UMAFall: A Multisensor Dataset for the Research on Automatic Fall Detection

Eduardo Casilari[a,*], Jose A. Santoyo-Ramón[a], Jose M. Cano-García[a]

ªUniversidad de Málaga, Andalucía Tech, Departamento de Tecnología Electrónica, ETSIT, Campus de Teatinos s/n, 29071 Málaga (Spain)

Abstract

The progress in the field of inertial sensor technology and the widespread popularity of personal electronics such as smartwatches or smartphones have prompted the research on wearable Fall Detection Systems (FDSs). In spite of the extensive literature on FDSs, an open issue is the definition of a common framework that allows a methodical and agreed evaluation of fall detection policies. In this regard, a key aspect is the lack of a public repository of movement datasets that can be employed by the researchers as a common reference to compare and assess their proposals.

This work (which is fully described in the proceedings of Mobile Systems and Pervasive Computing Conference - MobiSPC-, held at Leuven –Belgium- in July 2017) describes UMAFall, a new dataset of movement traces acquired through the systematic emulation of a set of predefined ADLs (Activities of Daily Life) and falls. In opposition to other existing databases for FDSs, which only include the signals captured by one or two sensing points, the testbed deployed for the generation of UMAFall dataset incorporated five wearable sensing points, which were located on five different points of the body of the participants that developed the movements. As a consequence, the obtained data offer an interesting tool to investigate the importance of the sensor placement for the effectiveness of the detection decision in FDSs.

Keywords: Fall detection systems, accelerometer, gyroscope, smartphone, dataset, wearable, sensors