Realization of the Neural Network Model of Prediction of the Software Project Characteristics for Evaluating the Success of Its Implementation

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Abstract

This paper proves the dependence of successful of software project implementation on the software requirements specification (SRS), the actuality and importance of the skill to evaluate the possible success of software project based on the specifications.

The neural network model of prediction of the software project characteristics for evaluating the success of its implementation based on analysis of specifications is first time proposed and implemented in Matlab.

Introduction

The successful implementation of software project is timely completion of software project within the allocated budget and implementation of all required features and functions.

The reasons of the almost all disasters and accidents with the software, are in the software requirements specification (SRS), i.e. successful of software project implementation depends on its SRS.

The successful implementation of software project at the design stage can be predicted on the basis of the predicted values of software project characteristics - the duration, cost, complexity, cross-platform, usability and quality.

The Neural Network Model Of Prediction Of Software Project Characteristics

Some SRS indicators affect to the above software project characteristics, but the equations are not known, by which the value of the software project characteristic can be calculated based on the set of influential SRS indicators. All available methods of evaluation of software project characteristics are oriented on the ready source code, but than on SRS.

Authors first time propose and implement the neural network model of prediction of the software project characteristics for evaluating the success of its implementation based on SRS analysis:

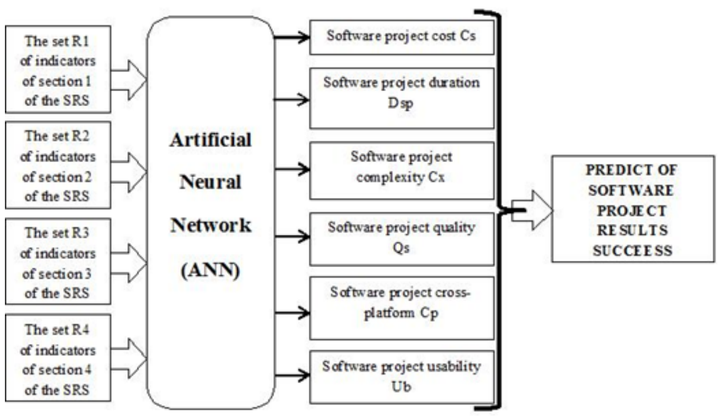

Fig. 1 The concept of neuronet prediction of software project characteristics based on the SRS analysis

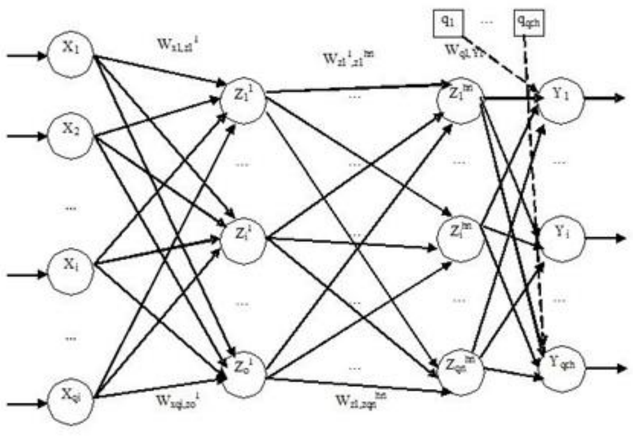

Fig. 2 Neural network model of prediction of the software project characteristics based on SRS analysis

The developed neural network model provides the taking into account of importance (weights) of each SRS indicator, and mutual influence of SRS indicators within each software project characteristics. The output functional of ANN provides the assessment of the overall impact of SRS indicators for characteristics. The predicted relative values of software project characteristics provide conclusions about the successful implementation of the software projects.

Realization Of Neural Network Model Of Software Project Characteristics Prediction

The ANN was realized in Matlab:

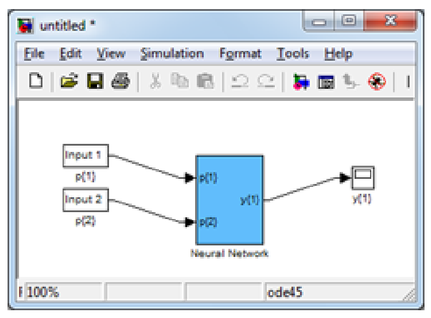

Fig. 3. ANN architecture

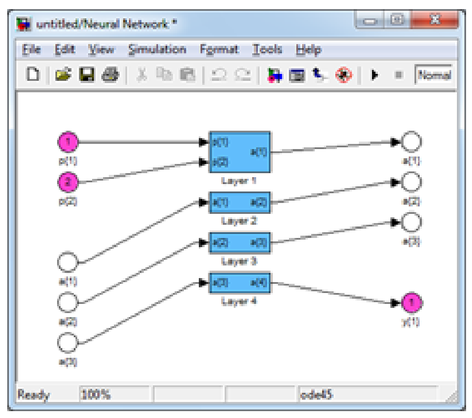

Fig. 4. Structural scheme of ANN layers

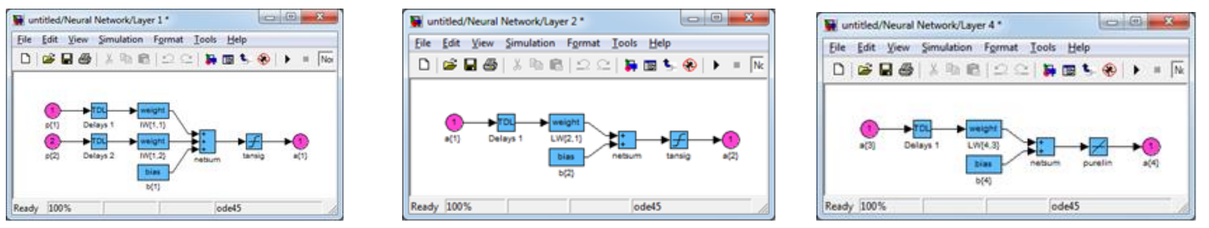

Fig. 5. Structural scheme of ANN 1st- 4th layers

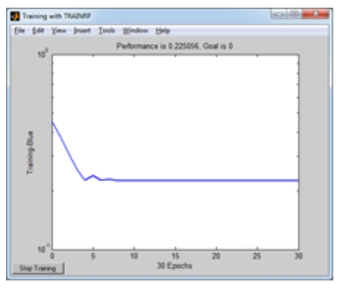

Fig. 6. Resilient backpropagation training method (first way of training)

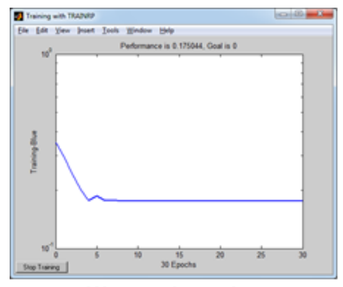

Fig. 7. Resilient backpropagation training method (second way of training)

Experiments

Table 1. Predicted relative values of characteristics for the software projects (first way of training)

Characte-ristics	Project1	Project2	Project3	Project 4
Cost	0.83	0.2	0.39	0.59
Duration	0.89	0.19	0.41	0.57
Complexity	0.73	0.3	0.4	0.65
Usability	0.85	0.15	0.5	0.56
Cross-platform	0.87	0.21	0.47	0.57
Quality	0.89	0.17	0.49	0.61

Table 2. Predicted relative values of characteristics for the software projects (second way of training)

Characte-ristics	Project 1	Project 2	Project 3	Project 4
Cost	0.21	0.78	0.59	0.39
Duration	0.1	0.84	0.6	0.4
Complexity	0.15	0.69	0.63	0.38
Usability	0.85	0.15	0.5	0.56
Cross-platform	0.87	0.21	0.47	0.57
Quality	0.89	0.17	0.49	0.61

Conclusion

The proposed model provides prediction of the success of software projects implementation based only on the SRS and provides complex comparison of software projects taking into account of the predicted values of the main characteristics of the software project. The evaluations of all main characteristics, provided by ANN, help to "cut off" the software projects with failed SRS. The results of project development confirmed the ANN results.