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Smart Spatial Analyses in Land Leveling

Land leveling is one of the most important steps of soil preparation for consequent objectives. It requires considerable amount of energy by heavy machines and equipment. Creating the desired slope for surface of the area with minimal degradation of the ground causes least damage to plant and animal organisms in the soil, and it protects the environment. On the other hand, reducing fossil fuel consumption for land leveling reduces air pollution and improves the environment. In the recent years, new techniques such as Integrating artificial neural network and particle swarm optimization algorithm (PSO-ANN), ANNs and regression have been employed for developing of the predictive models to estimate the desired parameters. In this soil cut/fill volume, soil compressibility factor, specific gravity, moisture content, slope, engine speed, tillage depth in energy consumption were investigated. In this study, total of 90 samples were collected from 3 land areas. The grid size was (20 m × 20 m) in Karaj, Iran. The aim of this work was to develop PSO-ANN and ANN and regression models to predict the energy consumption for land leveling and analyze the sensitivity of using these models. According to the results, by using sensitivity analysis method only three parameters of soil slope, soil compressibility, by using sensitivity analysis method only three parameters of soil slope, soil compressibility, tillage depth and soil compressibility factor and soil cut/fill volume showed the significant effects. and soil cut/fill volume showed the significant effects. The results showed that using PSO-ANN for prediction of energy consumption of labor energy, fuel energy, total machinery cost, and total machinery energy can be successfully demonstrated. Overall, the results revealed that PSO-ANN models have better accuracy and ability to predict targets according to their higher R2 value and lower RMSE value.

Biography

Alzoubi has completed his PhD at the age of 40 years Tehran University and postdoctoral studies from Tehran University School of Surveying Geospatial Engineering-Department of Surveying and Geomatics Engineering. He is the director at the Directorate of Engineering and Transportation, a premier service organization. He has published more than 15 papers in reputed journals and has been serving as an editorial board member of repute. He Opening and studying the financial offers and the organization of the fundamental record, supervising the efficiency of electrical generators at Nseeb border center, and Supervising the efficiency of agricultural machinery at the ministry of agriculture.