

MEMSWear II

Motivation

Falls and fall-related injuries are the most common cause of injury and hospitalization among elderly. Typically fainting is the most important cause of fall and its unexplained recurrence is common in the elderly as they grow older. Around 40 -60% of faint related falls are unwitnessed; thus, a wearable system competent in faint fall onset detection will offer great advantages to elderly health care in terms of reducing elderly health care expenditure, and helping elderly with fall experiences rehabilitate, regain confidence and independence in free living conditions.

Objective

Our aim is to develop a wearable real-time system that will distinguish between faint falls versus normal bodily activities at their onset stages. Upon detection of the onset, feedback systems would be deployed during the lead time (the time interval between the onset of fall and the subject hitting the ground) to prevent the fall and reduce the severity of fall related injuries.

Scope

Prior to fainting, abnormal vital signs would be detected by ECG and blood pressure physiological sensors. Then, motion sensors based faint fall onset detection system, applying gyroscopes and 3-axis accelerometers, will detect onset of fall by determining the degree of deviation of the body from its standing position. Fall prevention and injury minimization feedback systems will be activated upon detection of fall.

Innovative Idea / Novelty

We focus on the onset detection of fall, using physical and physiological sensors, which has not been explored yet in elderly fall related research work. The development of a faint fall safety system for the elderly will be of great innovation in elderly health care applications especially for those who are very prone to fainting.

Demonstrable Activities

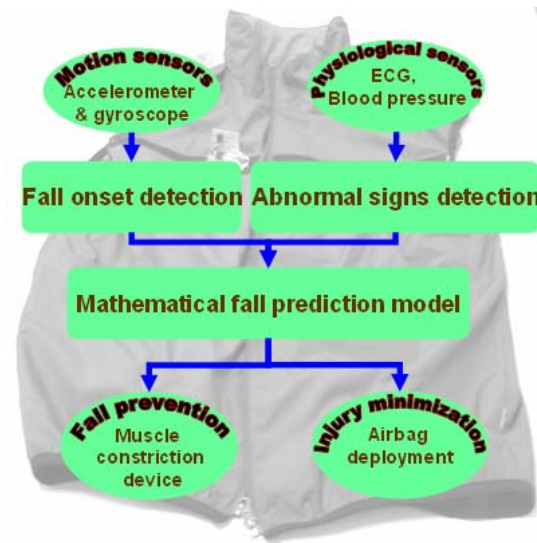
The final deliverables is a smart shirt incorporated with the physiological and motion sensors. It will also include a muscle constrictor and a deployable airbag which serves as feed back systems to prevent fall and to minimize the injury minimization when a fall is inevitable.

About the Team

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Graphics



**Figure 1: MEMSWear Elderly fall safety system
(Faint fall prediction, prevention & injury minimization)**