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A Tracking System Using Location Prediction and Dynamic Threshold for Minimizing SMS Delivery

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Abstract-- **We propose an application in this paper that willautomatically detect the location of the user when accident occurs ,the system sends SMS to the nearby hospital or rescue centre. Most of the people are stressed out and overstrained due to accidents. Consequently they face some problems in reporting the accident to the police and civil defense or they may provide inaccurate information about the location. So, the objective of this paper is to reduce the time required to report an accident and to determine its location accurately. In this paper, a novel method called location-based delivery (LBD), which combines SMS and GPS, is proposed, and further, a realistic system to perform precise location tracking is developed. LBD mainly applies the following two proposed techniques: Location prediction and dynamic threshold. Location prediction is performed by using the current location, moving speed, and bearing the target to predict its next location. When the distance between the predicted location and the actual location exceeds a certain threshold, the target transmits a short message to the tracker to update its current location. The dynamic threshold maintains the location tracking accuracy and number of short messages on the basis of moving speed of the target.**

Keywords—sms,gps,tri-axial accelerometer,ecompass,pressure sensor

I. INTRODUCTION

The main objective of our system is to reduce the time required to report an accident and to determine its location more precisely. We propose a novel method called Location-based delivery (LBD), which combines these two 1. Short Message Service (SMS), 2. Global Positioning System (GPS).Unexcepted fall accident has been the major cause of injury to the affected person in recent years.To protect the affected person from the injury of unexcepted accident events or to give an immediate assistance to the affected person after the occurrence of a unexcepted fall accident event,many researches have developed the fall detection algorithm and system[1].With the improvement in integrated circuit technologies, they use devices like triaxial accelerometer and pressure sensor ,ecompass and gyroscope in small compactable devices.

Earlier research based on various movement are modified and analyzed as follows, Prathusa Perugu et al..[1] in this the author proposes a new system that provides security to the mother land by using concepts of WINS, GPS tracking and object and metal detection and tracking of vehicles with in the country. It provides a new monitoring and control capability for monitoring the borders of the country. Using this concept we can easily identify a stranger or any object crossing the border where the army cannot reach in regular. Using the satellite communication and GPS tracking the area will be identified.

Jensen et al..[2] In this the author suggest that they predict the future positions of moving objects. For all representations, the predicted position of a moving object is updated whenever the deviation between it and the actual position of the object exceeds a given threshold. For this case where the road network, in which the object is moving, is known, we propose a so-called segment-based policy that represents and predicts an object's movement according to the road's shape. Jing luo *et al.*[3] in this the author propose an effective judgment of elderly fall, a fall monitoring device based on tri-axial accelerometer. It collects the acceleration and the angle between the horizontal and vertical plane. Based on threshold value it determine whether old people fell. Finally it sends SMS to guardian.

Civilis *et al[4]* The author proposes to use the road network within which the objects are assumed to move for predicting their future positions. The paper presents algorithms that modify an initial road-network representation, so that it works better as a basis for predicting an object's position, it proposes to use known movement patterns of the object, in the form of routes, and it proposes to use acceleration profiles together with the routes. [7] discussed about a method, Optimality results are presented for an end-to-end inference approach to correct(i.e., diagnose and repair) probabilistic network faults at minimum expected cost. One motivating application of using this end-to-end inference approach is an externally managed overlay network, where we cannot directly access and monitor nodes that are independently operated by different administrative domains, but instead we must infer failures via end to-end measurements. We show that first checking the node that is most likely faulty or has the least checking cost does not necessarily minimize

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of this, we construct a potential function for identifying the candidate nodes, one of which should be first checked by an optimal strategy. Due to the difficulty of finding the best node from the set of candidate nodes, we propose several efficient heuristics that are suitable for correcting fault nodes in large-scale overlay networks. We show that the candidate node with the highest potential is actually the best node in at least 95% of time, and that checking first the candidate nodes can reduce the cost of correcting faulty nodes as compared to checking first the most likely faulty nodes.

A). Existing System:

In this system, a device is equipped with a global system for mobile communications (GSM) modem and a GPS unit It transmits short messages containing its GPS coordinates to the server at 30-s intervals. The system then communicates with an emergencydispatcher to assist in determining the appropriate emergency personnel. When the target or the tracker is unable to access Wi-Fi, it is impossible to perform location tracking. People can't explain the exact location type of the accident. Therefore, SMS is a relatively more reliable and flexible solution because of its widespread use. The transmission cost of a tracking system by the number of SMS transmissions while maintaining the location tracking accuracy is high. It holds few limitations such as i) Tracker and target it should be in same Wi-Fi coverage Area, ii) SMS is a user-pay service but the number of SMS transmission is high, iii) When the target or the tracker is unable to access Wi-Fi, it is impossible to perform location tracking.

B). Proposed System:

In this System, a novel method called location-based delivery (LBD), which combines the short message service (SMS) and global position system (GPS). LBD reduces the number of short message transmissions while maintaining the location tracking accuracy within the acceptable range. The proposed approach, LBD consists of three primary features: a) Short message format, b) location prediction c). dynamic threshold. The defined short message format is proprietary. Location prediction is performed by using the current location, moving speed, and bearing of the target to predict its next location. When the distance between the predicated location and the actual location exceeds certain threshold, the target transmits a short message to the track or update its current location. The threshold is dynamically adjusted to maintain the location tracking accuracy and they number of short massage on the basis of the moving speed of the target.

III. ARCHITECTURE

The architecture of our proposed System is as follows

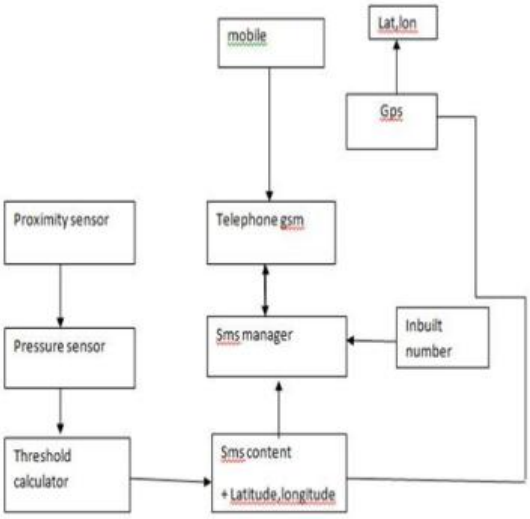

Fig 1. Architecture of our System

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We propose in this paper a smart phone based unexcepted fall accident detection system. Fall detection is a difficult process because we cannot find the exact location where the accident has occured. we have overcome this difficulty by providing a standardized solution which identifiy the exact location. Usage of tri-axial accelerometer and other sensor make the proposed system be more effective. Besides, there is a lot of new trends available for fall detectors using the smart phones , but their real world scenarios can still be compromised. Every android mobile contain proximity sensor.

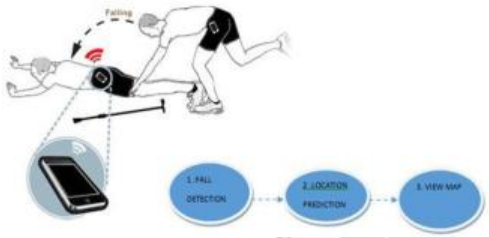

Fig 2: Unexcepted fall detection and positioning

IV. IMPLEMENTATION

The various modules of our proposed system are

a). Well-defined SMS format

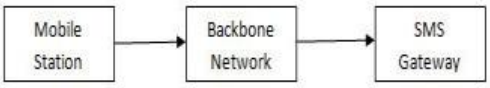

Fig 3. SMS Format

The proposed system uses SMS to transmit location update messages and assumes that the message delay between the tracker and the target is negligible. A short message is transmitted from the mobile station (MS) to the GSM base station (BTS) through a wireless link and is received in the backbone network of the service provider. The (MSC), (HLR), and (VLR) determine the appropriate (SMSC), processes the message by applying the "store and forward" mechanism. If the recipient is unreachable, the SMSC queues the message for a retry at a later.

b). Location prediction

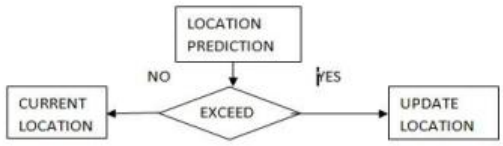

Fig 4. Location Prediction

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Location prediction module, which is built in both the target and the tracker side, uses the information on the current location. Location prediction is performed by using the current location, moving speed, and bearing of the target to predict its next location. When the distance between the predicted location and the actual location exceeds a certain threshold, the target transmits a short message to the tracker to update its current location. By using the location prediction module we can easily predict the location using the latitude and longitude value. It tell the exact latitude and longitude value. c). Dynamic threshold.

Fig. 5 Dynamic threshold

When the mobile feel high pressure or unexpected event it will predict the current latitude and longitude and it will generate a automatic sms with current position to target

d). Viewing map

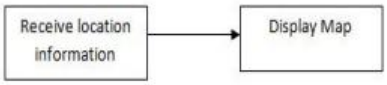

Fig 6. Viewing Map

When the tracker receives a response message from the target, it means that the accuracy of the predicted location is too low. Therefore, the Map updates the target location information according to the received message rather than according to its prediction. Particularly, the messages from the target are received by the SMS Receiver on the tracker side. The SMS Receiver extracts the location information (e.g., coordinate, speed, and bearing) from the received message and passes it to the Map, which in turn displays and marks the target location on a map.

IV. METHODS

In this section, the signal accession as well as the feature selection process will be introduced. It is observed that most of the smart devices are equipped with certain kinds of interior detectors, e.g., the triaxial accelerometer (also known as *G*-Sensor), the electronic compass, or the gyroscope, so that the orientation of the device can be recognized by its operating system. Considering the availability, we use the triaxial accelerometer (*G*-Sensor) and the electronic compass as the major sensors for input signal acquisition and generation in the proposed system. In this paper, the outputs of the triaxial accelerometer will be sampled with a frequency of 150 Hz. The sampled signal is a three-dimensional data sequence, i.e., [*ax* [*n*], *ay* [*n*], *az* [*n*]]. To simplify the dimension of the sampled signal, we apply ~~in this paper the use of the~~ one-dimensional signal magnitude vector (SMV) *S*[*n*] as shown below

$S[n] = 2 + 2 + 2$ [ ]where n is thesample index, ax [n], ay [n], and az [n] are the gravitation values along the *x*-axis, *y*-axis, and *z*-axis, respectively (as in Fig. 6). In this paper, the pitch angle acquired by the e- compass is used to detect real fall events from normal activities. The coordinate convention of the triaxial accelerometer and the orientation definition of the electronic compass are shown in Fig. 6(a) and (b), respectively. It should be noted that the e - compass should be used in company with the triaxial accelerometer, where the triaxial accelerometer is used to regulate the actual angle obtained. With the aids of information obtained by the magnetic field sensor as well as the gravity sensor, a so-called 3 × 3 rotation matrix can be obtained by using the function "getRotationMatrix" in android systems, and then the rotation matrix will be used as the input of the function "getOrientation" to get the orientation of the smart phone, i.e., the angle of azimuth, pitch, and roll. It is denoted that the azimuth rotates around the *Z*-axis, the pitch rotates around the *X*-axis, and the *roll* rotates around the *Y* -axis [10]. The pitch ,is used to indicate the angle between the *Y* -axis and the ground. Thi s is because when the user is suffering a unexpected fall accident event, the smart phone in the user's pocket also tend to lie down, and the pitch angle is usually small and around zero.

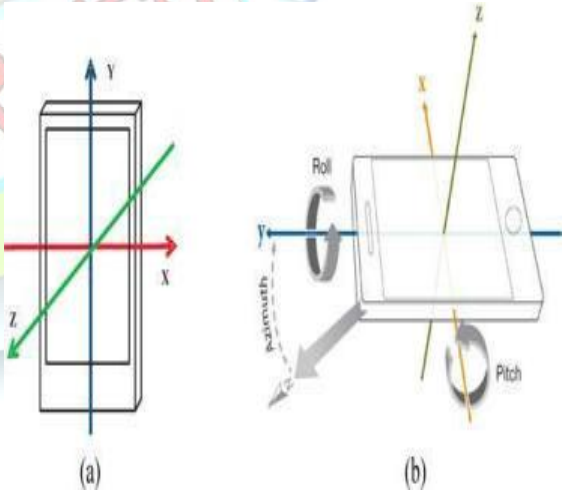

Fig. 6. (a) Coordinate convention of the triaxial accelerometer. (b) Orientation definition of the electronic compass

V. CONCLUSION

Once accident has been happened it detect whether it is real or not, by using a triaxial accelerometer, ecompass, and pressure sensor. By finding all the values if real fall happens means the sms manager generate the message

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which contains the latitude and longitude of the location where the accident has occurred. The message will be received by the rescue centre and the necessary action will take place.

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