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SOLUTION OF THE CLASSIFICATION PROBLEM FOR MEDICAL DATA ON THE BASIS OF AZURE MACHINE LEARNING SERVICE AND THE DEVELOPED WEB APPLICATION

Machine learning (ML) is a method of data analysis that automates the creation process for the analytical model. This is a branch of artificial intelligence based on the idea that systems can learn from data, detect patterns and make decisions with minimal human intervention [1].

Currently, ML is one of the most trending directions in software development. The healthcare industry makes extensive use of ML technologies to create web applications that help predict risks or detect diseases at an early stage, to improve patient care.

The development of a web application that receives input data and predicts the output result will include three steps:

Stage 1. Creating an Azure machine-learning model.

Stage 2. Developing the Web application and integrating the model into the application.

Step 3. Deploying a web service via Azure technologies.

Azure Machine Learning is a cloud-based, fully controllable module that helps you effectively perform a variety of ML tasks, such as data preparation, model learning, and the deployment of a forecasting service as a web application, using Microsoft Azure's vast computing power. [2]

For the first stage, Azure Machine Learning Designer is used, which provides a graphical environment for creating ML models.

The main steps of creating a model are:

1. Creating a pipeline.

2. Importing Data.

3. Preparing the Data.

4. Learning the model to use the selected algorithm.

5. Estimating and analyzing the model.

Algorithm'schoicedepends on the type of data and the task. Medical problems are usually solved via thesupervised learning algorithm, specifically classification. [3]

Classification Algorithms use entry training data so to predict the probability of the output data will get into one of predefined categories. [4]

This model uses the decision tree algorithm. This is a classifier with a tree-like structure, where the internal nodes are the characteristics of the data set, the branches represent the rules of decision-making, and each end node represents the result. This module is suitable for solving the problem, because the target variable is a discrete one.

Evaluation and analysis of the trained model is based on metrics: accuracy, precision, recall, F1 score, confusion matrix, ROC-curve and AUC - area limited by ROC-curve. [5]

After creating and testing the developed model, the next step is to create a web application using VueJs, CSS, NodeJs technologies.

The purpose of this application is to enable physicians to diagnose their patients more quickly. At that time, other users will be able to access all of their test results.

Deploying machine-learning models is the process of bringing models into production, where web applications, enterprise software, and APIs can use the trained model to provide new data points and generate forecasts.

After a successful deployment, we can test the service using test data in JSON format to make sure that the web service returns the desired result.

References

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