

Prediction of Environmental Indicators in Land Leveling Using Artificial Intelligence Techniques

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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 and 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 the 686 patients with a diagnosis of AECOPD, 29.5% (N=202) rResults 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-A ANN algorithms had better performance.