Prediction of environmental indicators in land leveling using artificial intelligence   techniques
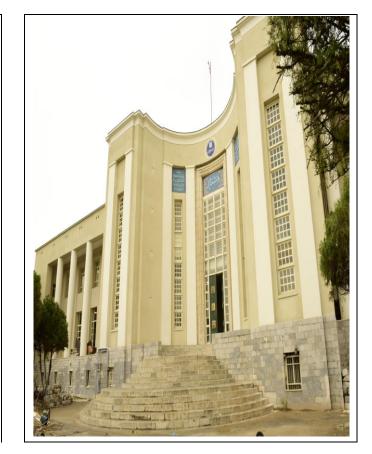
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ABSTRACT:

Land leveling is one of the most important steps in soil preparation for agricultural and other purposes. . New techniques based on artificial intelligence, such as Artificial Neural Network, integrating Artificial Neural Network and Imperialist Competitive Algorithm (ICA-ANN), or Genetic Algorithms (GA-ANN), or Particle Swarm Optimization (PSO-ANN) have been employed for developing predictive models to estimate the energy related parameters and the results were compared to SPSS and Sensitivity Analysis results. In this study, several soil properties such as cut/fill volume, compressibility factor, specific gravity, moisture content, slope of the area, sand percent, and swelling index were measured and their effects on energy consumption were investigated. Totally 90 samples were collected from 3 land areas by grid size of 20m×20m. The aim of this work was to develop predictive models based on artificial intelligence techniques to predict the environmental indicators of land leveling . Results of sensitivity analysis illustrated that only three parameters consist of soil density, soil compressibility, and soil cut/fill volume had meaningful effects on energy consumption. Among the proposed methods, the GA-ANN had the most capability in prediction of the environmental energy parameters. However, for prediction of LE and FE the ANN and ICA-ANN algorithms had better performance. On the other hand, SPSS software had higher R 2 value than Minitab software and sensitivity analysis and in fact close to the ANN values. Keywords: Energy; Imperialist competitive algorithm; Sensitivity analysis; ANN; Land levelling; Environmental indicators.

Biography:

Iesham alzoubi has completed his PhD at the age of 27 years fromDoctor of Philosophy Degree in Agricultural Mechanization Engineering (University of Tehran – Iran) University and Postdoctoral Studies from School of Surveying Geospatial Engineering-Department of Surveying and Geomatics Engineering, University of Tehran . Current Job: General commission for scientific Agricultural Research – Damascus – Syria (Mechanical Engineer) He has published more than 16 papers in reputed journals and has been serving as an editorial board member of repute.

1. Modeling and predict environmental indicators for land leveling using adaptive neuro-fuzzy inference system (ANFIS), and regression
2. Comparing ANFIS and integrating algorithm models (ICA-ANN, PSO-ANN, and GA-ANN) for prediction of energy consumption for irrigation land leveling
3. Integrating artificial neural network and imperialist competitive algorithm (ICA), to predict the energy consumption for land leveling
4. Epidural co-administration of neostigmine and lidocaine or xylazine enhances systemic sedation but not perineal analgesia in adult dairy cows
5. Modeling environmental indicators for land leveling, using Artificial Neural Networks and Adaptive Neuron-Fuzzy Inference System

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