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Combining distance and force measurements to monitor the usage of walker assistive devices

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IV. Experimental Results	
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I. Introduction

Topics related with people mobility are already of major importance today and this importance will be even greater in the near future. Not only for patients, during recovery periods, but also, and above all, for elderly people, the usage of assistive walking devices can extend significantly their autonomy and quality of life. Regarding statistics and previsions, it is estimated that by 2025 in United States and Canada 25 % of the population will be aged over 65 years older [1]–[3]. Moreover, it is expected that in the European Union, for year 2060, the life expectance for women and men will be around 89 and 84.5 years, respectively [4]. In this context, it is important to refer that a proper usage of mobility aiding devices by elderly people can provide significant cost savings of health and long-term care systems [5]–[7]. However, it must be underlined that harmful injuries [8]–[9] can result from a bad usage of mobility aiding devices, being important to monitor its right usage. Thus, it is important to develop measurement solutions that can be used to monitor balance and stability conditions of users of mobility aiding devices. Several authors already studied measurement solutions for this purpose [10]–[14] but some solutions are complex, expensive and the added value of the additional information that can be accessed is questionable in terms of walker day-by-day applications. Moreover, several alternative systems include accelerometer sensors to extract kinematic parameters, like the ones related with human gait, and those sensors require the usage of complex algorithms to improve measurement data accuracy [15]–[16].

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