Design and Implementation of Women Safety System Using Mobile Application in Real-Time Environment

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***Abstract*: Safety of Women has become a major problem in today's World. The crime rates in case of women have risen to a great extent. In order to reduce this crime rate and ensure women safety a secure Mobile application is proposed. This application requires an initial registration along with Emergency contacts. When the user is travelling from one place to another, the dynamic GPS tracking offered by G-Maps API is turned on to view the user's location on a map. During an emergency situation, the victim can either shake the mobile phone to a specific frequency or long press lower volume button. Immediately after this action an alert message containing the name of the victim, GPS location and a help message is sent via SMS to all the registered Emergency Contacts and a Call is made to the Master contact. Suppose if the emergency contact person has the same application they can directly monitor through the dynamic GPS tracking system, otherwise they can access the location through the message link. The Person can immediately rush to the spot to help the victim. Suppose if the victim is in motion, the live location will be updated for every certain seconds. Not only during Emergency situations, even when the battery drains out, an alert message with the last updated location is sent to the Emergency Contacts.**

***Keywords*: G-Maps API, Alert message, Emergency Contacts, SMS, GPS tracking system, Mobile application, Android, Master contact, Sensor.**

1. Introduction

Today's smartphones or mobile phones function the central computing and communication device in people's lives. These phones engraft varied sensors, together with measuring device, digital compass, GPS, and camera, enabling new applications in varied domains like health care, social networks, and environmental observation.

This can be as a result of falls square measure a significant health risk for older folks, decreasing the standard of life or perhaps leading to death. The autumn detection system will be will be four categories: image-based systems, database-based approach, context-aware techniques and acceleration-based detection. for instance, the advantage of image-based associated context-aware approaches is a correct detection rate; the information-based approach stores numerous detected user behavior into a database for numerous activities. The acceleration-based detection is that the most generally used technique, as current high-level devices integrate the acceleration sensors.

The planned system has 3 central components: sensing, learning, and alerting. within the within the, we have a tendency to take the benefits of the information base-based approach to gather realistic fall data. That is, we have a tendency to collect the important measuring device information from the mobile embedded sensors and record the corresponding user behavior to work out the specified parameters. within the second element, the planned system learns the link between the autumn behavior and also the collected information. within the third element, the mobile phones alert pre- configured emergency contacts through message. The experiment any investigates the impact of various locations wherever the phone hooked up, together with chest, waist, and thigh. Finally, we have a tendency to conduct in depth experiments to gauge the additional power consumption ensuing from the autumn detection software package.

2. Literature survey

C. Wang says, falls are the number one cause of injuries in the elderly. A wearable fall detector can automatically detect the occurrence of a fall and alert a caregiver or a medical rescue group for immediate assistance, mitigating fall-related injuries. However, most studies on fall detection to date have focused on the accuracy of detection while neglecting power efficiency and battery life, and hence the developed fall detectors usually cannot operate for a long period (a year or more) without recharging or replacing their batteries. This fall detector reduces its power consumption through both hardware- and firmware-based approaches. This study also incorporates several human trials to develop and evaluate the device, including simulated falls and activities of daily living. The LPFD reduces its power consumption using both hardware and firmware based approaches. The parameters of the classifier were optimized to achieve high but balanced sensitivity and specificity using PSO in the training stage. A benchtop power measurement test is also conducted to estimate the battery life with data from a one-week free-living trial. These experiments show that the fall detector achieves high sensitivity (97.5% and 93.0%) and specificity (93.2% and 87.3%) on training and testing datasets, whilst providing an estimated battery life of 664.9 days. The main drawback is that the LPFD is designed to work in an indoor home environment [2].

F. Sposaro says, injuries due to falls are among the leading causes of hospitalization in elderly persons, often leading to a rapid decline in quality of life or death. Rapid response can improve the patient's outcome, but this is often often lacking when the injured person lives alone and therefore the nature of the injury complicates calling for help. This paper presents an alert system for fall detection using common commercially available electronic devices to both detect the autumn and alert authorities. It is proven that fall detection algorithm makes the system highly reliable. It is Reliable and reduce the number of false positives mean greater adoption by emergency services. An Android-based smart phone is used with an integrated tri-axial accelerometer. Data from the accelerometer is evaluated with several thresholds based algorithms and position data to figure out a fall. The threshold is adaptive supported user provided parameters such as: height, weight, and level of activity. The algorithm modify to unique movements that a phone experiences as against similar systems that require users to mount accelerometers to their chest or trunk. If a fall is sense, then a notification is raised for the user's response. If the user doesn't respond, the system alerts pre-specified social contacts with an informational message via SMS. If a contact responds the system commits an audible notification, automatically connects, and enables the speakerphone. Certain interactions such as violently answering then ending a call or dropping the phone can break the Thresholds can change positions. If a contact confirms a fall, an emergency service will be alerted. Our system provides a realizable, cost effective solution to fall detection employing a simple graphical interface while not overwhelming the user with uncomfortable sensors [4].

N. Noury says that the main purpose is to automatically detect the autumn of the person from one device, worn on the trunk within the "para sagittal" plane in real time. The device includes 2 accelerometers, an 8 hits' RISC microcontroller, a buzzer and B push button. Good Results are obtained with limited population, each fall was simulated, and all the participants were young people. On improving the decision algorithm, interesting simulation results with more elaborated data signal processing, combining a decision on fuzzy data and a combination of decisions It is serially linked to a RF-modem. The test was taken on 10 healthy young persons in different situations and exhibits good specificity and sensibility. Improvements can he made on the decision algorithm using nonstandard theories. The common alarm systems are not satisfactory: a loss of consciousness or a faint are not detected, people suffering from the Alzheimer disease doesn't even have the intellectual ability to launch an expert to call for help from the place he fell down [8].

Mihail Popescu says quite one third of regarding thirty-eight million adults sixty-five and older fall annually at intervals the United States of America. To handle the on top of drawback we have a tendency to propose to develop Associate in Nursing acoustic fall detection system(FADE); which will mechanically signal a fall to the observance caregiver. As against several existent fall detection systems that require the monitored person to wear devices like accelerometers or gyroscopes within the least times, our system is completely unnoticeable by not requiring any wearable devices. to scale back the warning rate, we have a tendency to use Associate in Nursing array of acoustic sensors to urge sound supply height data. The sound is taken under consideration a warning if it comes from a supply set at a height on top of two feet. victimisation the peak of the sound, has drastically improved the warning rate. This dedicated fall detection system relies on a linear array of audio sensors. We tested our system during a pilot study that consisted of a collection of twenty-three falls performed by a stunt actor throughout six sessions of regarding unit of time every (1.3 hours in total). The actor was antecedently trained by our nursing collaborators to fall like Associate in Nursing old person. the employment of height data reduced the warning hourly rate from thirty-two to five at a 100% fall detection rate. Though the warning rate has been reduced, it's not fully corrected, Different array shapes(circular) are often thought-about for additional reduction of warning rate [5].

J. Dai says falls are a serious health risk that diminish the standard of life among elderly people. With the elderly population surging, especially with aging "baby boomers", fall detection becomes increase. However, existing commercial products and academic solutions struggle to realize pervasive fall detection. we propose utilizing mobile phones as a platform for pervasive fall detection system development. To our knowledge, we are the first to do so. We design a detection algorithm supported mobile platforms. We propose PerFaUD, a pervasive fall detection system implemented on mobile phones. The detection algorithm is designed based on mobile phone platforms. Experimental results show that PerFallD achieves good detection performance and power efficiency. We implement a prototype system on the Android Gl phone and conduct experiments to gauge our system. In particular, we compare PerFaIID's performance thereupon of existing work and a billboard product. PerFailD show that it achieves strong detection performance and power efficiency. PerFallD can be enhanced by integration with some extra protection devices, e.g., airbag based fall protector to reduce fall impacts and prevent fall related injuries [3].

3. Existing system

The major drawback with existing business product and tutorial analysis is that they need they need hinder pervasive fall detection. the bottom should be put in somewhere inside and also the moveable device should be hooked up to a belt at the waist. Once the bottom receives the signal from the device indicating a fall, it will mechanically communicate with a planned emergency contact victimization the victimization phone. However, the most distance between the device and also the base is proscribed. Fall detection will solely be conducted inside a little indoor atmosphere and older individuals might simply forget to bring the device with them, because it is an additional device that they rarely use in everyday life. what is more, these product area units overpriced. just in case of falls, the event of automatic, reliable, and prompt fall detection systems plays a significant to ensure immediate help and facilitate.

The Drawbacks of the system is when emergency situation occurs the user cannot protect the smartphones and they cannot track the phones if they lost it. The user cannot be set the alert function when they are in risk situation and immediately they cannot pass their location to friends and family members to intimate they are in risk. The internet cost is too high and time delay to find out the IMEI number of mobile to track it.

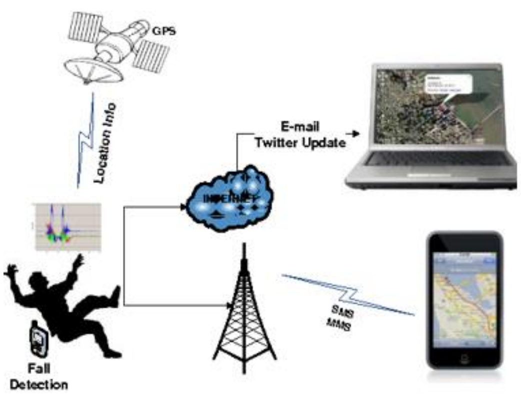

Fig. 1. Existing fall detection system

4. Proposed system

This study proposes a low-priced fall detection system, victimisation the present devices and wireless technology, while not the necessity for hardware modification, environmental setup, and sporting external sensors. The projected system has 3 central components: sensing, learning, and alerting. within the initial element, we tend to take the benefits of the knowledgebase-based approach to gather realistic fall data. That is, we tend to collect the important measuring system knowledge from the mobile embedded sensors and record the corresponding user behavior to see the desired parameters. within the second element, the projected system learns the link between the autumn behavior and therefore the collected knowledge. during this step, we tend to utilize totally different fall options, together with vertical and total acceleration, to style totally different fall detection algorithms. we tend to additionally live the performance in each sensitivity and specificity whereas considering their trade- off. within the third element, the mobile phones alert pre- organized emergency contacts through message. we tend to additional style AN interface that permits users to manually disable the tuned in to avoid false positive and to scale back transmission prices. GPS tracking feature tracks the user lively when you are the move after triggering the emergency button. When the battery is running low, it automatically sends the location the pre-stored contacts. This device works without internet connectivity.

1) Sensing

The measuring device embedded in mobile phones performs the sensing. Associate in Nursing measuring device detects acceleration, vibration, and tilt to see movement and precise orientation on the 3 axes. Apps use this smartphone device to see whether or not your phone is in portrait or landscape orientation. It can even tell if your phone screen is facing upward or downward. The measuring device can even notice how briskly your phone is taking possession any linear direction. once the person shakes the mobile at the next frequency, this measuring device helps in sensing the movement by victimization the x, y, z coordinates.

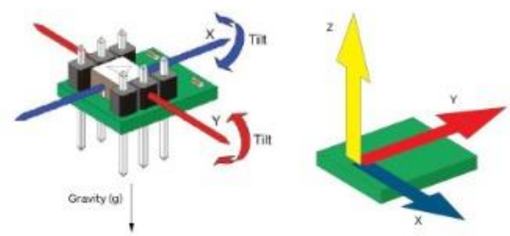

Fig. 2. Accelerometer

2) GPS tracking

Global Positioning System (GPS) units in smartphone communicate with the satellites to work out our precise location on Earth. The GPS technology doesn't really use net knowledge this can be why we are able to realize our location on maps even once losing the signals, however the map itself is foggy because it needs net to load the small print. this can be however offline map works. GPS is employed altogether location-based apps like Uber and Google Maps.

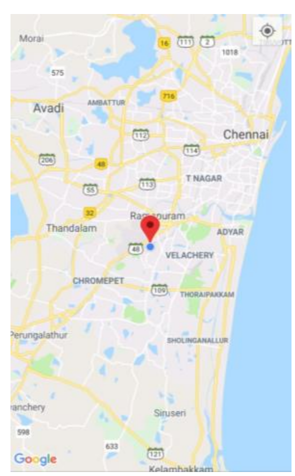

Fig. 3. GPS tracking

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3) Alert message

SMS messages are ancient text messages that support a wider vary of devices, however are restricted to solely short plain text notifications. where your workers have a transportable signal they'll receive one in every of these alerts. SOS Alerts aim to form emergency info a lot of accessible throughout a natural or human-caused crisis. we tend to gather relevant and authoritative content from the net, social media, and Google merchandise, and so highlight that info on Google merchandise like Search and Maps. looking on the character of the crisis and your location, you'll see updates from native, national, or international authorities. These updates might embrace emergency phone numbers and websites, maps, translations of helpful phrases, donation opportunities, and more.

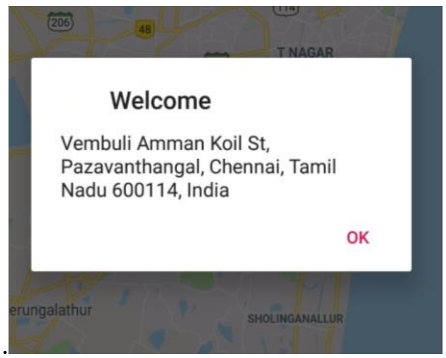

Fig. 4. Identifying exact location

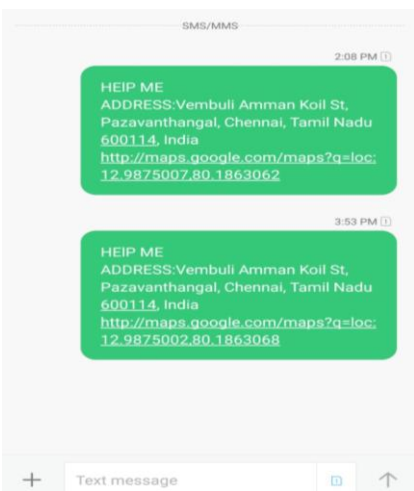

Fig. 5. Alert message sent through SMS

The basic skeleton working of the application is shown in the Fig. 6.

Initially user has to register in the application by providing their basic detail such as name, email id, mobile number. Permission to access contacts, messaging and GPS must be enabled. Once registration is done the user can login with the valid credentials. Now moving on to the foremost essential part of the application, where the user has to enter the contact numbers of the trusted people who should be contacted during emergency. The topmost number that is entered is called as Master contact. These emergency contact can be updated anytime as per user's wish. During an emergency situation, the person has two ways to indicate it. She has to either shake to the mobile phone with force or long press the lower volume button continuously. Once the accelerometer /sensor detects this vibration, the application immediately picks the current location and simultaneously picks the emergency contacts from the database and sends a SMS with a help message and G-map link of the fetched location to the emergency contacts. In addition to this a call will be made to the master contact.

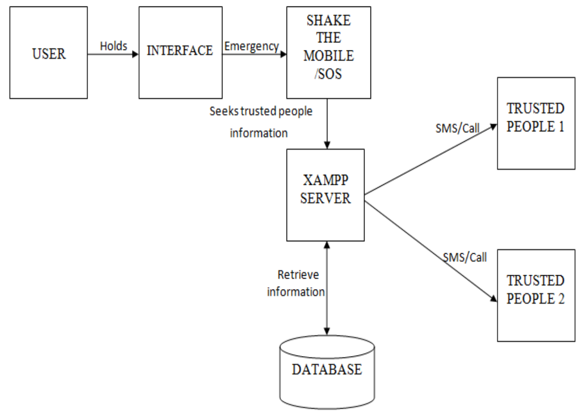

Fig. 6. Architecture diagram

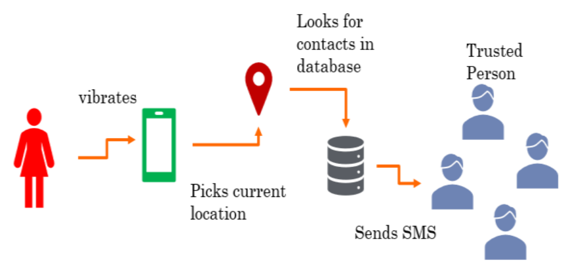

Fig. 7. Flow diagram

5. Modules

A. Module 1: Authentication module

A registration page can open wherever we will enter the user details. This contains details like Name of the user, Address of the user, his/her Mobile range and Email-id. These details area unit saved by clicking on save button. it's been designed by keeping all the constraints in mind like, the mobile range is restricted to ten digits and user has to enter solely the digits, email-id is ready victimization commonplace email-id format, if user enters some wrong format or misses @ or .com then it flashes a slip-up.

B. Module 2: Adding emergency contact

After registering user info, User will add the contact details of his/her shut associates like members of the family or friends, United Nations agency will reach instantly for facilitate just in case of emergency. A user will add new contacts with associate degree emergency message that contains Mobile range. which might be viewed shortly when clicking on update contact button of the applying. These 5 registered numbers can receive the message.

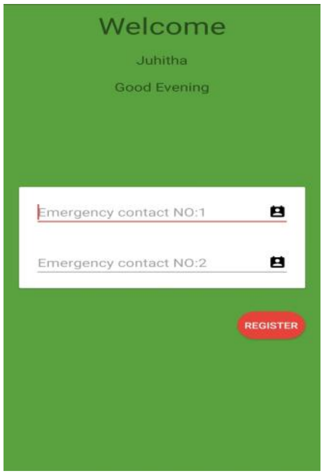

Fig. 9. Emergency contact

C. Module 3: Pressing volume button/shaking

The last and most significant feature of this application is causation facilitate message and creating decision by merely pressing volume key. when pressing volume key, a tiny low screen can seem for show activate GPS or not. when continuing, all the quantity in contact list of lady security app can solely receive the emergency message with full address. A decision is created to the primary master contact.

Fig. 10. Shake

D. Module 4: GPS tracking

If the location of smart phone is turned on but if there is no internet connection at the time of pressing volume key, the emergency message will be send with longitude and latitude of victim's sim's last network fetched by GPS.

Fig. 11. GPS tracking

E. Module 5: Send SMS

By pressing volume key, Women security app will send the emergency message with full address to all the contacts added in the emergency contact list. If both the internet and location of victim's android phone will have turned on then GPS will fetch the location automatically and send an emergency message to all contacts with the exact location of victim and their landmark with longitude and latitude through messages. So that the nearby associate can reach the victim easily for Her help.

Fig. 12. Send SMS

6. Future enhancement

Now a day's women are facing many problems like rapes, robbery and sexual assault. These victims of violence have been increased rapidly day by day in our country. Thus women hesitate to come out of home. They are mentally becoming weak to handle any such situations and populations of women's have been decreased. Hence, our secure app will help them to overcome the above problems. The proposed app is tested in different location and obtained a satisfactory result. In future work, we are trying to enhance our app by using the send the SMS without network.

7. Conclusion

In this paper, a low-cost women tracking system exploitation GPS and GPRS of GSM network, appropriate for wide selection of applications everywhere the globe. the mix of the GPS and GPRS provides continuous and real time trailing. the value is way lower compared to SMS primarily based trailing systems.

References

[1] Ahsan Shahzad and Kiseon Kim, "FallDroid: An Automated Smart-Phone-Based Fall Detection System Using Multiple Kernel Learning" IEEE Trans. Ind. Informat., vol. 15, no. 1, pp. 35 - 44, Jan. 2019.
[2] C. Wang et al., "Low-power fall detector using triaxial accelerometry and barometric pressure sensing," IEEE Trans. Ind. Informat., vol. 12, no. 6, pp. 2302–2311, Dec. 2016.
[3] J. Dai, X. Bai, Z. Yang, Z. Shen, and D. Xuan, "Perfalld: A pervasive fall detection system using mobile phones," in Proc. 8th IEEE Int. Conf. Pervasive Comput. Commun. Workshops., 2010, pp. 292–297.
[4] F. Sposaro and G. Tyson, "ifall: An android application for fall monitoring and response," in Proc. Annu. Int. Conf. IEEE Eng. Med. Biol. Soc., 2009, pp. 6119–6122.
[5] Mihail Popescu, Yun Li, Marjorie Skubic, and Marilyn Rantz, "An acoustic fall detector system that uses sound height information to reduce

the false alarm rate," 30th Annual International IEEE EMBS Conference, August 2008.

[6] Shaou-Gang Miaou, Pei-Hsu Sung, and Chia-Yuan Huang, "A customized human fall detection system using omni-camera images and personal information," Proceedings of the 1st Distributed Diagnosis and Home Healthcare (D2H2) Conference, pp. 39–41. April 2006.

[7] Jay Chen, Karric Kwong, Dennis Chang, Jerry Luk, and Ruzena Bajcsy, "Wearable sensors for reliable fall detection," Proceedings of the 2005 IEEE Engineering in Medicine and Biology 27th Annual Conference, pages 3551–3554, September 2005.

[8] N. Noury, P. Barralon, G. Virone, P. Boissy, M. Hamel, and P. Rumeau, "A smart sensor based on rules and its evaluation in daily routines," in Proc. 25th Annu. Int. Conf. IEEE Eng. Med. Biol. Soc., 2003, vol. 4, pp. 3286–3289.