

عنوان مقاله:

Utilization of Neural Network in Seismic Refraction Data Processing

محل انتشار:

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خلاصه مقاله:

Increasing our understanding of the earth's layering characteristics at an engineering scale is crucial for the optimal design of tall buildings, important industrial facilities, and lifelines infrastructures. The most important characteristics that can be measured by the seismic refraction method is the speed of longitudinal and transverse seismic waves. In addition, determining the thickness of layers up to depth of ۱۵۰ meters is another capability of this method. In this research, the classical refraction seismic method has been compared with methods based on artificial intelligence techniques with emphasis on two types of fully connected and convolution neural network techniques. The results of this research show that by replacing the neural network that fits the characteristics of the subsurface layers instead of using classical inversion methods, the accuracy of classical inversion methods can be achieved in much less time. Fully connected and convolutional neural networks are highly capable for identifying geological structures, whose measurement data is contaminated with noise, with acceptable accuracy without pre-processing. Therefore, our proposed method, in addition to the ability to detect the arrival time of seismic phases in noisy signals and the time-consuming process of manual processing, is likely to be useful for identifying complex geological formations

کلمات کلیدی:

Arrival time, convolutional network, Neural network, seismic refraction, Network architecture design

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