For surface microseismic monitoring, determination of the P-wave first-motion polarity is important because it has been widely used to determine focal mechanisms and the location accuracy of the diffraction-stack-based method is improved greatly using polarization correction.

**對於表面微震監測，P波初動極性的確定很重要，因為它已被廣泛用於確定震源機制，並且通過極化校正大大提高了diffraction-stack-based的方法的定位精度。**

The convolutional neural network (CNN) is a form of deep learning algorithm that can be applied to predict the polarity of a seismogram automatically.

**CNN是一種深度學習算法，可以應用於自動預測地震圖的極性。**

However, the existing network designed for polarity detection utilizes only individual trace information.

**但是，目前為了極性檢測而設計的網路只能輸入單一波形資料。**

In this study, we design a multitrace-based CNN (MT-CNN) architecture using several neighbor traces combined as training samples, which could utilize the polarity information of neighbor sensors in the surface microseismic array.

**這個研究中，我們設計了一個使用幾個鄰近的波形組合當作訓練樣本的multitrace-base的CNN結構(MT-CNN)，它可以利用在表面微震矩陣裡鄰近感應器的極性資訊。**

We use 17,227 field seismograms with labeled polarities to train two different neural networks that predict the polarities by a single trace or by multiple traces.

**我們使用了17227個區域擁有判別極性功能的地震儀來訓練兩個不一樣的判斷極性的網路神經，分別是使用single trace和multiple trace。**

The performance of the test set and field example of two CNN architectures shows that the MTCNN significantly produces fewer polarity prediction errors and leads to more accurate focal mechanism solutions for microseismic events.

**這兩個CNN結構的測試設定以及場域樣本呈現出MTCNN明顯的減少了預測錯誤的產生，並且提供了得到微震事件更精確的震源機制的方法。**