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Predictive Diagnostics of Newborn Pathologies Based on Neuroph Software Framework

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Background & Hypothesis:
The expert system for predictive diagnostics of newborn pathologies based on neuroph software framework of maternal genetical and biochemical profile was suggested.

Methods:
The polymorphisms in the following genes were investigated: *MTHFR, MTR, F2, F5, F7, F13, FGB, ITGA2, ADD1, AGT, NOS*. Biochemical markers were presented by levels of some hormones. The outcomes were postpartum bleeding, breathing problems and placental abruption. In total, 201 cases were analysed: 67 controls and 136 with pathologies. The calculations were made with the help of neural network based on Neuroph software framework. Naive Bayes classifier was trained for comparison. To test our prediction model, the cross validation technique was applied. All cases were shuffled and then formally split into 2 groups: training and testing sets, in the proportion of 9 to 1.

Results:
Being trained, neural network successfully recognised 95% of samples in the training set and more than 80% of samples in the testing set. Naive Bayes classifier showed significantly lower recognition rates: 65% and 55% respectively.

Discussion & Conclusion:
To increase the accuracy of prediction, data set should be considerably expanded. It requires the creation of a publicly available curated database to cooperate with other researchers. The set of the topmost informative markers was found to decrease the cost of the diagnostics. (This study was supported by the Federal assignment № 6.703.2014/K from the Russian Ministry of Science and Education.)

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