

Prediction of environmental indicators in land levelling using artificial intelligence techniques- Isham Alzoubi, Department of Surveying and Geomatics Engineering, Syria

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The aim of this work was to determine best linear model Adaptive Neuro-Fuzzy Inference System (ANFIS) and Sensitivity Analysis in order to predict the energy consumption for land leveling. In this research effects of various soil properties such as Embankment Volume, Soil Compressibility Factor, Specific Gravity, Moisture Content, Slope, Sand Percent, and Soil Swelling Index in energy consumption were investigated. The study was consisted of 90 samples were collected from 3 different regions. The grid size was set 20 m in 20 m (20*20) from a farmland in Karaj province of Iran. The values of RMSE and R2 derived by ICA-ANN model were, to Labor Energy (0.0146 and 0.9987), Fuel energy (0.0322 and 0.9975), Total Machinery Cost (0.0248 and 0.9963), Total Machinery Energy (0.0161 and 0.9987) respectively, while these parameters for multivariate regression model were, to Labor Energy (0.1394 and 0.9008), Fuel energy (0.1514 and 0.8913), Total Machinery Cost (TMC) (0.1492 and 0.9128), Total Machinery Energy (0.1378 and 0.9103). Respectively, while these parameters for ANN model were, to Labor Energy (0.0159 and 0.9990), Fuel energy (0.0206 and 0.9983), Total Machinery Cost (0.0287 and 0.9966), Total Machinery Energy (0.0157 and 0.9990) respectively, while these parameters for Sensitivity analysis model were, to Labor Energy (0.1899 and 0.8631), Fuel energy (0.8562 and 0.0206), Total Machinery Cost (0.1946 and 0.8581), Total Machinery Energy (0.1892 and 0.8437) respectively, respectively, while these parameters for ANFIS model were, to Labor Energy (0.0159 and 0.9990), Fuel energy (0.0206 and 0.9983), Total Machinery Cost (0.0287 and 0.9966), Total Machinery Energy (0.0157 and 0.9990) respectively, Results showed that ICA_ANN with seven neurons in hidden layer had better. According to the results of Sensitivity Analysis, only three parameters; Density, Soil Compressibility Factor and, Embankment Volume Index had significant effect on fuel consumption. According to the results of regression, only three parameters; Slope, Cut-Fill Volume (V) and, Soil Swelling Index (SSI) had significant effect on energy consumption. Using adaptive neuro-fuzzy inference system for prediction of labor energy, fuel energy, total machinery cost, and total machinery energy can be successfully demonstrated. During the only remaining century because of expanding human populace, requests for horticultural items have been colossally expanded. These days, one of the cardinal natural difficulties on the planet is energy creation and utilization. In spite of delicate development of environmentally friendly power utilization, for example, sun oriented energy, unseemly use and absence of appropriate administration have prompted an escalated ascend in petroleum product energy

utilization in this field. It likewise should be considered that ecological protection and market globalization will be subject to food security later on farming. Concerning, some extraordinary arrangements should be routed to consider energy perspective related to the natural issues to take care of the issue. Land leveling is one of the heaviest and exorbitant activities among rural practices that burn-through significant measure of energy. Also, moving substantial machines on the ground makes the dirt denser, especially in the wet areas where the dampness substance of the dirt is high and it makes a circumstance that isn't effectively recoverable. Then again, land leveling rearranges the water system, improves field circumstances in different practices identified with agribusiness and directs the dirt surface and standardizes its slant. Purportedly, there are three critical components which have impact on grain yield including the impacts of land leveling, techniques for water application and the connection between land leveling and water applied. Okasha et al. noticed an essential association among incline and assorted water system conspire in various seasons. A few analysts have utilized different methods, for example, Internet of Things (IoT) to upgrade the water system measure dependent on the actual attributes of soil. In any case, these techniques don't participate in land leveling measure. Different strategies for land leveling can influence the physical and synthetic properties of the dirt, and consequently can make contrasts in plant foundation, root development, ethereal cover and in the long run crop yield. As an immediate outcome, perhaps the main strides in soil readiness and a critical factor in food creation that should be advanced is land leveling. In addition, diminishing petroleum derivative utilization for land leveling decreases air impurities and improves the natural condition. There is a developing comprehension of significance and impacts of water and soil the board which thus uncovers the hugeness of upgraded laser land leveling from social, monetary and agronomic perspectives. Despite the fact that some improving methodologies have been proposed for the improvement of tasks identified with the climate, they have different unwanted impacts. Utilizing PCs and the Internet has demonstrated an extraordinary potential to tackle these sorts of issues by lessening the previously mentioned bothersome impacts. There are heap of PC based methods and as of late IoT that are utilized generally to take care of designing issues. ANNs are one of these strategies. ANN is a reasonable strategy, the yield or surmised variable of which can be demonstrated regarding different boundaries that are applicable to a similar cycle.