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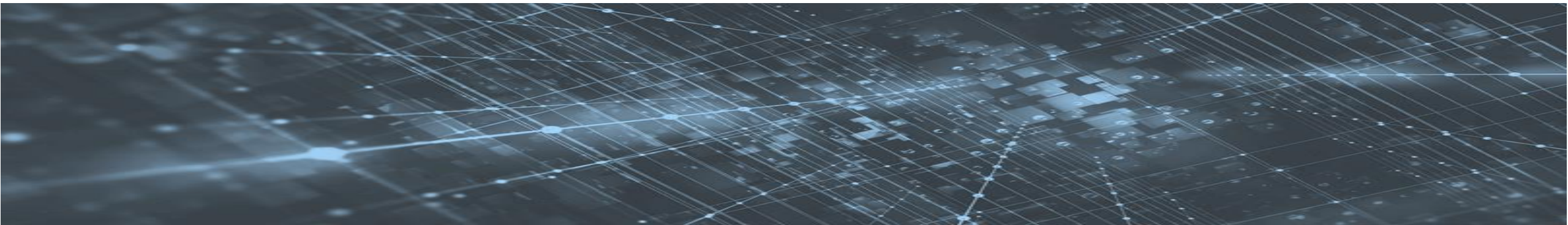
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«Comparative Analysis of Algorithms for Optimizing the Weight
Coefficients of a Neural Network when Adjusting its Structure Applying
Genetic Programming Method»

P. A. Sherstnev, A. S. Polyakova and L. V. Lipinskiy

Problem statement

- In the process of an artificial neural network design, the main difficulty lies in choosing the appropriate structure.
- To evaluate the efficiency of an arbitrary ANN structure, it is necessary to train a network with this structure on the problem being solved.
- This creates a need to select an efficient neural network weight tuning tool for almost every automated ANN generation algorithm.



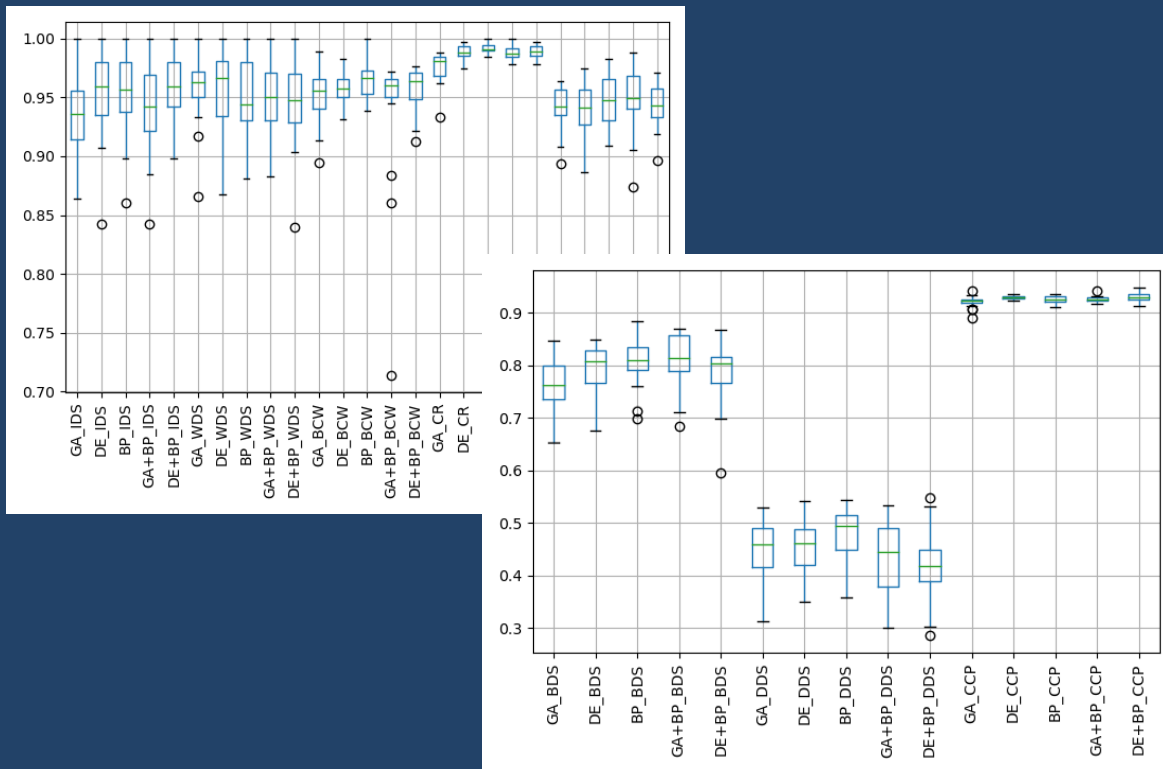
Solution methods

- The algorithm employs the genetic programming (GP) method to find the optimal ANN structure.
- The aim of the present work is a comparative analysis of the effectiveness of various algorithms for optimizing the weight coefficients of intermediate neural network structures for the optimal structure using the genetic programming method.
- The following methods were chosen among the algorithms and approaches: Genetic algorithm; Differential evolution; Backpropagation; Genetic algorithm + error backpropagation; Differential evolution + error backpropagation.



Conclusions

Results, implementation



As a result of the experiment, it was concluded that in most cases the error backpropagation method remains effective, although its use in structures of this kind may be inefficient due to the impossibility of applying matrix calculations in arbitrary networks. In the future it is planned to expand the list of used tasks and categories of tasks to be solved, as well as expand the list of ANN training methods applied.

Contacts

P. A. Sherstnev, A. S. Polyakova and L. V. Lipinskiy

Reshetnev Siberian State University of Science and Technology, Krasnoyarsk,
Russia

E-mail: Sherstpasha99@gmail.com