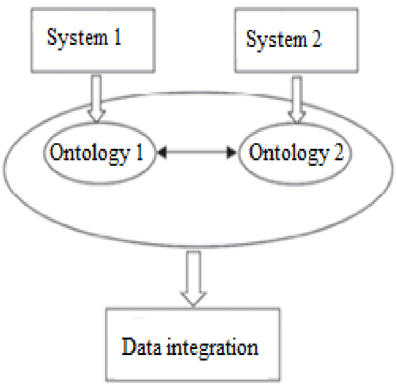

Fig. 3. Model of ontological integration of information monitoring system

Integration of information monitoring systems at the ontology stage is performed in the following sequence:

- an ontology for the field will be built. A connection is made between different ontology concepts;

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- formation of a general ontological model with the understanding of different subject areas;
- establishment of compatibility among information systems subjects;
- Introduction of procedures to bring data into one structure.

III.RESULT ANALYSIS

In accordance with the obtained requirements, an architecture of an expandable and scalable information system for monitoring production processes has been developed, it is possible to store information passing through it, which has the ability to expand the set of observable indicators and provide access to information from mobile and web terminals.

A system with this architecture has the residual mobility for the timely provision of detailed information about the production processes at the oil and fat factory, provides sufficient scalability for the least costly implementation in case of expansion of production, and provides the necessary extensibility to quickly add new sources of information. The provided mechanism for storing and obtaining historical data allows using the accumulated information for analysis, and the mechanism for adding computational components in JavaScript provides the ability to use both the results of the analysis of the data of the enterprise where the system is installed directly and external experience in similar enterprises. Using the JSON format to represent data and TCP/IP as a transport, as well as an event data model makes it possible and convenient to implement any kind of software terminals for any existing platforms, and the event model of data exchange opens up the possibility of moving from monitoring to management.

With the help of this architecture, an information monitoring system was created for oil and fat companies(Fig.4). The information monitoring sy-stem monitors the production process of the enterprise.

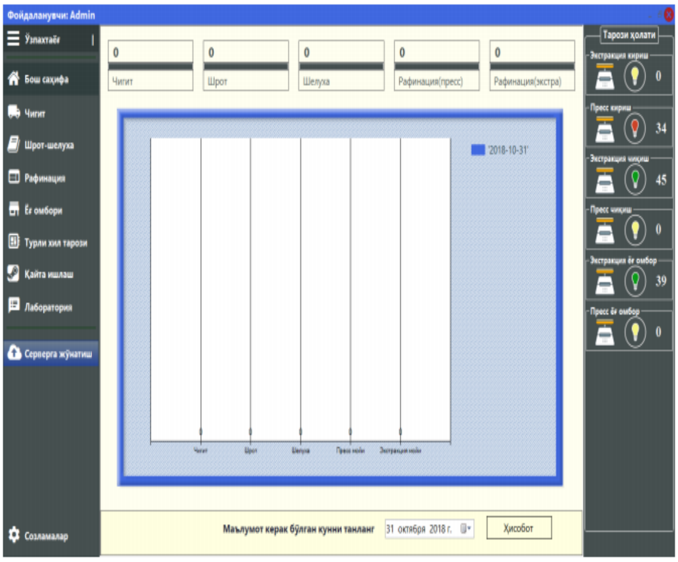

Fig.4. Application for monitoring information system

The information is integrated with monitoring system data, electronic scales, decision-making systems and Camera system data.

IV. CONCLUSION

Software applications are created for the client part of the information monitoring system. The applications are visually designed for web technologies and windows applications. Client applications are created based on LINQ technology running the C # language of the Visual Studio 2012 programming environment for windows.

Windows Server 2012 will be installed as an operating system on the server computer. SQl Client technology is used to connect to some data sets. Addressing and Managing Data The LINQ NET (Language-Integrated Query) query language was used on the .NET Framework. MS-SQL Server 2012 DBMS was used to manage some of the data. Some of the oil and fat business information is also created and managed in this system

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REFERENCES

[1] Kobayashi, K. LAWIN: A Latency-AWareInterNet architecture for latency support on best-effort networks. In Proceedings of the 2015 IEEE 16th International Conference on High Performance Switching and Routing (HPSR), Budapest, Hungary, 1–4 July 2015; pp. 1–8.
[2] Teslya, N.; Ryabchikov, I. Blockchain-based platform architecture for industrial IoT. In Proceedings of the Conference of Open Innovation Association (FRUCT), Helsinki, Finland, 6–10 November 2018; pp. 321–329
[3] Barbati M., Bruno G., Genovese A., Applications of agent-based models for optimization problems: A literature review, Expert Systems with Applications, 39, 6020–6028, 2012.
[4] Outtagarts, A. (2009). Mobile agent-based applications: A survey. IJCSNS InternationalJournalofComputerScienceandNetworkSecurity, 9(11), 331-339.
[5] Comer, Douglas, E., Internetworking with TCP/IP, Volume 1, 4th Ed., Addison-Wesley, Reading, Mass, 2000
[6] Chung, Y.; Choi, S.; Won, D. Lightweight anonymous authentication scheme with unlinkability in global mobility networks. J. Converg. 2013, 4, 23–29.
[7] Varun Jindal : PC to PC communication via RS -232 serial port using C , Electronics World, Jan 2006.
[8] Ullman J. D. Information Integration Using Logical Views // Proc. of the 6th International Conference on Database Theory (ICDT'97): Lecture Notes in Computer Science. Berlin, Germany:Springer, 1997. Vol. 1186. P. 19–40.
[9] Lenzerini M. Data Integration: A Theoretical Perspective // Proc. of the 21st ACM SIGACTSIGMOD-SIGART Symposium on Principles of Database Systems (PODS 2002). N. Y.: ACM.Press, 2002. P. 233–246.