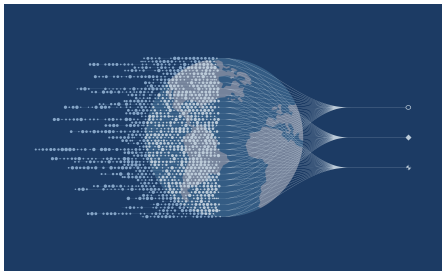

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Detection of Seismic and Infrasonic Signals from Nuclear Explosions Based on Machine Vision

The detection of seismic and infrasonic signals from nuclear explosions has traditionally been constructed around one-dimensional signal processing methods. However, such traditional approaches are quite different from the artificial interactive analysis and detection modes. In fact, when conducting interactive processing manually, personnel complete the relevant work by relying on the visual system rather than the auditory system. As a result, the vast and valuable experience accumulated during the artificial interactive process can hardly be effectively transferred to the automatic detection and processing procedures of seismic and infrasonic signals. In view of this, this paper innovatively proposes an automatic detection and processing scheme based on machine vision. Firstly, preprocess the one-dimensional signals, convert the one-dimensional signals that have undergone normalization processing into images and label the signal categories. Subsequently, introduce the state-of-the-art YoloV11 algorithm in the field of machine vision to carry out the training work. After the YoloV11 algorithm has been trained, it is deployed to the actual detection scene. This paper presents a large number of practical application cases, and the results show that this automatic detection and processing method for seismic and infrasonic signals from nuclear explosions based on machine vision technology demonstrates outstanding performance in practical applications.

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