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The prediction of earthquake building structure strength: Modified k-nearest neighbour employment
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Abstract
The earthquake damage brings significant effects. The resilience of buildings against the earthquake and the destruction's location is not an efficient outcome from previous research. This study applied the Modified K-Nearest Neighbor (MK-NN) in predicting the concrete structures' performance despite the earthquakes. The 2-story building prediction covered earthquake history, time, concrete quality, displacement, velocity, and acceleration. The analysis of MK-NN provided the values of Euclidean, distance calculation, validity, and weight voting towards the classification of damages as "Safe" or "Immediate Occupancy" (IO). The K values exploited were 1, 3, 5, 7, 9, and 11, and simulation data training at 10:90, 20:80, 30:70. This study revealed the highest degree of accuracy at 98.85% with K=1 and a ratio of 30:70. Simultaneously, the lowest error rate was 1.15% at a similar K value and ratio. Herein, MK-NN significantly exceeds the accuracy and error rate of KNN up to 1.02% and 0.69%, respectively. To date, the automatic calculation prototyping software was then successfully developed. Ensuring the application's accuracy, the Confusion Matrix, the Black box, and User Acceptance Test (UAT) have been performed. In a nutshell, this study provides a significant contribution to planning and information analysis of earthquake-resistant construction.

Author Keywords
Classification; Earthquake; Modified K-Nearest Neighbor; Performance Measurement; Prediction

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