Uniwersytet Przyrodniczy w Poznaniu

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ROZPRAWA DOKTORSKA

Identyfikacja parametrów charakterystycznych w plonowaniu nasion wybranych odmian konopi przemysłowych (*Cannabis sativa* L.) z użyciem metod sztucznej inteligencji

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Poznań 2022

Abstract

Currently, both in Poland and in the world, a significant increase in the interest in the cultivation of hemp and hemp products has been observed. The progressing climate change has an impact on the cultivation of agricultural plants, including hemp. Scientists are looking for methods to solve the problems posed by this phenomenon.

Neural modeling is more and more commonly used in solving problems of agricultural engineering and is gaining importance as a method both effective and particularly useful in analyzing complex data.

The analysis of literaturę has shown that neural modeling methods are useful in predicting the yield of many agricultural plants, but so far no such line of hemp yielding research has been conducted. Based on the above observations, the research problem was formulated as follows: Can the artificial neural network model effectively predict the yield of industrial hemp seeds, based on information obtained during the cultivation process?

In carrying out this doctoral dissertation, research was carried out to identify climatic, cultivation and agrotechnical factors affecting the yield and seeds of industrial hemp and its quality in selected varieties. For this purpose, neural modeling was used.

The collected data on seed plantations of the Białobrzeskie and Henola varieties allowed to generate models of artificial neural networks. The sensitivity analysis showed that all the variables and data from the training set turned out to be significant.

RBF networks turned out to be the best of the generated models. In the second stage of the research, the models generated using the User's Network Designer function exhibited 98% – 99% quality and an error of 0.2.

The conducted research allowed for the formulation of the main conclusion: on the basis of the set of characteristic features obtained during the agrotechnical process, it is possible to create a predictive neural model used to assess the yield of industrial hemp seeds.

Keywords: neural modeling, artificial neural networks, sensitivity analysis, hemp cultivation, seed material.