https://machinelearningmastery.com/deep-learning-models-for-human-activity-recognition/

Sliding window

* Time for each sample of the data (Generally between 1&2 seconds of data to classify activity)
* Optimal window size between 0,35-0,5 seconds leads to best recognition results

In general CNN & Recurrent NN (RNN) are used for activity recognition tasks

**CNN**

Convolutional Neural Network models, or CNNs for short, are a type of deep neural network that were developed for use with image data, e.g. such as handwriting recognition.

advantages

- local dependency: Nearby signals in HAR are likely to be correlated

- Scale invariance: Scale-invariant for different paces or frequencies

“In the paper, the authors develop a simple CNN model for accelerometer data, where each axis of the accelerometer data is fed into separate convolutional layers, pooling layers, then concatenated before being interpreted by hidden fully connected layers.”

Diagram

Description automatically generated

Graphical user interface, text, application, email

Description automatically generated

**RNN**

Recurrent neural networks, or RNNs for short, are a type of neural network that was designed to learn from sequence data, such as sequences of observations over time, or a sequence of words in a sentence.

A specific type of RNN called the long short-term memory network, or LSTM for short, is perhaps the most widely used RNN as its careful design overcomes the general difficulties in training a stable RNN on sequence data.

Unlike the CNN, the LSTM is trained in a way that pays specific attention to observations made and prediction errors made over the time steps in the input sequence, called backpropagation through time.

There has been limited application of simple LSTM models to HAR problems.