

# **SOFTWARE SYSTEM FOR EARLY DIAGNOSIS OF STROKES «STROKEML»**

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**Abstract:** The aim of the work is to develop a software system that allows the user to be tested, analyzes its results and provides the user with information about his susceptibility to stroke disease. The software system also aims to preserve the results of tests and provide recommendations for nutrition and healthy living.

Stroke is a disease that can strike for a few minutes to take, so it's important to prevent it, not rely on luck in treatment. Therefore, the goal of the project is to save as many people as possible by preventing this terrible disease in advance, and to provide recommendations for maintaining health (80% of strokes can be prevented with timely diagnosis). As a result of the analysis of the subject area the following tasks were formulated: to consider already created applications and to define their main advantages and disadvantages; develop a software system for people prone to stroke that will enable patients and their loved ones to monitor the course of the disease and monitor the condition and tests, which are among the factors that can help in early diagnosis; to investigate the practical feasibility of the created system in the daily life of users.

The purpose of the work is the implementation of a software system that allows the user to be tested, processes its results and gives the probability of stroke. There are analogues of the software system in the world, but they have a number of differences and shortcomings in comparison with the developed application "StrokeML". An example is the "Stroke Risk Meter" mobile application. But this application has only a mobile version, so people without a modern smartphone will not be able to use it. In addition, the application does not provide the ability to store test results. The main emphasis is on information about the disease in general, its symptoms and superficial recommendations.

The server must perform the following tasks: adding a new user, checking user data for authorization, saving user data, processing test responses, issuing probabilities, saving test results, the ability to create family accounts. The website should provide the ability to perform the following tasks: registration in the software system, authorization, user review of general information about strokes, testing, the ability to store test data. The mobile application should provide the following tasks: the ability to view general information about strokes, the ability to review the rules of first aid and rapid diagnosis of stroke,

the ability to take tests, display data from the IoT emulator, send recommendations to users (Telegram Bot).

The software system being developed is divided into four parts: a server, a website, a mobile application and an IoT emulator. The site consists of a user interface that is displayed in the browser using the React library, which interacts with the back end written in Django. The mobile application consists of a user interface that communicates with the server using HTTPS requests. The mobile application interacts with the server using Kotlin Android. The IoT emulator communicates with the server by exchanging HTTPS requests.

Python was chosen as the back-end development language. As a framework, the best choice is Django. Django is a free framework for web applications in the Python programming language that uses the MVC design template. Python has the ability to interact with I / O devices through its API, connect other external libraries written in different languages. The most popular database management system for Django is PostgreSQL. PyCharm was chosen as the IDE. The mobile application was developed using the Kotlin language, Android API and Android Studio IDE. The server has a set of endpoints that provide information about the available back-end functionality, describe the required query parameters, their types and a list of valid values (where necessary), and have the same description for possible back-end responses. One entity has several endpoints with different HTTP methods and slightly different parameters for requests and responses, which determines their grouping.

As a result, a software system for early diagnosis of strokes was developed. It consists of four parts: a server, a website, a mobile application and an IoT device emulator. A software system has been developed allows testing to be performed and, based on its results and analyzes, makes assumptions about the probability of a stroke in a user. The developed software system is only a prototype and cannot be used in real conditions in the current state. The first thing to do is to call an ambulance. It would also be a good idea to add a neural network that would make the analysis of test results and general user information more accurate.

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