

# Assistive Smart Sensing Devices for Gait Rehabilitation Monitoring

ICTs for Improving Patients Rehabilitation Research Techniques

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## Abstract

Smart sensing devices are nowadays part of the ambient assisted living architectures and may be adapted and personalized for gait rehabilitation assessment. Aiming an objective evaluation of patient progress during the physiotherapy sessions, the design and implementation of a set of sensing devices were carried out. Thus, it was considered a wearable solution materialized by a smart inertial measurement unit (IMU) and/or a set of walking aid objects characterized by embedded unobtrusive sensing units based on microwave Doppler radars. The data delivered by the smart sensing units designed for gait rehabilitation purpose are wireless transmitted to an advanced processing server that provides synthetic information to the physiotherapist that use a mobile device to access the available services. Elements of IMU sensor network and smart rollator design and implementation for gait assessment, as well as sensor signals digital processing, are included in the chapter.

## Keywords

Microwave Doppler radar   Inertial measurement system   Gait monitoring  
Time frequency analysis

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