ABSTRACT

Master's dissertation: 94 p., 10 figures, 12 tables, 25 sources, 1 application.

Relevance. The dissertation is devoted to the study of the linguistic approach to solve the problem of user recognition, in particular the recognition of the computer system user.

Thanks to technological progress, a large number of areas of human activity have shifted to computer systems. In the end, resources became available through global and local networks. In particular, internet banking, e-commerce, corporate services, or even ordinary home computers containing valuable, proprietary and personal information have access to the global network. Therefore, the issue of protection and personalization of a user who has the right of access to a specific resource has become very acute. There are several methods to solve this problem:

- login / password (the simplest and most vulnerable system due to the high probability of data abduction; it is impossible to check if this person has entered this account);
- two-step authentication (extension of the above method, it's now necessary to steal data from two places, but login / password problems still do not solve);
- biometric data (a very stable system, since it uses fingerprints, facial image and eye retina, but such devices has very high cost).

Compared to other user personalization methods, image recognition can solve their disadvantages. Most image recognition tools are based on two technologies: machine learning and visualization (visual presentation of information). The linguistic approach combines these two technologies.

The relevance of the use of the linguistic approach as a recognition tool determined the topic and direction of the dissertation research.

Relationship of work with scientific programs, plans, themes. The research was carried out at the Faculty of Informatics and Computer Science, Igor Sikorsky Kyiv Polytechnic Institute within the framework of the topic "Intelligent methods of programming, modeling and forecasting using probabilistic and linguistic approaches" (No. SR 0117U000926).

The purpose of the research is to provide high quality recognition of users of the system by characteristics of the trajectory of the cursor movement.

To achieve the goal there is need to accomplish the following **tasks**:
- carry out an overview of existing methods for recognizing computer users;
- select the characteristics for creating a user model;
- develop a method for treating cursor trajectory data in order to distinguish descriptive statistics and other characteristics necessary for user identification;
- carry out a comparative analysis of various methods and models of classification;
- carry out experimental research of the developed information technology;
- develop a prototype of the web service for testing;
- develop software implementation of the algorithm;
- carry out a comparative analysis of the results obtained.

The object of research is the user of a computer system or network, represented by the statistical characteristics of the trajectories of motion of the cursor on the monitor screen in the process of interaction with the computer system.

The subject of the study is statistical probabilistic methods and models of dynamics of the cursor movement and user recognition in real time.

Methods of research - methods of statistical processing of experimental data, probability theory, linguistic method of data analysis and formation of probabilistic conclusion, the theory of formal grammar, object-oriented analysis and design.

The scientific novelty of the obtained results is determined by the following theoretical and practical results obtained by the author:

- further movement in the development of the linguistic approach for solving the problem of user recognition by handwriting of the cursor;
- improved method of comparing grammars by combining existing methods and selecting the index of generating input outside the linguistic rules of the model;
- developed new information technology for solving the problem of computer user recognition, which is based on the use of the linguistic approach and provides improved recognition quality in comparison with known methods.

The practical value of the results

Implementation of the system is possible in a web application or in a desktop application in which the user interaction with the system takes place using the mouse cursor or the touchpad. For consistent system operation, you need to pick out a server or part of a Python-supported server and the MongoDB database.

Testing the results of the dissertation and publication:

- Kolyshchak B.V., Lanko V.V. "User identification and authentication system based on dynamic biometric characteristics" / VII All-Ukrainian Scientific and Practical Conference "Scientific Ukraine: Problems of the Present and Future of the Future", November 23-24, 2018 - pp. 55-61;

– Lanko V.V., Baklan I.V. "The solution of the problem of user authentication based on mouse cursor movements using the linguistic approach" / All-Ukrainian scientific and practical conference of young scientists and students "Information systems and technologies of management" (ISTU-2018) - Kyiv: NTUU "KPI them. Igor Sikorsky ", November 29-30, 2018 - pp. 95-99.

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