1.

The problem of rotation correction is similar to the problem of image or sound signal de-noising. To overcome this, de-noising algorithms such as autoencoders can be adapted for this task.

2.

The movement of the leg during running or walking is cyclic and can be decomposed into several stages (depending on the precision of the decomposition one can find between 3 and 7 stages). If rotations on several axes are detected on the phase where the 2 feet are adjacent (and thus where the leg is vertical), an undesired rotation of the sensor will be perceptible.

3.

The algorithm implemented is a convolutional autoencoder using CNN1D in order to exploit the temporality of the data. To realize it, the usual ML libraries such as Tensorflow, Pandas or Scikit Learn will be used.

4.

In order to make the rotations more realistic, in addition to the random number of rotations, the duration of the rotation is also random (between 3 and 10 TimeStamp). These have been realized thanks to the Scipy library.

5.

The results of the algorithm seem to be imprecise and have difficulties in correcting the rotations. Although different combinations of parameters have been tested, none of them offers conclusive results.

6.

The algorithm has great difficulty in correcting rotations, whether they are large or small. In addition, particular gestures such as falls or tackles are abnormal sensor movements that can be interpreted as sensor displacement. In order to improve the algorithm, it could be useful to use the properties of the leg by analyzing the acceleration cycles during a step.