Exercise 5

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In this task we implemented an event detection algorithm on accelerometer data gathered by a person walking down a staircase. The captured data is visualized in a graph in figure 1. The goal was to get the number of steps. This was achieved with event detection theory, which describes a number of precodures to obtain repetitions in a set of data.

The first step is to preprocess the data, for example by filtering it with a median filter. Step two is to estimate the width for the event in the data, also called window size. After this we choose reference profiles with the specified window size which we can match against later on. The next step is peak detection, where we slide the window over the signal to compare the values against a threshold which decides if an event is detected or not. After the events are detected, we align them against the selected reference profiles. By doing this we can calculate the number of events and how much variation there is among them. Table 1 contains the input and output parameters of the provided event detection program. Further information about the event detection is shown in figure 2-4.

Window	Threshold	Events	Profile match
20	0.35	29	98.14
20	0.40	28	98.53
40	0.35	28	95.66
40	0.40	28	95.66

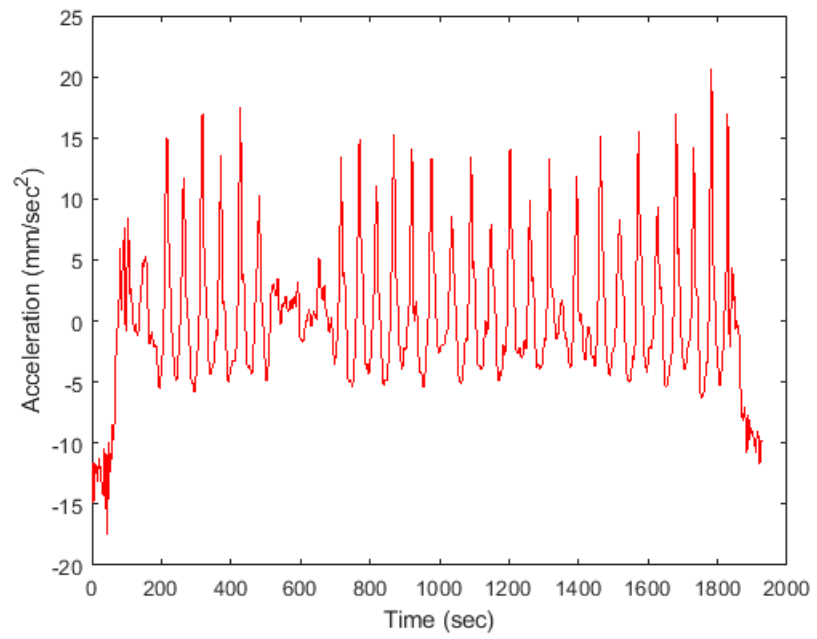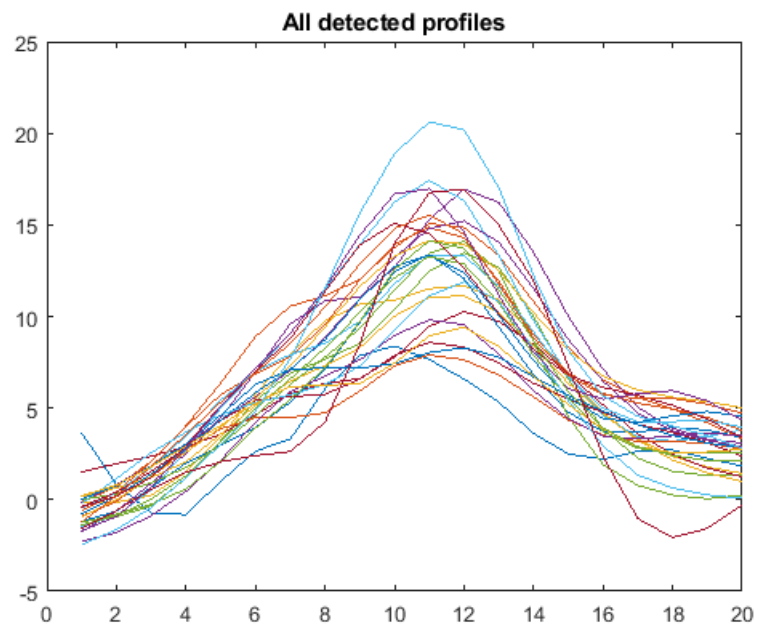Table 1: Event detection program parameters and output.

Figure 1: Data recorded by the accelerometer.
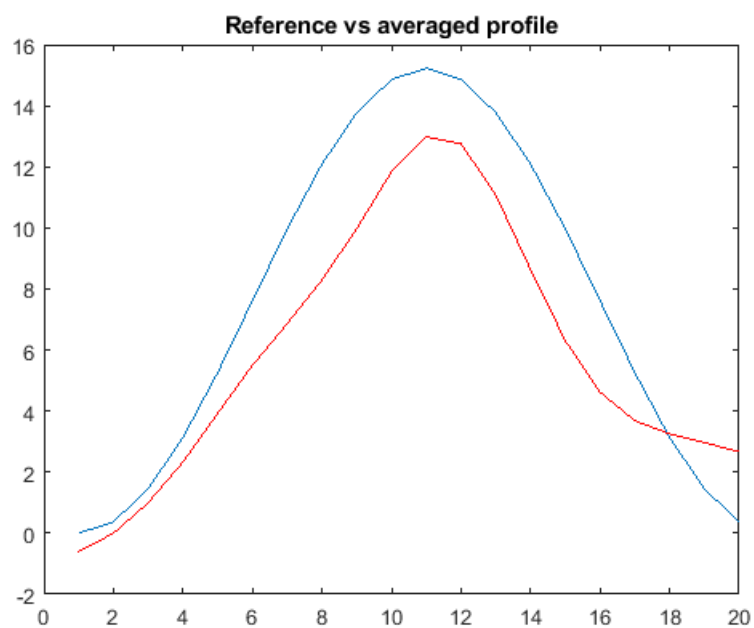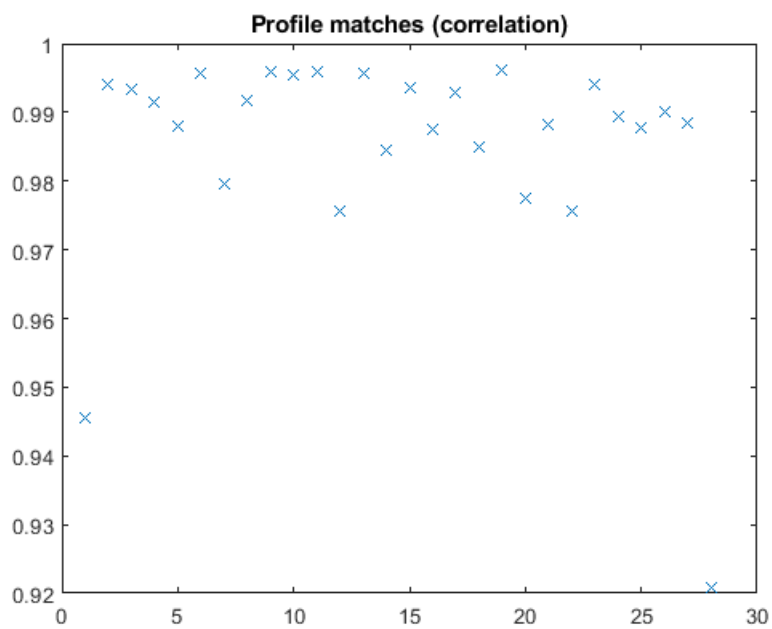

Figure 2:

Figure 3:

Figure 4: