Student Expo Abstract

Poster Abstract:

Did you know that every 11 seconds an elderly person is treated in a hospital due to a fall, and every 19 minutes an elderly dies from a falling incident? According to the Center for Disease Control and Prevention, 1 out of 5 falls results in a serious injury. Hospitals and nursing homes are encountering an increasing number of falls and a shortage of staff to treat these patients. This urgent problem requires measures that will minimize events that lead to falls without needing to expand the employee base, the self-activating fall alarm is aimed to resolve this growing issue. The fall alarm is a wearable (as in part of clothing or jewelry) system, which is “invisible” to the user, dependable, user-friendly, self-activating, and provides post-fall biometric data analysis. Through its low-power, wireless device, medical officials can now approach this problem from a different perspective.

Formal Abstract:

The self-activating fall alarm is an “invisible” wearable device which clips on to the waist of the user (i.e through belt, waistband, etc.). This device automatically detects falls with the goal of shortening fall response times, which can prevent serious injury. The self-activating fall alarm utilizes a bluetooth module (Bluetooth Mate Gold) directly connected to an Inertial Measurement Unit (IMU) to transmit sensor data to a laptop. The data from the three axis-accelerometers, -gyroscopes and -magnetometers, built-into the IMU, are analyzed by a fall-**detection** algorithm to determine if a fall has occurred. Once a fall has been detected, the system runs a fall-**response** algorithm through Matlab, which notifies the user’s caregivers and EMT, and reassures the user that help is on the way. The final portion of the algorithm, involves storing the user’s data allowing for physicians to analyze and interpret the fall occurrences in order to prevent future falls from happening.