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Audio Alert for Safe Driving by Smartphones

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ABSTRACT: As the world continues to enhance and strengthen its emergency services, mobile phones may be used to aid in safe driving practices and detection of emergencies. Drunk driving, without identification of danger zones, is a major cause of traffic accidents throughout the world. The entire solution requires only a mobile phone placed in vehicle along with accelerometer and GPS sensor. Once any evidence of drunk driving is present, the mobile phone will automatically alert the driver or call the police for help well before accident actually happens. The detection system on Android phone and have it tested with different kinds of driving behaviors. The results show that the system achieves high accuracy and energy efficiency. Safety systems for ground vehicles are deployed in different phases according to the timing of activation relative to the occurrence instant of an accident. Thus improved driver behaviour and accountability has resulted in the reduction of collisions. The purpose of this paper is to identify the danger zones and giving audio alert to driver (or) customer for reducing speed of vehicle. And also giving the directions from source to destination. This is very useful for driver and customer for identifying danger zones and direction, So it helps to prevent the accident and enhance the safety.

KEYWORDS: Mobilephone, Roadcondition, Sensor, Vehicle safety

KEYWORDS: Global Positioning System, Accelerometer.

I. INTRODUCTION

Mobile smart phones today are equipped with numerous sensors that can help to aid in safety enhancements for drivers on the road. Effective use of these data can educate a potentially dangerous driver on how to safely and efficiently operate a vehicle. With real-time analysis and auditory alerts of these factors, we can increase a driver's overall awareness to maximize safety.

A wireless network is a computer network that uses a wireless network connection such as a cell phone network, Wi-Fi local network or a terrestrial microwave network. Wireless networking is a method by which homes, telecommunications networks and enterprise (business) installations avoid the costly process of introducing cables into a building, or as a connection between various equipment locations. Wireless telecommunications networks are generally implemented and administered using radio communication. This implementation takes place at the physical level (layer) of the OSI model network structure. A cellular network or mobile network is a radio network distributed over land areas called cells, each served by at least one fixed-location transceiver, known as a cell site or base station. In a cellular network, each cell characteristically uses a different set of radio frequencies from all their immediate neighbouring[2]. cells to avoid any interference. The GSM network is divided into three major systems: the switching system, the base station system, and the operation and support system. The cell phone connects to the base system station which then connects to the operation and support station; it then connects to the switching station where the call is transferred to where it needs to go. GSM is the most common standard and is used for a majority of cell phones.

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Android is an operating system based on the Linux kernel, and designed primarily for touchscreen mobile devices such as smartphones and tablet computers. Initially developed by Android, Inc., which Google backed financially and later bought in 2005, Android was unveiled in 2007 along with the founding of the Open Handset Alliance: a consortium of hardware, software, and telecommunication companies devoted to advancing open standards for mobile devices. The first Android-powered phone was sold in October 2008.

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- Connectivity-Android supports connectivity technologies including GSM/EDGE, Wi-Fi, Bluetooth, LTE, CDMA, EV-DO, UMTS, NFC, IDEN and WiMAX.
- Bluetooth-Supports voice dialing and sending contacts between phones, sending files (OPP), accessing the phone book (PBAP), A2DP and AVRCP. Keyboard, mouse and joystick (HID) support is available in Android 3.1+, and in earlier versions through manufacturer customizations and third-party applications.[10]
- Tethering-Android supports tethering, which allows a phone to be used as a wireless/wired Wi-Fi hotspot. Before Android 2.2 this was supported by third-party applications or manufacturer customizations.[13]
- Media- Streaming media support RTP/RTSP streaming (3GPP PSS, ISMA), HTML progressive download (HTML5 <video> tag). Adobe Flash Streaming (RTMP) and HTTP Dynamic Streaming are supported by the Flash plugin.[4] Apple HTTP Live Streaming is supported by RealPlayer for Android,[5] and by the operating system in Android 3.0 (Honeycomb).[6]
- Media support-Android supports the following audio/video/still media formats: WebM, H.263, H.264, AAC, HE-AAC (in 3GP or MP4 container), MPEG-4 SP, AMR, AMR-WB (in 3GP container), MP3, MIDI, Ogg Vorbis, FLAC, WAV, JPEG, PNG, GIF, BMP, WebP.[3]
- External storage-Most Android devices include microSD slot and can read microSD cards formatted with FAT32, Ext3 or Ext4 file system. To allow use of high-capacity storage media such as USB flash drives and USB HDDs, many Android tablets also include USB 'A' receptacle. Storage formatted with FAT32 is handled by Linux Kernel VFAT driver, while 3rd party solutions are required to handle other popular file systems such as NTFS, HFS Plus and exFAT.
- Hardware support-Android devices can include still/video cameras, touchscreens, GPS, accelerometers, gyroscopes, barometers, magnetometers,[7]dedicated gaming controls, proximity and pressure sensors, thermometers, accelerated 2D bit blits (with hardware orientation, scaling, pixel format conversion) and accelerated 3D graphics.
- Java support-While most Android applications are written in Java, there is no Java Virtual Machine in the platform and Java byte code is not executed. Java classes are compiled into Dalvik executables and run on Dalvik, a specialized virtual machine designed specifically for Android and optimized for battery-powered mobile devices with limited memory and CPU. J2ME support can be provided via third-party applications.

The above mention terms are some of the features of Android application

II. SYSTEM ANALYSIS

2.1 Exiting System

A vehicle tracker system combines the installation of an electronic device in a vehicle, or fleet of vehicles, with purpose-designed computer software at least at one operational base to enable the owner or a third party to track the vehicle's location, collecting data in the process from the field and deliver it to the base of operation. There are many Vehicle tracker system devices available in market. Here Accelerometer Sensor (Predicts X, Y, Z movement) is used to detect the driving moment like whether the driver going faster or slower based that information it will draw a graph. Using this graph we can find the[2][5] traffic level on that place and the graph can be used again to guide the driver about the traffic level on that way Main Disadvantages of this is Accelerometer is inaccurate while moving even the little shake while driving, It will read as movement so the traffic reading may vary and , This will not give real time traffic details , this will only give the already saved traffic details only.Main Disadvantages of this is Accelerometer is inaccurate while moving even the little shake while driving, It will read as movement so the traffic reading may vary and , This will not give real time traffic details , this will only give the already saved traffic details only.

2.2 Proposed Sysytem

Android devices use the same global positioning technology as Google Maps and most third-party GPS tools do. This allows users to locate themselves on a map,[7][4] find and navigate to destinations via detailed directions, and search maps using a number of different methods. Mobile phones are available 24X7 now-a-days. So at emergency time contacting parents and locating present address is easy. Android enabled smart phones available at low cost also.

Here we are using GPS Sensor which helps us to get the latitute and langtitute of the current location directly from Satellite so that we assure at most accurate positioning of the car.and , We are using Google Maps Server Database which is open source to get the real time navigation details and continous updation on present traffic scenario.

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2.2.1 Douglas-Peucker algorithm

This algorithm for polyline simplification. The algorithm recursively divides the line. Initially it is given all the points between the first and last point. It automatically marks the first and last point to be kept. It then finds the point that is furthest from the line segment with the first and last points as end points (this point is obviously furthest on the curve from the approximating line segment between the end points). If the point is closer than ε to the line segment then any points not currently marked to keep can be discarded without the simplified curve being worse than ε. If the point furthest from the line segment is greater than ε from the approximation then that point must be kept.[8][9] The algorithm recursively calls itself with the first point and the worst point and then with the worst point and the last point (which includes marking the worst point being marked as kept).

When the recursion is completed a new output curve can be generated consisting of all (and only) those points that have been marked as kept. function

```
function DouglasPeucker(PointList[], epsilon)
   // Find the point with the maximum distance
   dmax = 0
   index = 0
   end = length(PointList)
   for i = 2 to ( end - 1) {
      d = shortestDistanceToSegment(PointList[i], Line(PointList[1], PointList[end]))
      if ( d > dmax ) {
         index = i
         dmax = d
      }
   }
   // If max distance is greater than epsilon, recursively simplify
   if ( dmax > epsilon ) {
      // Recursive call
      recResults1[] = DouglasPeucker(PointList[1...index], epsilon)
      recResults2[] = DouglasPeucker(PointList[index...end], epsilon)

      // Build the result list
      ResultList[] = {recResults1[1...end-1] recResults2[1...end]}
   } else {
      ResultList[] = {PointList[1], PointList[end]}
   }
   // Return the result
   return ResultList[]
end
```

III. DESCRIPTION OF PAPER

a. Overview of the Paper

The main purpose of location-based services is to provide services to customers based on the knowledge of their locations. Examples of these services include real-time traffic information, digital map services[6] which are delivered to mobile terminals according to user's location to minimize data transmission, providing dynamic guidance services according to the users' location and current traffic condition; requesting the nearest business or service(e.g., the nearest restaurant or cinema) and location based advertising (like "Send e-coupons to all cars that are within[5]two miles of my gas station"). Unfortunately the current state-of-the-art location based services are rigid as they cannot make good use of information.

b. Services/Features

Services are provided at inappropriate time without considering user's intention and changing environment. Also services are rigid as processing completely isolates various forms of user "preferences" For example, cellular phones

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can now be used to carry not only voice but also data traffic, such as text messages, pictures, and video clips from anywhere at any time. Cell phones now emulate computers, with enhanced graphical user interfaces, integrated Global Positioning Systems, wireless data connectivity, efficient batteries, powerful central processing units (CPU),[10] and expanded storage capabilities. Advanced communication protocols, databases, and software development environments ensures these end-system devices are connected to wireless cellular networks and can interact with many hosts and servers via the Internet. Similarly, hardware independent programming languages allow the development of applications that can run on any of these devices and exchange information to and from other clients, servers, and specialized databases. This generalized concept facilitates transportability of developed software across different devices and networks, which is a necessity for the rapidly advancing market of wireless communications. As vehicle manufacturers continue to increase their emphasis on safety[10] with advanced driver-assistance systems (ADASs), we propose a device that is not only already in abundance but portable enough as well to be one of the most effective multipurpose devices that are able to analyze and advise on safety conditions. Mobile smart phones today are equipped with numerous sensors that can help to aid in safety enhancements for drivers on the road. Effective use of these data can educate a potentially dangerous driver on how to safely and efficiently operate a vehicle. With real-time analysis and auditory alerts of these factors, we can increase a driver's overall awareness to maximize safety. Here we are using GPS Sensor which helps us to get the latitude and longitude of the current location directly from Satellite so that we assure at most accurate positioning of the car. and , We are using Google Maps Server Database which is open source to get the real time navigation details and continuous updation on present traffic scenario.

IV. MODULE DESCRIPTION

4.1 GPS and Google Maps

With location positioning system such as GPS becoming popular, there is a growing demand for location-based applications. It is easier, these days to utilize map information by connecting GPS receiver to PC and PDA. Corresponding to this momentum, GPS receivers are now embedded into mobile phones and applications using the location of the user in real-time are widely available. GPS[4][8] chips are now included in many devices to analyse satellite signals and determine the user's location with high accuracy. In a large social event, such as a big conference, since people come to communicate with each other,[10][3] they are more likely to release their location information and the location privacy is not an essential concern. In addition, people usually need to register to join a conference so a location server can easily get the participants' profiles. Hence, the server-centric mode is an economic way to handle location detection for big conferences. One of the key technological advances for the development of location-based applications is the use and availability of positioning systems.

1.2 Location Based Services

Location Based Service (LBS) LBS is mobile service that has the capability to provide real time information based on the user's location. Geographical Information System (GIS) has been the heart of LBS[8] in order to provide all the functionalities in LBS. First, we may send location information to remote parties. This set of services are commonly used today, e.g., in location tracking applications. Second, use location information to make communication decisions, e.g., a user agent may automatically disable instant messaging when driving. Third, location changes can trigger communication actions, e.g., when a person's user agent gets a location notification indicating the person enters a room, the user agent may automatically[4][5] turn on the light of the room. Sending location information to remote parties for location tracking Locations are usually represented in geospatial coordinates or civil addresses for tracking. By enabling to upload real time location and to create the content "on the spot", we can expect more variety of location-based services

4.3 Reminders as Per Situation

Different locations may require different communication behaviors. For example, video[2][6] or text conversation is not good when driving. User agents usually based on location attributes, instead of geospatial coordinates or civil addresses, can choose appropriate communication behaviors..

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1.4 Triggering Actions

User agents may invoke actions when detecting location changes. Location changes can be in an incoming location notification from a location server or retrieved through locally connected location[3][5] sensors. Actions: triggered by user's own location changes: For example, when a user drives on the way to his office, his user agent may get a location notification and automatically turn on the air-conditioner in his office. Another example, when a user moves from one location to another, his user agent may transfer the on-going media session to the user's new location. For this set of services, users subscribe to their own location information. There is no authorization needed. Actions triggered by remote parties' location changes: For example, in a day care centre, when a child leaves the playground, the teacher may get called. For this set of services, users subscribe to others' location information and need to get authorization for acquiring the location information.

1.5 Structure of the client side

The main module handles the registration procedure for opening a user account. The builder module accesses the user module on the server side and also sets up the location information. The drawer module provides a web editor function, which is the interface for making content using the mobile phone operating buttons. Created web content[2] is stored in the XML format. The query module provides form for content search. The data module controls data access inside the mobile phone. This makes it possible to access data and also to capture location information using GPS. To avoid accessing the server every time the user makes and renews content, new content is kept in the cache inside the mobile phone.

When making content, the information in this cache is first surveyed, and if the data is not stored there, the server[6] is then accessed. Accessing the data folder inside the mobile phone, obtaining location information or cache information and the HTTP transfer function are performed by the Java client program via the APIs provided by J2ME.

These types of information are solely managed by the data module, which bridges them to the main module, builder module, drawer module and query module. When the user requests date to create content, the request is received by the builder module, and handed to the data module. The data module first searches the RMS (Record Management System) provided by J2ME[4][6] to see if stored in the cache. When no corresponding information is found, the data module obtains the necessary information from the web server by using HTTP transfer.

4.6 Structure of the server side

The proposed system consists of a series of procedures for translating and storing content on the server side. XML content sent from the client is distinguished by the subscriber ID, which is attached to the HTTP request header. It is then translated into WML[1] and stored in the database to support WAP browsers. Content information from the user is also stored in the search database. For the search method, we use two functions, keyword and search range measuring from the user location. By showing the [4]result that meets these two functions, the web content can be selected. The Fig (1) deals with the modules of the Client and Server System.

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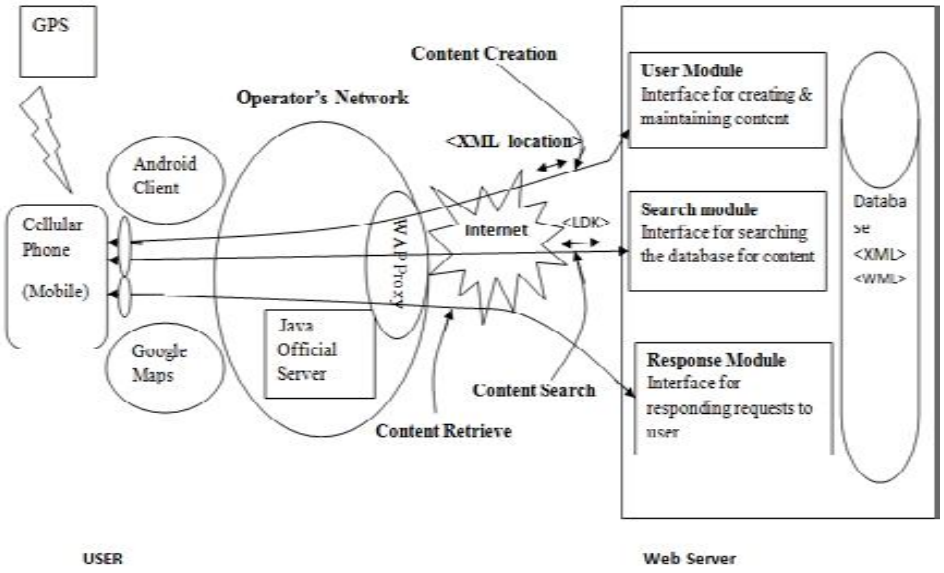

Fig 1: Overview and structure of the proposed system

V. CONCULTION AND FUTURE WORK

The main purpose of location-based services is to provide services to customers based on the knowledge of their locations. Examples of these services include real-time traffic information, digital map services which are delivered to mobile terminals according to user's location to minimize data transmission, providing dynamic guidance services according to the users' location and current traffic condition; requesting the nearest business or service(e.g., the nearest restaurant or cinema) and location based advertising (like "Send e-coupons to all cars that are within two miles of my gas station").

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