TRACK AND FIELD: DETECTING THE TIMING OF HURDLE CROSSINGS USING FOOT-WORN INERTIAL SENSORS TO IMPROVE PERFORMANCE AND RACE STRATEGY

ATHLETICISM: DETECTING HURDLE CROSSINGS DURING 400 METERS RACES

The 400 meters hurdles is one of the most tiresome track and field event. It is a combination of speed and endurance where racing strategy plays an important role. The number of steps and the running speed between the hurdles are key concepts used by the athletes to evaluate a race. Can foot-worn inertial sensors provide a quick and accurate analysis of a 400 meters hurdles race?

This project aims to detect hurdle crossing timing using one lightweight inertial measurement unit (Physilog 5, Gait Up, Switzerland) on both feet. Different techniques have been investigated, with the most promising method combining both the metrology and biomechanics experience of the EPFL’s Laboratory of Movement Analysis and Measurement (LMAM). Spatiotemporal parameters of the running gait are also estimated by the system so that it provides a complete analysis of the race. Parameters such as the timing at each hurdle, the speed within each interval and the number of steps in each interval are automatically estimated and outputted in a report. Such a tool will help the athletes and their coaches to improve performance, strategy and technique.