Mobile application for conducting interactive lectures on data processing

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Currently traditional passive lectures are replaced by lectures in interactive form. Interactive lecture is a form of teaching involving continuous interaction of the participants in the process under the teacher control. This lesson allows you to solve many problems that occur during traditional lectures.

Computer technology is one of the key elements of effective interactive lectures. And since the concept of the interactive lectures is becoming more common, complex hardware and software are developing. However, approach of conducting interactive lecture using computers has significant weaknesses. First of all it is the cost of equipment. Another problem is that the participants attached to the workplace, i.e. deliberately deprived of the movement possibility during operation, which can become a significant inconvenience. In this case, the solution may be found in a mobile technologies.

Despite the obvious and significant benefits, mobile learning is quite underdeveloped in the Russian Federation, although the first steps for the implementation of mobile technologies in education has already been done.

It may be noted that currently actively developing direction and disciplines associated with the data processing (machine learning, Big Data, etc.). Thus, the question remains open about the use of hardware and software for conducting interactive lectures in these subjects. In particular, existing software practically allows you to interactively carry out the study of the foundations of mathematical statistics and data processing with the direct participation of the whole group of students.

The aim of this work is to develop a mobile application for an interactive lectures on mathematical statistics and data processing. The aim is to involve all the students in the process of carrying out the assigned experiment and data collection.

In addition to develop mobile applications for smartphones and tablets for students, an application in Python for the lector's computer is developed. Using mobile application we collect data, for example, obtained as the result of any experiment. This data is sent to the server, then on the lector's computer they are read, analysed and visualized by the application.

The developed mobile application contains 4 tabs: "Survey", "Statistics", "Data processing" and "Monitoring". On the "Survey" tab there are elements that allow you to send to the server the results of any students survey and polls during lectures. On the "Statistics" tab there are elements which allow to send to the server from each student numeric values, which further are used to calculate the statistics of this sample of students. On the "Data processing" tab there are elements through which you are sending to the server the values of the predictors and the predicted variable from each student. On the "Monitoring" tab there are elements with the help of which the control of the assimilation of the examined material by students is carried out by answering the questions posed in the form of a test.

We propose the following stages of the interactive lectures on the fundamentals of regression analysis and data processing. Let the task of lesson is to identify a possible dependence of an average score for exams on the student's IQ level and an average number of hours spent preparing for the exam. In the lesson, work with applications is as follows.

1. Students open the application installed on their mobile devices, go to the tab "data processing".
2. The lector explains the task, the revealed dependence, independent variables (predictors), dependent (predicted) variable. After that, students enter the values of their IQ level, the average number of hours spent preparing for the exam and the average score for the exams. After clicking the "submit" button the entered student data is sent to the server.
3. The lector starts the application on the computer, runs a command that downloads from the server the data entered by the students. He selects the regression model.
4. The macro performs the calculation and visualizes data and results of their processing at every step. The lector commented on each step of the program. As a result, the screen displays the selected regression model, as well as information explaining the calculation of regression coefficients. For example, in the case of simple linear regression, the screen displays estimates of the regression coefficients using the method of least squares.
5. Students are asked to change the values in order to demonstrate the other results of analysis with different variations of data.
6. If necessary, students perform survey on the "survey" tab or work with statistical information on the "Statistics" tab.
7. Students go to the tab "Monitoring" and perform the test.