OFFLINE LOCATION DETECTION AND ACCIDENT INDICATION USING MOBILE SENSORS

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Abstract - *The usage of technology has ended up being a value asset. Nowadays, from PCs to mobile phones, advancement in the society is large . Because of these ideal circumstances, new research has to make structures and applications to help with people's prosperity, for instance, recognizing accident with the usage of mobile phones. The system is made out of three kinds of fragments: data gathering, range decision, and Spot ID. It utilizes the wireless' intrinsic sensors (accelerometer) to recognize the region of the mobile phone and once a zone is perceived, the accident distinguishing proof portion happens. A general depiction on fall area systems is given, including the differing sorts of sensors used nowadays. The proposed course of action is presented and depicted in wonderful unobtrusive component. The accident detection results can be used as important cues to assist many other human oriented tasks, for instance, people tracking and human gait recognition.These devices can be handy and it is comfortable to use.*

Key Words: **Accident detection,Offline tracker, Mobile sensors,Location**

1.INTRODUCTION

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

1.1 EXISTING SYSTEM

To design and develop a prototype of an electronic gadget which is used to detect fall among elderly and the patients who are prone to it. In this article, the body posture is derived from change of acceleration in three axes, which is measured using triaxial accelerometer. 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 . 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. 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.

1.2 PROPOSED SYSTEM

To design and develop a prototype where we can detect any accident even in rural areas and find the exact location with great accuracy with the help of our smart phones. This system uses three intrinsic sensors which are accelerometer, gyroscope and magnetometer. These sensors help in identifying the movement ,velocity of the smart phone and calculate their values. The main advantage of this system is that it works even offline. This system gets the location of the smart phone from the satellite at regular intervals . Initially the user is required to enter the emergency contact number to which the alert message along with the location is to be sent and has to set the base range value for all the three sensors. Whenever there is an abnormal movement in the smart phone then the values of the three sensors varies and if it exceeds the particular base value then the alert message is automatically sent to the emergency contact along with the location.

1.3 PROBLEM STATEMENT

Usually when an accidents occur ,the location of the phone and where the phone was last active is tracked by the police.The radius obtained is very large.This makes it even harder to find the injured person .In this system,we can obtain the location using satellite even when the user is offline. When a user has met with an accident at a remote location no one is aware of it this technique can will be helpful.In this system when an accident occures the mobile sensors trigger the satellite to send the location of the person to any two selected contacts.

2. ARCHITECTURAL DESIGN

2.1 SYSTEM ARCHITECTURE

The first step is to login/register. 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 confirm password those kind of details should be stored in database. Login screen contains email id or username and password when the user wants to login the app, it should retrieve the data to the database and combine based on user input. if it matches user name and password it allows the user to enter into the app otherwise shows an alert message to the user.

The next step is to create database. The user email id or user name and password have been stored after registration. Android uses MYSQL Database for storing and fetching user application details. Then we have to start the session. After login, the Authenticated user go to Home screen to start the session, where we have to add the emergency number and the message that has to be sent. These data are added to the Cloud application. In this module we can also update your friend mobile number and Message options. The start session button appears after this process.

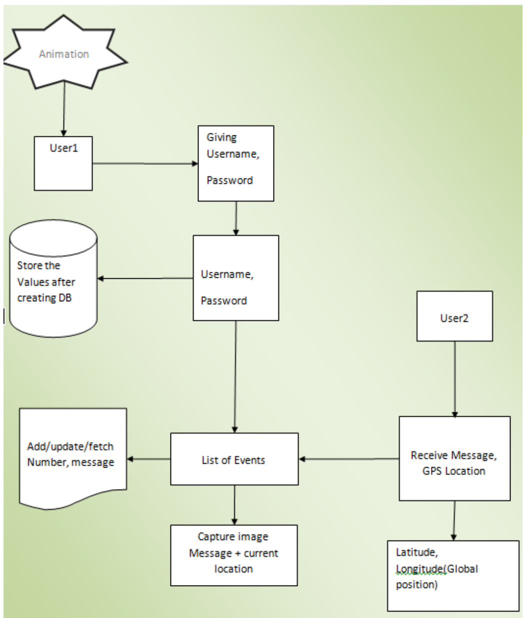


FIG 1: architecture design

Next the mobile's motion is checked. The body posture is derived from change of acceleration in three axes, which is measured using tri axial accelerometer. After the activity is started, user can find motion variation from change of acceleration in three axes , which is measured using tri axial accelerometer. user can now view the accelerometer changes. Finally, after calculating the variances in all the three sensor values now it gets the location from the satellite and sends it to the favourite contacts. Thus the location is sent successfully.

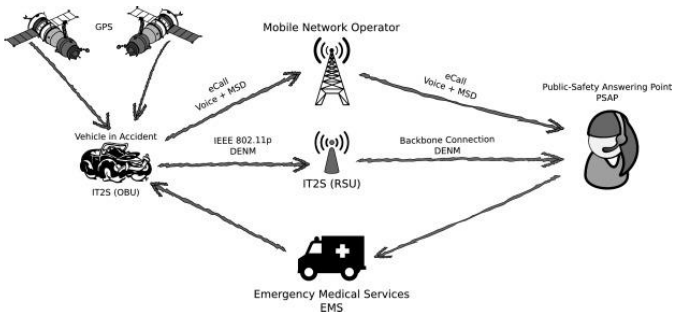


FIG 2: contectivity diagram

3. ALGORITHM

Deployment Algorithm Details The proposed deployment algorithms are iterative, and in each iteration, the following steps are carried out.

1) All sensors broadcast their sensing radii and positions. Thus, based on the received information, every sensor constructs its own region, given a guaranteed diagram.

2) Every sensor detects coverage holes in its own region in a distributed manner (i.e., independently).

3) After discovering the coverage holes, by using a specific movement algorithm (which will be discussed in Section V-B), the corresponding sensor calculates its new candidate location.

4) Once the new location is calculated, the corresponding coverage area is evaluated (based on the previously constructed region) and compared with the current coverage area. The sensor moves to the new location only if the resulting coverage area is greater than the present value; otherwise, it does not move in this iteration.

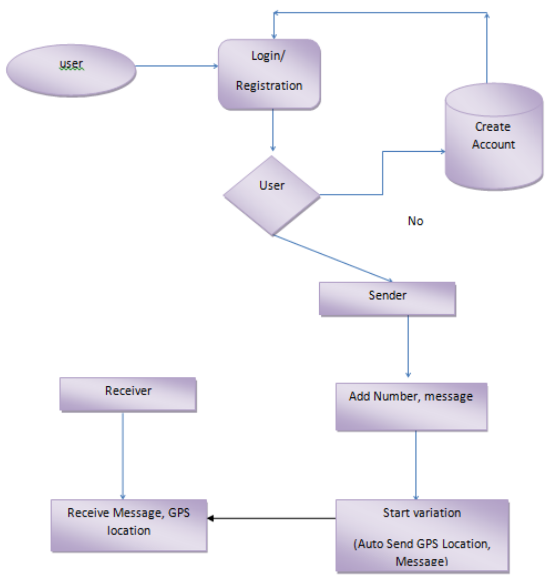
5) To have a termination criterion for the algorithm ,a proper threshold δ is defined; the algorithm is terminated if no sensor can improve its coverage area by this threshold or a predefined number of iterations (Imax) has been completed. δ and Imax are chosen based on which of the coverage, energy consumption, or convergence time is the main concern. For example, when the convergence time or the energy consumption is the main concern, the operator chooses a relatively small Imax and relatively large δ in the beginning. On the other hand, when the coverage is the most important concern, a relatively large Imax and a small

threshold δ are chosen by the operator such that the covered area increases as much as possible.

The deployment algorithms are iterative, and in each iteration, it is tried to improve the total coverage, at least as much as a threshold $\delta>0$. The algorithm is stopped if no improvement is possible or a certain number of iterations (Imax) have passed. Algorithm 1 briefly describes the farthest point-based GAWVD (FPGAW) method. The deployment algorithm for the other algorithms (i.e., FPGMW and MPGP) is exactly the same, except that the movement algorithm changes accordingly.

Deployment Algorithm for the FPGAW

k ←0, iterations←0,D←1
whileD = 1 and iterations <Imax do
for i = 1 ton do
• construct Πi according to(9) and set $\Pi k\ i \leftarrow \Pi i$
• find $\pi k\ i$ (the area of the ith region that is covered by si)
end for
• iterations←iterations + 1
• k ← k + 1
• C←0
for i = 1 ton do
• calculate a new location (pk i) for si, based on the FPGAW movement strategy
• evaluate $\pi k\ i$ based on the new location for the current region ($\Pi k-1\ i$)
if $\pi k\ i > \pi\ k-1\ i + \delta$ then
move si to pki
C←C+ 1
end if
end for
if C = 0 do
D = 0
end if
end while



4.CASE STUDY

We propose an optimization-based path-planning framework for an aerial mobile sensor network. The purpose of the path planning is to monitor a set of moving surface objects. The algorithm provides collision-free mobile sensor trajectories that are feasible with respect to user-defined vehicle dynamics. The objective of the resulting optimal control problem is to minimize the uncertainty of the objects, represented as the trace of the augmented state and parameter estimation error covariance. A Voronoi-based strategy is proposed to maximize the sensing coverage in a mobile sensor network. Each sensor is moved to a point inside its Voronoi cell using a coverage improvement scheme.To this end,a gradient-based nonlinear optimization approach is utilized to find a target point for each sensor such that the local coverage increases as much as possible, if the sensor moves to this point. The algorithm is implemented in a distributed fashion using local information exchange among sensors. Analytical results are first developed for the single sensor case,and are subsequently extended to a network of mobile sensors, where it is desirable to maximize network-wide coverage with fast convergence. It is shown that under some mild conditions, the positions of the sensors converge to a stationary point of the objective function, which is the overall weighted coverage of the sensors. Simulations demonstrate the effectiveness of the proposed strategy. Voronoi-based mobile sensor deployment algorithms require the knowledge of sensors' locations to guarantee a simple reliable coverage detection, and they miss the mark if the location is inaccurate. However, in practice, it is often too expensive to include a Global Positioning System (GPS) receiver in each node, and location information is inaccurate as sensors estimate locations from the messages they receive. We study sensor deployment algorithms in the presence of location estimation error for sensors with nonidentical sensing ranges. We propose a set of Voronoi-based diagrams, which are called guaranteed Voronoi diagrams (VDs), that guarantee single-cell-based coverage hole detection algorithms, provided that upper bounds on localization errors are assumed.. Hence, even if the location information is exactly known at each node, assuming some error margins improves the network coverage if guaranteed Voronoi diagrams are used.

Efficient deployment algorithms are developed in this paper to increase the coverage area in a network of wireless mobile sensors. The proposed strategies iteratively compute the new candidate position of each sensor based on the existing coverage holes. These holes are obtained using a Voronoi diagram for the case of sensors with the same sensing ranges,and a multiplicatively weighted Voronoi (MW-Voronoi) diagram for the case of sensors with different sensing ranges. Each sensor is driven by some virtual forces which are applied to it from the vertices and boundaries of its Voronoi cell. These forces are obtained in such a way that when the sensor is relocated, the covered area of the corresponding cell increases. Simulation results demonstrate the efficacy of the proposed strategies, and their superiority to existing algorithms. HazeEst—a machine learning model that combines sparse fixed station data with dense mobile sensor data to estimate the air pollution surface for any given hour on any given day in Sydney. We assess our system using seven regression models and tenfold cross validation. The results show that estimation accuracy of support vector regression (SVR) is similar to decision tree regression and random forest regression, and higher than extreme gradient boosting, multi-layer perceptrons, linear regression, and adaptive boosting regression. Our results can be visualized using a Web-based application customized for metropolitan Sydney. We believe that the continuous estimates provided by our system can better inform air pollution exposure and its impact on human health.We consider the design of a pair of moving sensors trajectories for the purpose of optimally localizing a stationary emitter based on time-difference-of-arrival measurements.The localization error covariance matrix is predicted by the Cram´er–Rao bound.

5. CONCLUSION

We propose in this paper 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 activities are estimated by using the proposed cascaded classifier with SVM, which demonstrates the superiority of the proposed approach

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