Accelerometry Signals into a Novel Two-Dimensional Activity Image

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ABSTRACT
Wearable sensors such as accelerometers embedded in portable devices can be used to recognize human physical activities, which has wide applications relevant to our daily life. To mitigate the challenge of extracting effective features for identifying activities, automatic feature extraction based on Deep Convolutional Neural Networks (DCNN) has emerged as a promising method because it does not rely on handcrafted feature design. However, most existing deep models on accelerometer-sensor-based activity recognition are simple and shallow because they are restricted to the input of the raw one-dimensional time-series sensor signals. In this paper, we go deeper by assembling accelerometry signals into a novel two-dimensional activity image, which not only explores the intra-relationship between accelerometry signals, but also enables a more complex and deeper neural architecture. The proposed approach is evaluated in five publicly available datasets and it outperforms five state-of-the-art methods on a wide variety of activity categories.

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