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**Thesis Idea Overview:**

Falls are the leading cause of death in elderly (aged over 79) adults. They are also the second most prevalent cause of accidental injury related death across people of all ages [Griffiths et al.]. The risk of falling can reduce an individual’s confidence and is a significant barrier to independent living in otherwise healthy older adults.

By designing and creating devices to detect when a person has had a fall it is possible to allow people to continue to live a more independent life, reduce the number of carers required and thus reduce associated costs, whilst still ensuring that any fall events receive a quick reaction.

This area of fall detection has seen rapid growth over the past number of years. Numerous approaches have been taken in commercially available products and in research & academic projects. These approaches include wearable devices (such as lanyards, wristbands, electronic shoe insoles), ambient devices (such as fall sensing floors) and camera/vision based devices – each with their own strengths and weaknesses.

Another area which has seen explosive growth over the last few years has been low cost computing hardware. Systems such as the Raspberry Pi are now available offering a fully-fledged computer, including Bluetooth and Wi-Fi for less than €40.

Machine vision hardware has seen a similar trend since the advent of the original Microsoft Kinect. Its release sparked a flurry of development and there are now multiple sensors capable of recognising and tracking figures as well as calculating their distance from the camera for less than €100.

This project proposes to conduct a survey of the current state of the art for fall detection systems, and assess the respective strengths and weaknesses of each. It then proposes to go on to investigate the potential solutions offered by these new low cost imaging and computing technologies. The insights gained here will then be used to develop and critically evaluate a system which will marry the aforementioned low cost camera and computer systems to create a small, cheap and unobtrusive fall detection system with the ability to notify a third party should a fall be detected. This system will be compared and evaluated against existing solutions.

**References:**

C. Griffiths, C. Rooney, A. Brock, Leading causes of death in England and Wales—how should we group causes? Health Statistics Quarterly 28 (2008). Office for National Statistics.