M. Torrent, C. Angulo, C. Raya. Autonomous system for movement monitoring. Gerontechnology 2008; 7(2):224. One of the most concerning problems in people with reduced mobility and especially in elderly people is the risk of falling[1]. This abstract presents the design of a new prototype for movement monitoring and analysis with the objective of prevent falls by identifying the prone people. The main features of this prototype are giving ubiquitously measures of movement during the daily routine of the patient. For this reason the device is capable to operate standalone and is intended to be as non invasive as possible from the patient point of view. **Device description** The device proposed is based on the use of 3-axis accelerometers to measure the static position and the intensity of movement. In order to capture as many information as possible of the posture and activity of the patient we used five sensors distributed in the extremities (arms and legs) and in the chest, which makes a total of 15 acceleration measures. The extremity sensor boards measures 18 x 20 mm and are wired to the board in the chest that acts as the central control of the system[2]. The chest sensor board also contains a microcontroller to control the system functions, an external memory to record the data captured, and a Bluetooth transceiver which makes the system capable to transmit on line the sensor measures. This control board measures 36 x 56 mm and it also has an attached battery powering the whole system. The design is intended to operate in two modes: continuous monitoring and on line movement analyser. In the first mode the device can operate during hours recording the movements of the patient in her/his daily life, as the data are directly written into a SD micro card. This kind of memory can store measures for several days of continuous operation, and it also provides a direct interface to any computer for a later data analysis. The online operation mode, in addition, allows viewing the measures as they are recorded. The Bluetooth transceiver included in the system can transmit data wirelessly to a PC, PDA or mobile phone in a range of 10 meters. This mode is more intended to be used in clinic tests, having the advantage of instantaneous feedback to the user. **Results and discussion** In order to test the prototype, the device was used on various volunteers during different physical activities[3]. The tests were carried out in the laboratory and using a PC to record the data on line via Bluetooth. Data were recorded from the five sensors (3 axis each) at a rate of 40 samples per second. Some of the results of the test are shown in Figure 1: (i) a forward-backward inclination from the chest sensor, (ii) a leg capture during kneeling down, c) data from the leg when walking, and d) an arm reading when jumping. The results obtained show that it is possible to distinguish movement from the data captured from accelerometers, nevertheless, future work is needed to discretize and classify the data in order to reduce its size.

References

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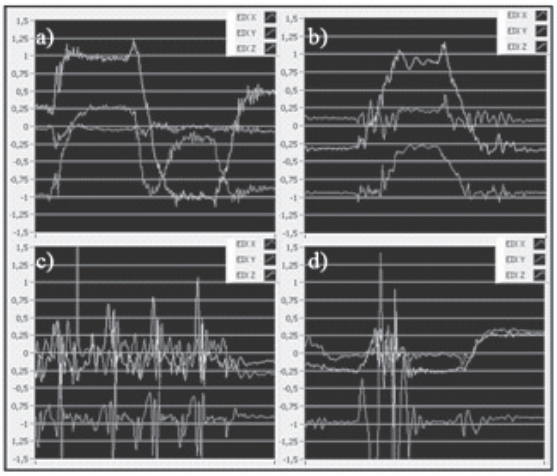

Figure 1 On line visualization of different movements