Department of Software Engineering
Course Code: SOFE 3490U
Software Project Management
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Introduction

Currently, the government is searching for a fall monitor system that aims to lessen the number of casualties that occurred from falling for seniors (aged 65+). The fall control system includes a small electric appliance - required to be worn - and a user authentication page that they must be registered to. The appliance must be able to detect when its user has dropped and to contact necessary emergency services if required. The product will allow the user to signal if a fall has been incorrectly detected. When a fall is detected and the user does not respond within a given time frame, the product should alert an agent who will then contact emergency services and provide the users medical information, precise location, and the time of the fall. It should also differentiate whether or not the user is in a life-threatening emergency.

The group attained a government contract for this project due to mutual interests it brought. Not only will members feel safe for their elders at home, it will inevitably yield benefits for their families as they age. As time progresses, so will technology - leading to more exciting and newer methods of technology to be incorporated within this project. The “Fall Monitor” is an excellent way to expand our engineering portfolio’s, as well as potentially impact lives.

The objective requires appropriate implementation of a device into real-world situations in hopes to save lives. The latter is accomplished from the concept of a device sensing whether a person has fallen, immediately contacting a company representative which then can get the appropriate assistance. This will bring forth demands for a job as well, benefiting the economy in the long run. If completed to perfection, this project is probable to be the basic structure behind the a series of innovative life-saving appliances

Project Objectives

- Develop a product which will be used to detect falls.
- Achieve a correct fall detection rate upwards of 90%.
- Battery life for the product should last a minimum of 24 hours, and can be charged wirelessly.
- Product should prompt users upon a suspected fall, if no response from user within a given time frame,an agent will be contacted to alert emergency services.

- Develop a website where the users can enter their information including residential address, age, health card number and government aid information.
- Website information should be encrypted for maximum security for the user.

Project Measures of Success

Overview

- Deliver a finished product at every given stage.
- Final design completed within a set budget.
- Create a low priced, reliable device.
- Create a functional, user-friendly website and database.
- Security should have high priority when creating the database/website.

In order to meet these requirements, various test cases will need to be implemented for the device and website. For the fall monitor to be successful it will need to be responsive, be able to contact help immediately and be able to provide an accurate location of the victim. Furthermore, the cost of production must be evaluated so that a clear price for profit can be found. As for the website, it must be able to accept and store valid information into the database. The website also must be able to securely validate the user's health card numbers using the government's database. The main priority when building this project is security. The website and device must be able to resist any form of hacking to provide the highest form of safety for our users. Once all these requirements are met, only then will the product be deemed successful.

Infrastructure

Hardware

- One piece of hardware we will need for the fall monitor is the gyroscope. A gyroscope consists of a wheel or disc which is mounted so that it can spin about its axis. The gyroscope is used to measure or maintain orientation or angular velocity. This means it will be efficient in sensing falls due to the rapid change in angular velocity and momentum.
- Another piece of hardware used for fall detection is an accelerometer. An accelerometer measures changes in gravitational acceleration. Since the accelerometer can sense changes is gravitational acceleration, it is efficient in being able to detect a fall, due to the user's change in acceleration. Combined with the functionality of the gyroscope, the fall detector can sense the rapid change in angular velocity and momentum, along with the change in acceleration when the user falls.
- The last piece of hardware we will need will be the device itself. Optimally, we would like to implement a product which functions similar to the fall detection of

the Apple watch. For this, the watch will display a prompt on the screen if it detects a fall, which will allow the user to cancel emergency services being alerted if the fall was incorrectly detected. If there is no response from the user within 45 seconds, an agent will be alerted to contact emergency services.

Software

- Implement an online website for registration with the product. The website should include user registration and device information. For user registration, the user should input medical information as well as an emergency contact in case of a fall.
- Implement a cloud server which will be used to store the information of the users.
- GPS implemented on the product so that when a fall is detected and emergency services are contacted by the agent, they can receive an exact location of the user.
- The device will use Bluetooth to communicate between the sensor and communication module. Bluetooth will be used because it will allow for easier connection to other devices such as the mobile phone of the user. Using low energy Bluetooth will also allow for the battery to be optimized on the device so that it can meet the requirements for the necessary battery life.