

Резюмета на научните трудове на английски език

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B.4.1. Karova, M., Penev, I., Kalcheva, N., Comparative analysis of algorithms to search for the shortest path in a maze. In 2016 IEEE International Black Sea Conference on Communications and Networking (BlackSeaCom) (pp. 1-4). IEEE. ISBN: 978-150901925-0

The aim of the paper is research and comparative analysis of algorithms from the field of artificial intelligence for searching shortest path in a maze. The algorithms studied are A* (A star), backtracking algorithm and genetic algorithm (GAPP – Genetic Algorithm Path Planning). The algorithms are compared by two criteria: length of the found path and time for finding the path. The results, presented analytically and graphically, show the application of the three algorithms for mazes with various size and number of obstacles.

B.4.2. Kalcheva, N., Zagorska, A., Dukov, N. and Bliznakova, K., 2017, September. Analysis of Suitability of Five Statistical Methods Applied for the Validation of a Monte Carlo X-Ray Based Software Packages. In International Conference on Intelligent Information Technologies for Industry (pp. 448-456). Springer, Cham. ISBN 978-3-319-68321-8

The aim of this study is to compare five statistical algorithms used to evaluate software packages based on Monte Carlo techniques. These methods are the following: regression, correlation, Bland Altman, Wilcoxon rank sum and Kolmogorov-Smirnov tests. The methods were applied to a case study to validate a dedicated computer code for calculating scattered X-rays reaching the operator's eyes during interventional procedures. The transport of the X-rays and their interaction with the matter were carried out using Monte Carlo techniques. To validate the code, the following scenario was simulated: an X-ray tube above the couch and a primary spectrum incident on a patient: RQR2, the patient is modeled as a cylinder with a diameter of 40 cm and a height of 15 cm. Scattered photons are registered using a virtual window placed in front of the operator's head. The conserved parameters are the energies of the photons, their position and direction. The results were presented as the number of registered photons as a function of their energy and further compared with data from Behrens et al. The five statistical methods were applied to the data, showing very good agreement between the two data sets. In the case of regression analysis, a polynomial dependence of the 6th degree was found between the number of scattered X-rays and their energy. The regression coefficient is 0.961. Correlation analysis showed a correlation coefficient equal to 0.960, which is an indicator of a very strong correlation between the data used in the comparison. The Bland Altman method shows that the differences between the two types of data are symmetrically distributed around the zero value, and at the same time, the mean value of the difference between the two data sets is also close to zero, which is actually an indicator of excellent agreement between the data sets. The Anderson–Darling test confidentially rejected the null hypothesis that the data were from a normally distributed population. The Wilcoxon rank sum test returned a p-value of 0.635, failing to find significant differences between the two sets. Finally, a two-tailed Kolmogorov Smirnov test showed that indeed the two data sets had the same distributions (p-value of 0.996). Of the five statistical comparison methods, the Bland-Altman method is the most suitable for our application. Further efforts are related to the development of a specific software application for the evaluation of data generated from general-purpose X-ray simulations, as well as the analysis of more data obtained from various incidental X-ray spectra.

B.4.3. Kalcheva, N., Karova, M., Penev, I., 2020, September. Comparison of the accuracy of SVM kernel functions in text classification. In 2020 International Conference on Biomedical Innovations and Applications (BIA) (pp. 141-145). IEEE. ISBN: 978-172817073-2

The objective of this paper is to compare the accuracy of different kernel functions of the SVM method for text classification. As a basis for the research film reviews are used. The authors try to detect the kernel functions and their parameters to achieve high accuracy in movie reviews classification. The studied kernel functions are: polynomial kernel of degree 2, a linear kernel and a radial base kernel. The achieved accuracy is higher than 83%. The experiments show that the sigmoid radial kernel is an inappropriate choice in text classification.

B.4.4. Kalcheva, N., Karova, M., Penev, I., 2020, October. Comparison of the accuracy and the execution time of classification algorithms for Bulgarian literary works. In 2020 International Conference Automatics and Informatics (ICAI) (pp. 1-5). IEEE. Varna, Bulgaria, ISBN: 978-1-7281-9308-3

The purpose of this paper is to compare the accuracy and the execution time of machine learning algorithms for classification of texts, written by Bulgarian authors. The algorithms examined are: Multinomial Naive Bayes classifier, Support Vector Machines, Random Forest and AdaBoost. The results show that the Multinomial Naive Bayes classifier is the most accurate and fastest algorithm for classifying texts by two authors with an equal number of poems in Bulgarian language. The ensemble algorithm AdaBoost is the most accurate for unbalanced data classification. The Support Vector Classification has the highest accuracy. In a classification with an unbalanced set of data, the fastest algorithm is Bernoulli Naive Bayes classifier.

B.4.5. Chakyrova, D., N. Doseva, and N. Kalcheva. Bin weather data of Varna and their influence on the seasonal efficiency of heat pumps with energy source outdoor air. In IOP Conference Series: Materials Science and Engineering, vol. 1032, no. 1, p. 012024. IOP Publishing, 2021., DOI:10.1088/1757-899X/1032/1/012024, ISSN: 17578981

The aim of the current paper is to investigate the influence of climatic data for external air temperature bins on the seasonal coefficient of performance, SCOP, of an aérothermal heat pump. Therefore, the main problem of the investigation is the development of a mathematical approach to obtain realistic climate data for the distribution of temperature bins. Data on the external air temperature measured in the Varna region for the period from 2005 to 2019 were used and a statistical analysis of the data was performed. The relative frequency and the relative cumulative frequency of the temperature bins were calculated. The main result of the present study is that using the obtained external air temperature bins data, the SCOP, the heat produced and the electrical energy consumed by an air-to-water heat pump were determined. The results of the calculation were compared with the values for these parameters obtained using climatic data from other literary sources (EN 14825:2019 and Climatic reference book of the Republic of Bulgaria, 1983). It is concluded that using the information from EN 14825:2019 for the external air temperature bins, this would lead to about 40% and 37%, respectively, relative difference in the results for the heat produced by the considered air-to-water heat pump and the consumed electrical energy. On the other hand, the relative difference between the results for the these parameters, calculated using the data from the present paper and those from the Climate guide for the Republic of Bulgaria (1983, Kyuchyukova) is relatively small: 4.4% and 3.6%, respectively.

B.4.6. Linova, P., Kalcheva, N. and Nikolov, N., 2021, September. Use of deductive and/or inductive approach in the study of nonlinear programming problems. In 2021 XXX International Scientific Conference Electronics (ET) (pp. 1-4). IEEE. ISBN: 978-166544518-4

The purpose of this paper is to propose a new model of teaching nonlinear programming tasks by describing two main approaches used to acquire knowledge in teaching theory and practice: inductive and deductive. The focus of the report is on how to use both approaches effectively in the process of teaching students to solve nonlinear optimization problems. The authors tried to describe the theory and give examples of three algorithms to solve nonlinear optimization problems: the Hooke and Jeeves algorithm, the method of steepest descent, and the Lagrange multipliers method. Teaching with one of the two approaches or a combination of them, applied depending on the specific problem, improves the principles of science, activity, accessibility of the studied material, and permanent mastery of knowledge, skills, and habits.

B.4.7. Kalcheva, N. and Nikolov, N., 2020, September. Laplace Naive Bayes classifier in the classification of text in machine learning. In 2020 International Conference on Biomedical Innovations and Applications (BIA) (pp. 17-19). IEEE. ISBN: 978-172817073-2

The purpose of this publication is to compare the accuracy of a new algorithm based on the Naive Bayesian classifier using the Laplace distribution and named the Laplace Naive Bayes classifier with the Gaussian Naive Bayesian classifier. One of the most common approaches used to determine which of the two classification algorithms is a more accurate method is the t - Student's sample test (pairwise tests), where hypotheses are evaluated on the same samples. The relative behaviour of the two algorithms is considered, averaged over all possible training sets of size, which can be formed randomly from instances taken from a given distribution.

The t-pairs test statistically proves that the observed difference in the accuracy of the two algorithms on a selected database of English film reviews is not the result of a random order of examples used for training and testing, but of the different classification behaviour of the algorithms.

B.4.8. Kalcheva N., Teaching of Bayes formula, 57th International Scientific Conference on Information, Communication and Energy Systems and Technologies, Ohrid, North Macedonia, 16-18 June, 2022, ISBN: 978-1-6654-8500-5

Bayesian statistics are gaining popularity and it is essential to look for effective ways to teach Bayes' theorem.

One of the most popular algorithms in machine learning is the Naive Bayesian Classifier. For its successful mastering by the students, it is first necessary to understand the Bayesian formula in detail, which at a later stage will help to facilitate its subsequent conversion of the algorithm into program code. One way to facilitate this learning process is for the examples to relate to real-world situations and the active participation of students in the learning process.

Bayes' formula, taught both through an abstract-deductive approach and through a concrete-inductive approach, is always a struggle for students. This is a subject that, even with the inclusion of many examples, confuses learners. Active involvement in discussions, solving examples together by the whole group or in teams leads to better results. Encouraging students to be an active party and not a passive part of the learning process is one of the harder but beneficial tasks of the teacher.

The article proposes a new model of teaching Bayes formula by using the educational strategy of active learning for technical university students.

B.4.9. Kalcheva N., Kovachev I., Comparison of BERT and XLNet accuracy with classical methods and algorithms in text classification, International Conference on Biomedical Innovations and Applications, Varna, Bulgaria, 2-4 June 2022, ISBN: 987-1-6654-4581

The aim of this publication is to compare the accuracy of the Bidirectional Encoder Representations from Transformers (BERT) and Generalized Autoregressive Pretraining for Language Understanding (XLNet) models in text classification with the accuracy of classical machine learning methods and algorithms. Analyzed: Bidirectional Encoder Representations from Transformers (BERT), Generalized Autoregressive Pretraining for Language Understanding (XLNet), Bernoulli Naive Bayes classifier, Gaussian Naive Bayes classifier, Multinomial Naive Bayes classifier, Support Vector Machines. The results show that when classifying 50,000 reviews in English, XLNet ranks with the highest accuracy - 96%, which is nearly 8% more than the best-performing classic classifier Support Vector Machines. The advantage of neural network methods using the "Transformer" architecture is due to the consideration of the context of a word - the words that surround it and the positions in which they are relative to it. The advantage of XLNet over BERT is due to the much deeper context (up to $512 \times 24 = 12,288$ words for XLNet vs. 512 words for BERT), which it uses to digitally assess the meaning of words, as well as to use a more effective training method - "Permutation Language Modeling". This study provides a guide to selecting machine learning techniques for text classification.

B.4.10. Kalcheva N., Karova M., A Comparison of Machine Learning Classification Algorithms and Methods for English Author's Works and their Translations into Bulgarian, 57th International Scientific Conference on Information, Communication and Energy Systems and Technologies, Ohrid, North Macedonia, 16-18 June, 2022, ISBN: 978-1-6654-8500-5

The aim of the publication is to compare the accuracy, precision, sensitivity and F-measure of machine algorithms trained in the classification of authors of works by English authors and the classification of authors of the same works translated into Bulgarian.

The algorithms examined are Multinomial Naive Bayes classifier, Bernoulli Naive Bayes classifier, Support Vector Machines, Random Forest, AdaBoost, Decision Tree and K-Nearest Neighbor.

The research results show that in the English author's classification with an equal number of works in English, Support Vector Machines and Multinomial Naive Bayes classifier receive the highest values of the studied indicators. In Bulgarian texts, the best results are obtained depending on specific authors.

B.4.11. Kalcheva N., V. Petrova, Teaching of the Naive bayesian classifier algorithm for the classification of bulgarian text in machine learning, Masters International Research & Development Center, MIRDEC-18th, International Academic Conference on Economics, Business and Contemporary Discussions in Social Science (Global Meeting of Social Science Community, 4-6 July 2022, Lisbon, Portugal.

The Naive Bayesian Classifier machine learning algorithm builds a classification procedure based on an analysis of a set of text. In the Naive Bayesian Classifier task, a decision is made for each category as to whether or not the document belongs to a category.

Teaching text classification using the Naive Bayesian Classifier method is effective through the use of interactive learning. In this type of training the activity of the teacher gives way to the activity of the students. A spirit of competition emerges, and every idea expressed by the neighbor provokes in others a desire to express their idea close or even opposite. When using interactive teaching methods, learners stimulate and encourage each other. All these activities in an atmosphere of mutual help and kindness help to achieve the goal of the lesson, namely: consolidating knowledge and developing skills for text classification through the Naive Bayesian Classifier algorithm.

The article presents a new model for teaching the Naive Bayesian Classifier for text classification using interactive training to students of technical universities.

Г.7.1. Todorova M., Kalcheva N., Identification of Characteristic Descriptors and Creation of a Model for Predicting the Stage of Cancer, 57th International Scientific Conference on Information, Communication and Energy Systems and Technologies, Ohrid, North Macedonia, 16-18 June, 2022, ISBN: 978-1-6654-8500-5

The report presents an analysis of data for patients with registered oncological diseases in the period 2013. – 2019 and applying correlation analysis to determine the most significant characteristic descriptors that have the greatest impact on determining the stage of malignancy. Based on the conducted theoretical studies, four groups of regression models created with three machine learning methods – Decision Tree, Support Vector Method and Ensemble Algorithms – are presented for three independent data sets. A generalized model covering all ICD groups is also presented. The results of the conducted experiments show that a correlational approach through supervised machine learning is applicable in determining the significant characteristic descriptors for predicting the stage of malignant disease. The quality of the resulting models depends on the analysis, structure, preliminary preparation and processing of the data and the detection of factors that most influence the staging.

Г.7.2. Todorova M., Kalcheva N., Marinova G., Classification of oncological medical institutions on the basis of patient survival and topographic code of the disease, 57th International Scientific Conference on Information, Communication and Energy Systems and Technologies, Ohrid, North Macedonia, 16-18 June, 2022, ISBN: 978-1-6654-8500-5

The report presents the discovery of dependencies between data for patients with registered oncological diseases in the period 2010. – 2014 in order to create a methodology for classifying oncology treatment facilities based on patient survival and topographic disease code. Based on the created methodology, one hundred and fifty-six classifiers for classifying medical facilities were trained and tested, for twelve datasets, through five machine learning methods - Decision Tree, K-Nearest Neighbor, Naive Bayes Classifier, Support Vectors, Ensemble. Generalized classifiers have been created covering the twelve ICD groups. The accuracy and the classification error of each model were calculated, both in the training process and in the prediction process. Evaluation and comparison of classification models has been implemented. The classification of medical facilities will provide an opportunity for patients to make an informed choice when choosing a medical facility for treatment.

Г.7.3. Marinova G., Kalcheva N., Distress Study Through Machine-Learning Techniques, International Conference on Biomedical Innovations and Applications, Varna, Bulgaria, 2-4 June 2022, ISBN: 987-1-6654-4581

The aim of the article is to predict distress among cancer patients segmented into three age groups. Experimental results from a study conducted on patient age and distress assessment using three machine learning methods are presented. A comparative analysis was made to assess the quality of the classification models using the accuracy, sensitivity, recall and F-measure metrics. Based on the analysis of the tabular comparison of the results of the conducted research, for the second and third groups the risk is higher compared to the rest of the research, which corresponds to age changes and their different tendency to move into a state of distress after the diagnosis of oncological disease.

Г.8.1. Калчева-Арабаджиева Н., Обзор на публикации свързани с модификации на алгоритъма Наивен Бейсов класификатор при класификация на текст в машинното обучение, Списание Компютърни науки и технологии, ISSN 1312 -3335, 2021, ТУ – Варна, България, том 1, стр. 78-82, ТУ – Варна, България

The text classification task is complex in nature due to the fact that the source data are natural language texts. Each word in such texts carries a meaning, and a combination of words can have complex semantic meanings.

Traditionally, it is believed that the discrepancy between the text classification results and the expected results is related to the imperfections of the classification methods themselves. This assumption is the main motivation for modifying existing methods and algorithms for text classification.

The purpose of the report is to review publications related to modifications of the Naive Bayes algorithm classifier for text classification in machine learning. The analysis of the published research shows that the classification of text in machine learning is an important and topical task, finding application in various real practical tasks. The Naive Bayesian classifier is very often modified by researchers in order to increase the efficiency of the algorithm.

Г.8.2. Линова П., Н. Калчева-Арабаджиева, Алгоритъм на клъстеризация в машинното обучение, Списание Компютърни науки и технологии, ISSN 1312 -3335, 2021, ТУ – Варна, България, том 1, стр. 91-95, ТУ – Варна, България

Machine learning can be classified as Supervised machine learning, also known as supervised machine learning, Unsupervised machine learning and semi-supervised machine learning, which combines machine learning with a teacher and without a teacher.

In machine learning, clustering is an example of unsupervised machine learning.

The clustering algorithm is a process of grouping objects with similar characteristics. Objects in one cluster differ from objects in other clusters in their characteristics.

The report discusses the clustering algorithm in machine learning. The types of cluster structures in clustering in machine learning are graphically presented. Basic clustering methods are considered

Г.8.3. Калчева-Арабаджиева Н., Предимства и недостатъци на алгоритъма Мултиномиален наивен Бейсов класификатор, Списание Компютърни науки и технологии, ISSN 1312 -3335, 2021, ТУ – Варна, България, том 1, стр. 83-86, ТУ – Варна, България

The article presents the popular Multinomial Naive Bayes classifier algorithm with its characteristics, advantages and disadvantages.

One of the classic algorithms in machine learning is the Naive Bayes Classifier, which is based on Bayes' theorem for determining the posterior probability of an event occurring. Known algorithms of the Naive Bayes classifier type are: Gaussian, Bernoulli and Multinomial, associated with different assumptions about the distribution of features. In the Multinomial Naïve Bayes classifier, the document feature vectors contain the frequency of occurrence of the words

The multinomial Naive Bayes classifier is suitable for a discrete set of attributes and for binary verification. In text classification, it does not consider the meaning of the words, but needs a small amount of training data. If there is correlation in the data the classifier performs poorly. It is suitable for large dictionary sizes, but not for small ones.

Research shows that the Multinomial Naive Bayes Classifier is not a universal classification method that could be used with 100% accuracy for each application task.

Г.8.4. Калчева Н., Обзор на публикации със сравнителен анализ на методи и алгоритми за класификация на текст в машинното обучение, Списание Компютърни науки и технологии, ISSN 1312 -3335, 2020, ТУ – Варна, България, том 1, стр. 118-125, ТУ – Варна, България

An overview of publications related to comparative analysis of methods and algorithms for text classification in machine learning is presented in the article. The analysis of published scientific research shows that the classification of text in machine learning is an important and topical task, finding application in various real practical tasks. In most of the studies with the best characteristics of selected metrics is Support Vector Machines, often followed by the Naive Bayesian classifier.

Research shows that there is no one-size-fits-all method or algorithm for machine learning text classification. Each method or algorithm works well depending on the specifics of the task at hand and the data used.

Г.8.5. Тодорова М., Н. Калчева, Г. Маринова, Н. Николов, Обзор и класификация на методи и задачи в Data Mining, VIII INTERNATIONAL SCIENTIFIC CONFERENCE TECHNICS, ISBN 2535-0315, 2020 г.

The report provides an overview of the Data Mining field. The steps for extracting data from large arrays are described. Data mining methods are classified based on three characteristics - data mining tasks, mathematical apparatus used, computer mathematics and artificial intelligence theory. The tasks that are solved in the extraction of knowledge from data are categorized based on two criteria - methods used in knowledge extraction and methods used in data analysis. The two stages of data classification are described - model creation and application and assessment of the reliability of the created model. A mathematical formulation of the main tasks solved in the Data Mining field - classification, regression and clustering - is presented. The authors come to the conclusion that the proposed methods can be used to solve a wide class of tasks with practical application in various fields.

Г.8.6. Маринова Г., Н. Калчева, Х. Ненов., Open Source Blender 3D моделиране и анимация, Fourth Scientific International Conference Computer Sciences and Engineering, 30 September -01 October, Списание Компютърни науки и технологии, ISSN 1312 -3335, стр. 124-128, 2016, ТУ – Варна, България.

The report examines Blender, an application that is gaining popularity in the world of 3D modeling and animation. Its characteristics, advantages and disadvantages are presented. The functionalities of the program provide extremely large opportunities to users when creating their models. The open source nature of the code makes it easy to create additional custom extensions that develop and enrich the existing Open Source Blender. The Blender program makes it possible to create three-dimensional models used in advertising, multimedia, computer games, industrial, interior and industrial design, and more. The modeling process proceeds individually depending on the idea, the series of actions for realization and achievement of the set task.

The software product is widely used by students, hobbyists, artists, scientists and professionals, and its use by these and other groups is growing every day. The program is a basic alternative for people who want a free, open and independent tool for 3D models and animation.

Г.8.7. Karova M., I. Penev, M. Todorova, H. Bobev, N. Kalcheva, Graph Construction Algorithm for finding the Shortest Path in a Maze, Proceedings of Papers, 51st Scientific Conference on Information, Communication and Energy Systems and Technologies, ISBN: 978-9989-786-78-5, Faculty of Technical Sciences, Bitola, Macedonia, 2016, pp. 225-228

The paper presents implementation of an algorithm, called AlgoHris, for movement of a robot from a start position to a final destination in a maze. The algorithm solves two main problems: transformation of the maze into a graph and finding the shortest path from an initial to a final position. The algorithm is implemented as a part of an application, using already generated text image, obtained by a picture of the maze from above. Walls (obstacles), empty spaces, starting position of the robot and the final destination are marked on the image. The maze is presented as a bit set to form a graph which vertices are valid positions of the robot (i.e. the robot can rotate without touching a wall). The algorithm finds the shortest path and produces movement commands.

Г.8.8. Arabadzhieva – Kalcheva N., Preparation of an analysis "bow-tie" in a set case "hacker attack in it company". Scientific Conference with international participation MATTEH 2022, Conference proceedings, Vol. 2, Shumen, 2022, ISSN 1314-3921, pp. 63-67.

The "bow tie" analysis is a diagram showing the relationship between the main risk and the causes and consequences of the risk, the existing barriers to preventing adverse effects, and mitigating and restorative management tools.

The "bow tie" analysis is a combination of two methods: Fault Tree Analysis and Event Tree Analysis. The Fault Tree Analysis method analyzes the causes of an event, and the Event Tree Analysis method analyzes the consequences of the event that occurred. At the heart of the "bow tie" analysis method is an examination of the barriers between risk, the causes of risk and the consequences of risk.

The report presents an example, related to computer security, demonstrating the application of the analysis of the "bow tie knot", on the basis of which combined with the listed causes and consequences can be made risk analysis and follow-up preventive actions to avoid risk or reduce its consequences.

Г.8.9. Arabadzhieva – Kalcheva N., Nonlinear structures of data: trie and integer trie. Scientific Conference with international participation MATTEH 2022, Conference proceedings, Vol. 2, Shumen, 2022, ISSN 1314-3921, pp. 68-71.

The paper examines the tree structure Trie and its variant Integer Trie.

A Trie structure is a type of search tree that is used to store an associative array. Unlike a binary search tree, a node in the tree does not store the key, but the key is obtained by traversing it. Vertices can hold characters from the key string (optional). The location of each vertex in the tree indicates what key it is associated with. Keys are not necessarily associated with each node. The root of the trie is empty, and each vertex has a common prefix with the string associated with that vertex.

An Integer trie is a binary tree that uses integers instead of strings as keys. The idea is that an integer can easily be represented in binary format. The location of nodes in this tree is controlled by its bits. Each zero means a branch to the left, and a unit means a branch to the right.

Algorithms for their construction are presented in the report and examples are attached. Advantages and disadvantages of the Trie structure and their applications are discussed.

Г.8.10. Arabadzhieva – Kalcheva N., Application of the method of analysis of causes and effects in a set case "computer network failure", Scientific Conference with international participation MATTEH 2022, Conference proceedings, Vol. 2, Shumen, 2022, ISSN 1314-3921, pp. 72-75.

The analysis of causes and effects is a method used to determine the possible causes of a problem. With its help, critical control points can be found, strategies can be formulated to overcome the main causal links in a complex system. The report considers an example, related to computer security, demonstrating the application of the method Analysis of causal relationships. Ishikawa's diagram indicates the possible causes of changes in the process, and can establish the causal links between them, to get a complete and clear picture of the real problems and their interactions.

Г.8.11. Kalcheva N., M. Todorova, G. Marinova, Naive Bayes Classifier, Decision Tree and AdaBoost Ensemble Algorithm. Advantages and disadvantages, 6th International Conference – ERAZ 2020 – Knowledge based sustainable development, Online/virtual, May 21, 2020, Published by: Association of Economists and Managers of the Balkans – Belgrade, Serbia, ISBN 978-86-80194-33-2, doi: 10.31410/ERAZ.2020.153

The purpose of the publication is to analyze popular classification algorithms in machine learning. The following classifiers were studied: Naive Bayes Classifier, Decision Tree and AdaBoost Ensemble Algorithm. Their advantages and disadvantages are discussed.

Research shows that there is no comprehensive universal method or algorithm for classification in machine learning, with a 100% accuracy for any applied task. Each method or algorithm works well depending on the specifics of the task and the data used. Thus, many different algorithms ought to be explored before picking the right one. The strengths and weaknesses of each one should be noted when making a decision.

Г.8.12. Arabadzhieva – Kalcheva N., Tsankov Ts. Failure Modes and Effects Analysis – FMEA. Scientific Conference with international participation MATTEH 2022, Conference proceedings, Vol. 2, Shumen, 2022, ISSN 1314-3921, pp. 58-62.

Failure Modes and Effects Analysis (FMEA) is a method of finding a mechanism for detecting failures, the causes of failures, ways to prevent failures and / or mitigate their effects on the system, and the likely consequences of these failures.

The example presented in the report demonstrates the application of Analysis of the types of failures and their consequences in a particular case of "Failure of a computer network in a company". Possible risks, selected by experts, are presented in a systematic way in tabular form. Based on the results of applied quantitative assessments, measures for overcoming the risk and application of methods for risk prevention have been identified.

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