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A Smart Phone-Base Pocket Fall Accident Detection, Positioning, and Rescue System.

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ABSTRACT

Architecture for the fall accident detection and matching wide area rescue system based on a smart phone and the third generation(3G) networks. To recognize the fall detection algorithm, the angles acquired by the electronic compass and the waveform series of the triaxial accelerometer on the smart phone are used as the system inputs. The acquired signals are then used to produce an ordered feature sequence and then examined in a sequentialmanner by the proposed cascade classifier for acknowledgment purpose. With the proposed cascaded classification architecture, the computational load and power expenditure issue on the smart phone system can be alleviated.
Keywords: destination prediction, mobility model, mobility pattern, mobility prediction, path prediction

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INTRODUCTION

Fall accident has been the major cause of injury to the elderly in recent years. To protect the elderly from the injury of fall accident events or to give an immediate assistance to the elderly after the occurrence of a fall accident event, many researches have been devoted to the design of a fall detection algorithm and system[1] . Among all the currently proposed algorithms, the fall detection system can be roughly divided into two categories , namely, environmental monitoring based , and wearable sensor-based systems Digital Object Identifier 10.1109/JBHI.2014.2328593, pressure sensors , or accelerometer for vibration detection are placed in a predefined space or environment to monitor the activities of the elderly as well as the occurrence of a fall accident event. Compared to the type of wearable sensor-based system, the environmental monitoring-based fall detection system is more comfortable to the elderly since there is no need of wearing any module.[2] However, the environmental monitoring-based system can only function in a predefined environment where it is installed. Moreover, the protection of the private matters for the elderly is another problem and contention is usually discussed with the environmental monitoring-based system[3].

- Start section for detecting fall accident. Give message and mobile number to send SMS.
- The body posture is derived from change of acceleration in three axes, which is measured using tri axial accelerometer.
- After accelerometer variation, device starts to vibrate.Saved message sent to save mobile numbers with current GPS location (GPS ON) to find accident location.

Literature Survey

Detecting falls with wearable sensors using machine learning techniques

Falls are a serious public health trouble and possibly life threatening for people in fall risk groups. We develop an automated fall detection system with wearable activity sensor units fitted to the subjects' body at six different positions. Each unit comprises three tri-axial strategy (accelerometer, gyroscope, and magnetometer/compass). Fourteennumber of volunteers perform a standardized set of movements including 20 voluntary falls and 16 activities of daily living (ADLs), resulting a very large dataset with 2520 trials[3]. To reduce the computational difficulty of training and testing of the classifiers we focus on the raw data for each sensor in a 4 s time window and around the point of tip total acceleration of the waist sensor, and then to perform feature extraction and reduction[4].

A Survey on Ambient-Assisted Living Tools for Older Adults

In recent years, we have witnessed a swift surge in assisted living technologies due to a rapidly aging society. The aging inhabitants, the increasing cost of formal health care,the caregiver burden, and the importance that the personalities place on living independently, all motivate enlargement of innovative-assisted living technologies for harmless and independent aging. In this survey, we will summarize the emergence of 'ambient-assisted living" (AAL) tools for older adults grounded on ambient intellect paradigm. We will summarize the state-of-the-art AAL machineries, tools, and systems, and we will look at current and future challenges[5].

Chameleon: personalised and adaptive fall detection of elderly people in home-based environments

Threshold-based fall discovery has been widely implemented in conventional fall detection systems. In this paper, we argue that already fixed threshold is not flexible enough for different people. By exploiting the modified and adaptive threshold, we suggest a novel threshold extraction model, which meets being adaptive to detect a fall, while only taking deliberation of data from activity of daily living (ADL). We believe this is a solid step toward improving the enactment of the threshold-based fall detection solution. Furthermore, we incorporate the proposed idea into Chameleon. To evaluate the presentation of this threshold extraction model, we compared Chameleon withthe advanced magnitude detection (AMD) and fixed and the tracking fall detection (FTFD). The results show Chameleon has an accuracy of 96.83% when detecting falls, which is about1.67% higher than FTFD and is 2.67% higher than the AMD. Meanwhile, the sensitivity and the readings of Chameleon are also higher than the other two algorithms[6].

Robust Video Surveillance for Fall Detection Based on Human Shape Deformation

Computer vision offers a capable solution to analyze personal behavior and detect certain unusual events such as falls. In this paper, a new method is anticipated to detect falls by analyzing human shape deformation during a video sequence. A shape matching technique is used to track down the person's silhouette along the video sequence[7]. The shape deformation is then quantified from these profiles based on shape analysis methods. Finally, falls are detected from normal events using a Gaussian mixture model. This paper has been accompanied on a realistic data set of daily activities and simulated falls, and provides very good results (as low as 0%error with a multicamera setup) compared with other common image processing methods

Posture Recognition Based Fall Detection System

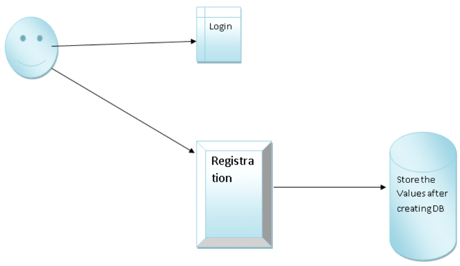
In this paper, we introduce a video-built fall detection system for an elderly person in a realhome environment. We abstract global (ellipse) and local (shape context) features from static postures and an improved Directed Acyclic Graphic Support Vector Machine (DAGSVM) is used for posture classification. After classifying different postures, certain rules are set to detect falls. This fall detection scheme is shown by evaluation on real datasets to achieve a good fall detection performance[8].

PROPOSED DESIGN

To protect the elderly from the injury of fall accident events or to give an immediate assistance to the elderly after the occurrence of a fall accident event.

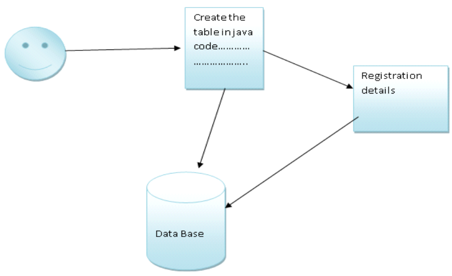
Login & Registration

In this module we design to develop login and signup screen. android used xml to develop classical screens in our application. the modules describe signup page contains email id or user name, password and conform password those kind of details should be stored in database. login screen contains email id or username and password when the user to login the app it should be retrieve the data to the database and combine based on user input if its match user name and password to allow in the app otherwise alert and show a message to the user.



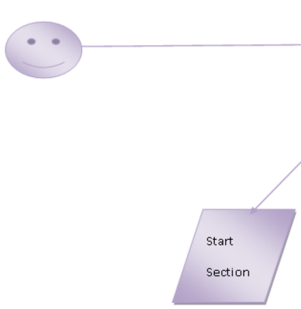
Database Creation

The user's email id or user name and password have been storedhere after registration. Android uses sqlite database for storing and fetching user application details



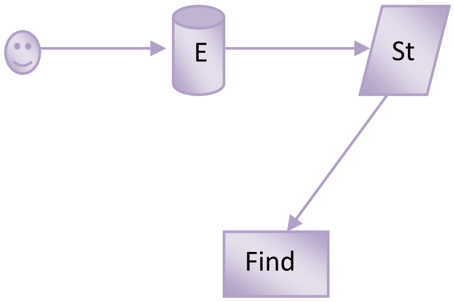
Start Section:

In this module start section for detecting fall accident. Give message and mobile number to send SMS.



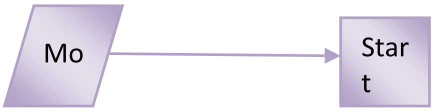
Check Motion for Mobile

The body postureof the users is derivatived from alteration of acceleration in three axes, which is measured using tri axial accelerometer.



Mobile Vibrating& SMS Send:

After accelerometer variation, device starts to vibrate.Saved message sent to saved mobile numbers with current GPS location (GPS ON) to find accident location.



Algorithm

Sensing algorithm

Step 1- Initialize serial communication ports of microcontroller

Step 2- Configure ACD and analog input channel

Step 3 - Initialize GSP and GSM modules

Step 4- Receive analog inputs from sensor

Step 5 - Receive location information from GPS

Step 6- Compare the digital values of sensor signal with predefined thresholds. If acceleration is greater than the threshold go to step 7 else go to step 4

Step 7 - Wait for time t and again read accelaration values .Compare with same threshold again

Step 8 - Is fall detected ? If yes to go step 9 , go to step 4.

Step 9 - Send text message to stored numbers , send alarming signal to meters if the operating mode1 . Send only alarming signals to the indicators if mode2

EXPERIMENTAL RESULT

To speed up the efficiency of classification process, the early states are composed of simple and important features that allow a large number of negative samples to be quickly excluded from being regarded as a fall event. Those complex features are then placed in later states. With the proposed algorithm, the computational and power consumption burden of the system can be alleviated. Moreover, a distinguished performance up to 92% on the sensitivity and 99.75% on the specificity can be obtained when a set of 450 test activities in nine different kinds of activities are estimated by using the proposed cascaded classifier with SVM,

Figure 1: Login

Figure 2:Registration

Figure 3:Start section

Figure 4: check motion

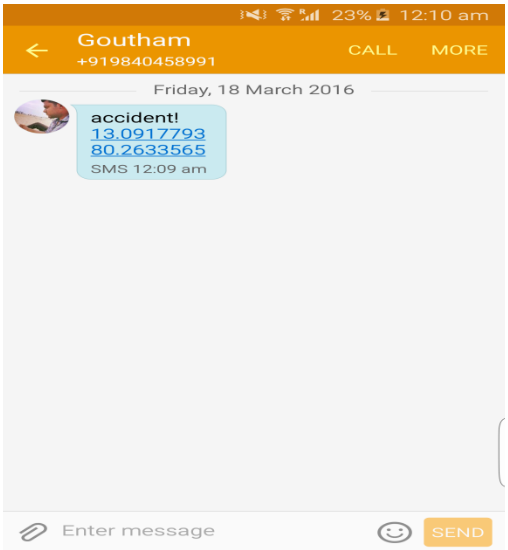


Figure 5:SMS send

CONCLUSION

We recommend in this paper basically a smart phone-based pocket fall accident detection system. The fall detection algorithm is realized with the proposed state machine that investigates the features in a sequential manner. Once the corresponding feature is verified by the current state, it can proceed to next state; otherwise, the system resets to the initial state and waiting for the appearance of another feature sequence. To speed up the efficiency of classification process, the early states are composed of simple and important features that allow a large number of negative samples to be quickly excluded from being regarded as a fall event. Those complex features are then placed in later states. With the proposed algorithm, the computational and power consumption burden of the system can be alleviated. Moreover, a distinguished performance up to 92% on the sensitivity and 99.75% on the specificity can be obtained when a set of 450 test activities in nine different kinds of events are estimated by using the proposed cascaded classifier with SVM, which demonstrates the superiority of the proposed.

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