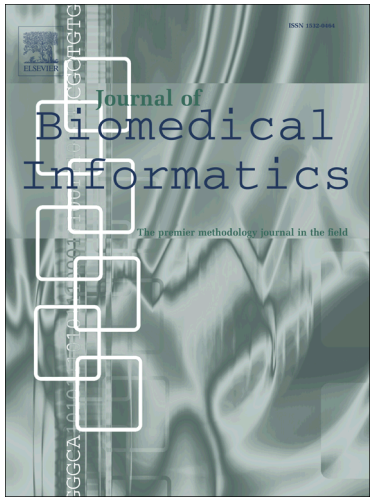

Increasing Fall Risk Awareness Using Wearables A Fall Risk Awareness Protocol

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Increasing Fall Risk Awareness Using Wearables

A Fall Risk Awareness Protocol

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Abstract. Each year about a third of elderly aged 65 or older experience a fall. Many of these falls may have been avoided if fall risk assessment and prevention tools where available in a daily living situation. We identify what kind of information is relevant for doing fall risk assessment and prevention using wearable sensors in a daily living environment by investigating current research, distinguishing between prospective and context-aware fall risk assessment and prevention. Based on our findings, we propose a fall risk awareness protocol as a fall prevention tool integrating both wearables and ambient sensing technology into a single platform.

Keywords: daily living, fall risk assessment, fall prevention, fall risk awareness protocol, fall prevention tool, wearable sensors, sensor fusion

1 Introduction

Each year about one third of elderly aged 65 or older experience a fall [61, 88], and each year older adults are hospitalized for fall-related injuries up to five times more often than other causes [33]. Between 10% and 20% of falls by elderly cause serious injuries such as fractures or head traumas while non-fatal fall injuries are associated with considerable morbidity including decreased functioning and loss of independence [11]. The falls also present a significant cost in healthcare [64]. Many of these falls may be avoided if fall risk assessment and prevention tools where available as an integral part of daily living.

Fall risk assessment is a process in which the probability of a future fall is estimated, usually within a timeframe of 6-12 months. Fall risk prevention, on the other hand, addresses the important question; how should one prevent falls from happening in the first place. This question has been investigated in a number of studies by addressing intrinsic factors like medications and general health status [67, 68], extrinsic factors like hazards found in the living environment [68], and evaluation of balance and mobility using functional tests [9, 28, 63]. In a study by Oliver & Healy [24] they reported on nurses who recognized whether a patient suffer from a prominent risk of falling simply