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THE METHOD TO DEVELOP CLASSIFIERS BASED ON GEOMETRICAL INTERPRETATION OF DATA STRUCTURE

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Introduction. Since variables in medical data arrays are mostly random, the preferable models for medical decision support systems (DSS) development are stochastic, probabilistic and statistical ones. Methods of multivariate statistical analysis are especially topical for such kind of models. One of the actual modern tasks in medical DSS development is problem of constructingof the decision rules to diagnose patients, as well as seeking for and formalization of informative structure elements, which are basis of these decision rules.

Supervised classification deals with learning information to construct rules (named classifiers) for assigning new objects to one of the prespecified groups (classes). A solution of supervised classification problem serves as a basis for medical DSS, designed for differential diagnostics, form of disease recognition, patient's grade of severity estimation, clinical outcome prognosis, etc.In such tasks learning sample consists of patients, which are described by heterogeneous features, wherein classifier is presented as function of object's features values.

Objective of the paper is to developthe method of supervised classification which allows using heterogeneous features as predictors, and paying attention to their possible non-linearity and non-monotony when passing from one class to another.

Results and Discussion. The proposed method for constructing classifiers is based on metric approach to graphical representations generated by methods of geometric interpreting of data structure (multidimensional scaling and correspondence analysis were used).The key point of the method developing is that we represent “classes” not as some subspaces or areas of compact layout in objects' space, but as an additional feature of object's description. Using such interpretation of “class” notion we construct the mathematical model of target feature “class” dependence on other explanatory variables.

The 3-stage algorithm for practical application of the developed method is suggested. At the 1st stage structuring and reorganization of learning data table is carrying out. As a result each feature is represented as a set of patterns, which characterize its inhesion to separate classes. This set of patterns and “class”-feature is an input information for correspondence analysis (stage 2), which allow getting geometrical representation of their interrelations. At 3rd stage the obtained spatial structure is analyzed. The metric to estimate distances between features in the obtained map should be selected, and weights of predictors should be evaluated. The degree of influence of some pattern on object's belonging to some class can be estimated as inverse distance between the points, which represent the pattern and the class. Then for each class the estimators of object's belonging to it are evaluated. The class, which an object should be assigned to, is that with maximum estimate.Thus the model of the specific classifier is formed.

Conclusions. The appliance of the supervised classification method, which is reported in the paper, allows improving of overall accuracy, specificity and sensibility ofclassification in medical

DSS. Mathematical models, which can be developed on the basis of the method, are interpretable due to logical rules lying in its grounds, i.e. they not only return an answer, but an explanation why the answer is most probable.

Keywords: supervised classification, heterogeneous features, multidimensional scaling, correspondence analysis.

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USE OF SAFETY-CASE DOCUMENT FOR THE EVALUATION AND GUARANTEE SECURITY SOFTWARE AND INFORMATION TECHNOLOGY IN THE PHARMACEUTICAL ENTERPRISE

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Introduction. The Safety-Case methodology is a complex of rules, methods, software and techniques, which are needed to research safety indexes and other proofs, that researching system should have safety and security protection.

The aim of the paper is consideration of the conception and organization of the development process with Safety-Case document like the proof of the functional safety automated control system of the technological process manufacture drugs in tablet form in the pharmaceutical enterprise.

Evaluation of the software and informational technologies may be based on the Computer Aided Software Engineering. This approach let us formulate the set of safety requirements of the modeling automated control system, including sets of the computerized and instrumental resources. The proposed main points of Safety-Case document are the typical points, because different standards are exist. But the most impotent in the Safety-Case document – the presence international industry standards and regulation documents in the presentive area.

Conclusions. Safety-Case document is a proof of the safety and security of the automated control system, which formed in the pharmaceutical enterprise. This system should be provide the technological process of drugs in tablet form and stay safety in any conditions.

Key words: Safety-Case document, software, pharmaceutical enterprise, technological process of manufacture, drug, ICS of critical used, safety.

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МЕТОДИ ІНФОРМАТИКИ У РЕАЛІЗАЦІЇ ЗАВДАНЬ РЕФОРМУВАННЯ ФАРМАЦЕВТИЧНОГО СЕКТОРУ ГАЛУЗІ ОХОРОНИ ЗДОРОВ'Я УКРАЇНИ

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Ключові слова: фармацевтична інформатика, електронний медикаментозний паспорт, електронний рецепт, пілотний проект з інформатизації рецептурного обігу.

Напрями реформування фармацевтичної складової охорони здоров'я (ОЗ) окреслені Концепцією розвитку фармацевтичного сектору галузі охорони здоров'я України на 2011 - 2020 рр. Вона акцентує увагу на інформатизації фармацевтичного сектору, конкретні шляхи