FORECASTING AND DETERMINING OF COST PERFORMANCE INDEX OF TUNNELS PROJECTS USING ARTIFICIAL NEURAL NETWORKS

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Abstract

Construction projects, especially tunnel projects in the Arab world, suffer from poor documentation of data and information, and therefore there is a difficulty in estimating the budget or total costs or indicators of earned value, and with the advancement of artificial neural networks, the urgent need arises to estimate the earned value indicators for tunnels projects in the absence or lack of data required for the purpose of estimating costs and durations together. Objective: The primary aim of the current study is to introduce Artificial Intelligence (AI) in conducting statistical approach for earned value management of the tunnels projects. Methodology: The study was based on the assurance of different variables that effect on the Earned Value Management (EVM) of the tunnels projects that involves historical data in Iraq and Jordan. Five independent variables were randomly selected (Actual Cost AC, Planning Value PV, Earned Value EV, Actual Duration AD and Planning Duration PD), which were all around characterized for each tunnel project, and one dependent variable Cost Performance Index (CPI) was selected. NEUFRAME V.5 Program was selected, which is the premier neural network simulation environment. The methodology of ANN embraced for finding best network architecture and inside parameters that control and monitoring the preparation procedure which did by utilizing the default parameters of the NEUFRAME programming package. Results: The experimentation results reveal that, Mean Absolut Percentage Error (MAPE) and Average Accuracy percentage (AA) generated by ANN model (CPI) were found to be 9.6% and 90.368%, respectively. Therefore, the ANN model (CPI.model.1) shows a magnificent concurrence with the real estimations.