



## Passive fall detection system

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## Abstract

With age, people will experience an increase of the risk of a fall at home, while walking in the park or just performing everyday chores. Some people have very strong family values and will take care of their elderly relatives at home but, in current modern times they are themselves very busy and very often away at work.

While there are a few products that are designed to assist elderly people in the event of a fall, these products rely on the person to execute an action like the press of a button to alert someone that they have fallen. If a person falls and becomes unconscious the product will not initiate a call or notification on its own. Also these products work on a subscription basis which many low income families would not be able to afford.

Our proposed system will passively alert the user in the event that a relative being monitored by the system falls whether they remain conscious or not. Such system will take advantage of the user's infrastructure, namely a cell phone and wireless connectivity thus not requiring the user to subscribe to use the system.

We will be designing a wearable device based on Raspberry Pi with several vibration sensors of different sensibilities that can detect impacts of different magnitudes and a three axis accelerometer that can register the changes in attitude. We will design an algorithm that can reliably detect a fall or other events and send the corresponding notification via Bluetooth or Wi-fi.

We will also design a cell phone app that utilizes various sensors that are built in the device and create a fall detection algorithm that would detect when and if the person holding the phone suffers a fall. We will also use the integrated GPS chip to transmit the user's location in the event that they are not at home which will be a choice that the user will have.

Each device will be able to work independently and will have its own algorithm but we will enable both devices to work in conjunction to reduce the occurrence of false positives and thus have a more robust system.