New Automatic Fall Detection and Activity Classification using Monodroid Application

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Abstract: **The mobile application is capable of detecting possible falls for elderly, through the use of special sensors and through a user friendly interface that can be used to alert caretakers.The alert message contain useful information about the people in danger.In occasions of false alerts,the supervised person is given the ability to estimate the value of importance of a possible alert and stop it before being transmitted.The system also includes calibration of accelerometers.The Fall Detection System will be able to assist cares,nearby people as well as the elderly.This fall detection system is designed to detect the accidental fall of the elderly and alert the carers or their loved ones via Smart Messaging Services(SMS) immediately.This fall detection is created using Microcontroller technology as the heart of the system.The accelerometer is used to detect the sudden movement or fall and the Global System for Mobile communication is used to send SMS to the caretaker.A Helpline Video was played and it contains the health details about the fell down people.This Helpline Video was helps the nearby people to give firstaid services to fell down elderly person.**

Keywords: ***Mobile Computing, Fall Detection, Location Tracking, Communication Helpline Video.***

I. INTRODUCTION

Mobile Computing is a generic term used to refer to a variety of devices that allow people to access data and information from anywhere. In today's computing world,different technologies have come up.With mobile computing people can work efficiently in any location they wish and the security concerns are properly factored. Being an ever growing and emerging technology mobile computing will continue to be a core for future technologies

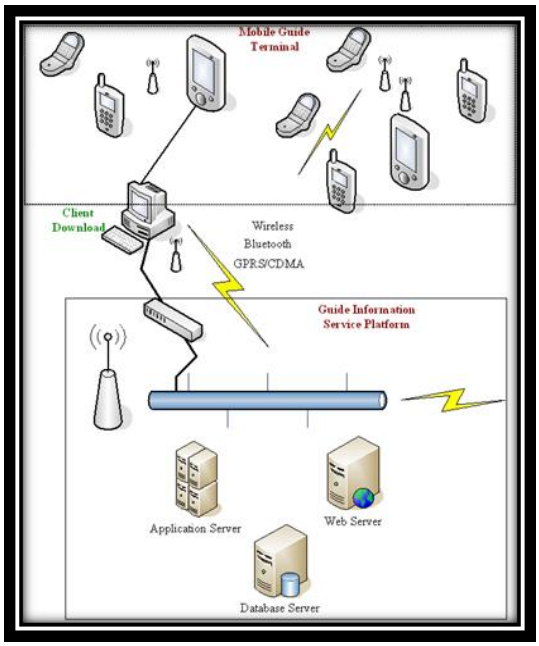

Fig1: System model of mobile computing

The main advantages of mobile computing are location flexibility, time saving, enhanced productivity, entertainment.

Android operating system is ruling the mobile market nowadays.The biggest advantage of android is that it is an open source,integrated software and it is cost effective.The android SDK allows us to create our own apps and has encouraged innovation.

II. EXISTING SYSTEM

Falls are the major problem for elderly people and an obstacle to their independent living[5].The estimated fall incidence was very high.several mechanisms for fall detection has been implemented[8].

A number of camera based fall detection systems are already implemented[2].Some systems uses single camera and some other systems uses multicameras.

An enhanced fall detection system also existed,for elderly person monitoring that is based on smart sensors worn on the body[1,9].It was operating through consumer networks.

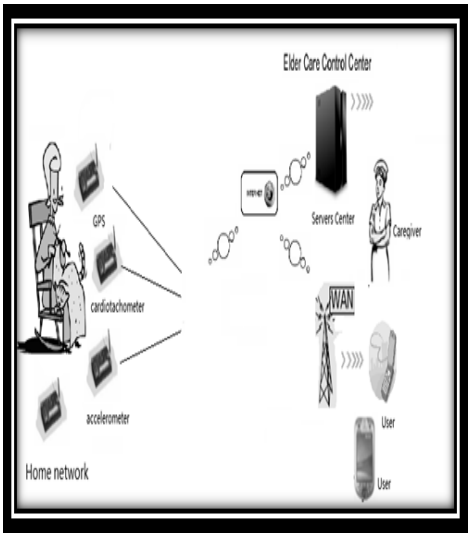

Fig2: System Architecture of fall detection using sensors

Another method for fall detection is dynamic evidential network[3].Among the multisensory fusion methods, Dempster Shafer Theory (DST) is used to process the imperfect information.Furthermore, data from multiple heterogeneous sensors present in the remote home healthcare monitoring systems have different degrees of imperfection and trust.

Several disadvantages of fall detection using mobile phones [4,10]:An application for Apple IOS by using an accelerometer to detect falls[6,7]. A possible drawback is that the development platform Apple IOS is not accessible to the average user. An application in Symbian S60 using machine learning algorithm takes 64 samples every two seconds from the accelerometer and decides whether there is a fall.

III .PROPOSED SYSTEM

We designed an application with the ability of automatic fall detection by using the mobile sensors.An automatic notification was send to supervisors as well as visual display to nearby people.Our application uses two incorporated mobile sensors namely gyroscope and accelerometer.

A counter starts counting loudly on the screen from 30 to 0. If te counter reaches 0, then an SMS message is sent to the caregiver or relative and an entry is made to the Database. The first service detects the patient's position and calculates whether the patient is further away than a set distance. When activated can give directions to the patient what route to follow to return back to home.

The elderly people tagged the android mobile as an ID.So that it can be more efficient.If they went out anywhere,When also the corresponding location was tracked by the help of google map.

We also proposed to maximize the performance of automatic fall detection and thus make the systemmore reliable. However, the presence of noise, the variability of recorded signals by the sensors, and the failing or unreliable sensors may thwart the evidential networks performance.

We also included a helpline video to the new automatic fall detection system.Thus it contains the health details about the elderly people who fell down.It helps the nearby people to give first aid to the elderly people.

The related systems we used in our system are Global System for Mobile communication(GSM) and Global Positioning System(GPS).The communication between the user and the care taker was done with the help of GSM.The location of the fell down area is tracked with the help of GPS.

The system we proposed was efficient than the existing system.The architecture diagram of our new automatic fall detection was as follows:

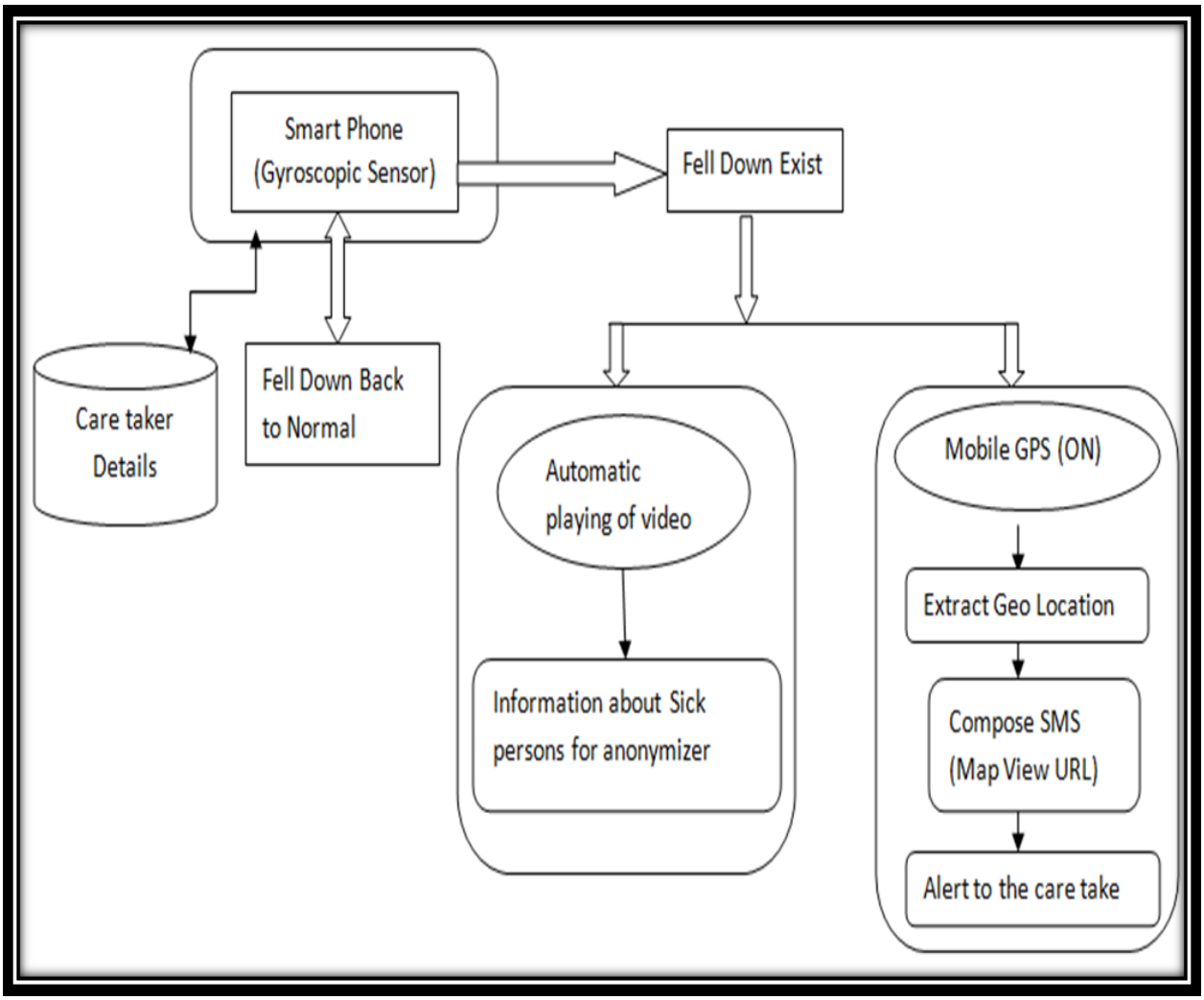

Fig3:System Model for New Automatic Fall Detection

IV. IMPLEMENTATION

The new automatic fall detection was implemented in 5 modules.The modules are fall detection,location tracking,communication,route map integration and helpline video

The fall is detected in the first module by using mobile sensors.The FALL DETECTION is something that we have developed to Alert someone so you can be safe at all times. Whether you are a senior citizen and want to maintain your independence, a concerned family member looking for peace of mind, or a caregiver with patients. Prevention is key. Use it to inspect and detect hazardous areas in our homes that could result in a fall. If our answer "no" to the questions, we have already taken action to reduce your risk of falling. If our answer "yes" to any of the questions, consider making the recommended change or adaptation to reduce your risk of falling.

The location of the user was tracked in the second module by using GPS technologies.Real-time locating systems are used to automatically identify and track the location of objects or people in real time, usually within a building or other areas.They are a form of local positioning system, and do not usually refer to GPS, mobile phone tracking, or systems that use only passive RFID tracking. Location information usually does not include other details such as speed, direction, or spatial orientation.

The communication between the user and the care taker was achieved in this module.The table that maintained the mapping between the agent's name and the landmark location is shared and updated by the agents who were on nodes within the landmark's coverage. When the node is not a landmark node, the table is used as a cache table. If communication with the other agent succeeds, thelocations and the name of the agents are registered in this cache table. It is possible for the agent to periodically get the location of the target agent and store the required information in the cache table. The use of a cache table enables agents to initiate direct communication with each other and reduce the communication overhead to landmarks. When the cache misses, the agent sends a

request to the landmark to get updated information. Agents can also delete the information from the cache table. The communication between landmarks is implemented; however we only use this communication to call the target agent when there is no target agent within the coverage area. This primitive is used when the programmer deploys agents and makes deployment of agents easy.

The integration of spatial maps in mobile was investigated using a spatial analog to sensory preconditioning. The GPS chip outputs the positioning information which is transferred over a GPRS link to the mobile operator's GGSN (Gateway GPRS Support Node) and then to a remote server over a TCP connection. The TCP server stores the incoming positional data in a SQL database. When a user clicks on the tracking page., soap, which is an open source web application server, serves up an HTML page with an embedded JavaScript code. The JavaScript would run in the user's browser and has instructions to retrieve the positional information from the MySQL database every second. It then integrates this information into Google Maps through Google Maps API which displays the position on a map. Since the positional information is retrieved every second and the maps updated at the same frequency, a real time GPS tracking effect is achieved.

In the final module a helpline video was played about the users health details that can be used for nearby peoples.If fell down confirms care taker can track elderly person location and will the location but it takes several time to reach the location. So helpline video was introduced in this implementation. It solves the instant recovery by auto playing the stored video about the elderly person health and first aid information. The Inbuilt video player was embedding with this application. For storage memory we use smart phone memory which may deals with MB's. This Helpline Video helps the nearby peoples to give first aid services to fell down elderly person.

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