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Rapid Disclosure of Client's Spot With the help of Location Based Services

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Abstract— When people are in emergency, generally they may be confused in what to do how to do in getting out of that emergency. Such times people need to inform their condition to whoever is right. For that, location based service is required. This particular paper especially meets the needs of such people, who met with an accident or in some other emergency by sending their location in simply by pressing one or two buttons from their mobile. One advantage of the proposed system is that it can be used to report and locate the accident ***automatically*** by the person involved in the accident even if he cannot speak. A **Location Based Service** is an information service that can be accessed using the mobile device through the mobile network and utilizes the ability to make use of geographical positions of the mobile devices. The main objective of this work is to design and implement a ***Client-Server*** System that helps users to locate their addresses.

Key Words: Location Based Services, Accident Location

I. I NTRODUCTION AND MOTIVATION

Recently, the number of accidents of different types (Vehicle accidents, fires, etc.) has been increased. Table I Shows the number of deaths and injuries resulting from Accidents of different types in India during the period of 2004-2007 [1]. Table I shows that the number of deaths and injuries are increasing yearly. In 2007, for example, more than 750 accident victims died in India. Some of these deaths can be attributed to the long response time required to reach an accident.

This is due to the fact that the process of determining the location of an accident made by a communication between a person in the accident or a person near the accident and an emergency personnel as well as sending the nearest emergency service and/or police officers needed for reporting the accident can be quite lengthy. Moreover, the persons in a given accident may need an urgent treatment and the delay in response time can increase the severity of the accident.

The main objective of this paper is to reduce the time required to report an accident and to determine its location more precisely. This will reduce the time required for the police and the emergency personnel to reach the accident location. The proposed idea will make the location identification automatic and hence will be more precise and take less time.

The remainder of the paper is organized as follows. Section II provides an overview of related systems and discusses the difficulties in applying such systems specifically in India. We introduce in Section III location based services and their applications. After we introduce our approach in Section IV, we conclude in Section V.

II. R ELATED WORKS

Advanced Automatic Crash Detection Systems are those systems that automatically notify emergency centers of vehicle crashes. These systems are commonly equipped with sensors distributed in all directions of the vehicle and used to collect crash severity information. The system then communicate with an emergency dispatcher to assist in determining the appropriate emergency personnel and Equipment.

OnStar [2], which is one of such systems, has been Designed in 1996 to deliver safety, security and information Services using wireless technology and the Global Positioning System (GPS) satellite network.

OnStar services include but are not limited to automatic notification of air bag deployment, stolen vehicle location assistance, emergency services, roadside assistance with location, and remote door unlock. It also allows drivers to make and receive voice-activated wireless calls and access a wide range of other information services through a nationwide cellular network.

However, such systems are installed in specific vehicles. For example, OnStar is a wholly-owned subsidiary of General Motors. Therefore, they cannot be directly applied in countries like India because everyone should replace his vehicle by a new vehicle equipped with such a system or install the system in his vehicle, which could be too expensive.

Moreover, it is required to identify each country' section in order to use the Global Positioning System (GPS) satellite network. Where a section can be a street, subway, university campus, etc. For this reason, it is not easy to use the GPS in India.

Other systems, usually called traffic Accident Recording and Reporting Systems (ARRS) [3], [4], [5], [6] are vision-based traffic accident detection systems. Such systems are either image-based or video-based and used for automatically detecting, recording, and reporting traffic crashes. They consist mainly of a charge coupled device (CCD) camera

Accident / Year	Rescue		Emergency		Firefighting		Total	
	Death	Injuries	Death	Injuries	Death	Injuries	Death	Injuries
2004	374	9201	278	20590	38	683	680	30474
2005	466	12028	188	21057	45	629	699	33714
2006	488	13723	254	23737	34	642	776	38102
2007	473	15432	255	26152	24	720	752	42304

Figure 1. Snapshot of Accident Recording and Reporting Systems (ARRS).

(located at intersections, traffic lights, or bridges) to obtain a view of accidents and/or a digital video recorder (DVR) that can be used for recording all the situations at a given place, and finally an image processing unit that detects images which could be related to a traffic crash.

Such systems analyze traffic images & report accidents to Traffic Monitoring Center (TMC) as illustrated in Figure 1.

Nonetheless, the usages of such systems are limited since cameras (CCD) and digital video recorders (DVD) can not be distributed everywhere (for example, along roads, highways, subways, etc.). Consequently, it will be useful for the detection and reporting of accidents in some hot spots like intersections.

III. INTRODUCTION TO LOCATION BASED SERVICES AND THEIR APPLICATIONS

As a result of the huge numbers of mobile phone users, it becomes possible to use the mobile in specifying the location of the mobile users. One method that can be used to accomplish this task is the use of location based services (LBSs). A location-based service (LBS) is an information service that can be accessed using mobile devices through the mobile network and utilizes the ability to make use of the geographical position of the mobile device [7], [8], [9].

There are a number of services included in LBS such as specifing other people positions, other resources, and the position of the user itself, etc. The primary service is obtaining the position of the user itself in order to use a given service such as finding the nearest restaurant..A client number and send an SMS message to specify a given

Pull services: this type of service is initiated by the client himself by requesting the service from LBS and giving the permission to the LBS to know his/her location. One example of a Pull service is traffic information requested by sending an SMS to a given number such as 1000 that is specialized in this service. The service provider need to know the location of the client to provide him with information that fulfil the request of the client.

Push services: this type of service is initiated by the service provider as a result of previously getting the authority from the client to receive the requested information from the service provider, that is a client must be registered to receive this service. For example, a client can register in a traffic service. Every morning when she/he is going to work at 7:30AM, the service provider supplies her/him with information regarding traffic movement at that time depending at her/his current location. Consequently, if there is a huge number of vehicles at a given street it will provide her/him with possible alternatives that she/he can go on so that she/he can arrive at her/his work on time.

Tracking services: this type of services allow someone to request the location of another one. In such type of services, the person whose location is required has to permit the first one to follow him. Such a service is provided by UMNIAH (a mobile phone company in Jordan). A client can press person location, if the person replay, the client will receive his location via SMS.

Emergency Services: such kind of services provide an automatic or manual call to civil defense in case of an accident or risk. This service should be provided to all mobile clients registered in this mobile company. In USA when you dial 911 from your mobile this service will allow the emergency personnel to specify the location of the caller directly.

AUTOMATIC ACCIDENT REPORTING AND LOCATING

In this section, we present a novel approach for fast and precise accidents reporting and locating. The approach is

based on designing and implementing a new service that can by sponsored by mobile phone companies to notify police center (or other emergency personnel such as fire emergency) of an occurred accident and its location.

A. The Design and the Implementation of the System

The proposed system uses location based services, which are already supported by mobile phone companies, in order to specify the location of an accident.

Basically, the service provided by the system will require from the user to open an application on his mobile or to select an option for such purpose, he do not have to do any thing more. In more details, as shown in Figure 2, one person in the accident or anyone near the accident will call a specific number, which is a number for opening services of a given mobile phone company, then she/he will select among services' options, the option specified for the new service.

The option may contains the following sub-options:

1) police only;
2) police and ambulance;
3) police and fire emergency;
4) police, ambulance, end fire emergency.

Note that police is required in all options to report an accident. Once the user selects one of the above options, a message will be sent to the mobile phone company containing a request to use one of the emergency services mentioned in the above options. The mobile phone company processed the request as follows:

1) first, it will identify the location of the mobile phone who has sent the request message.
2) second, it will send a message to the police and emergency personnel in the following format {<Location>, <Emergency Type>, <Client identity>}

Besides the location and the type of emergency, the detailed message includes the identity of the person who has requested the service. One advantage of the proposed system is that it can be used to report and locate the accident automatically by the person involved in the accident even if he can not speak.

B. Additional Improvements

Every one who wants to obtain a phone number should provide the phone company with a form containing identity information as well as a photo copy of his identity card to be used later by the company to validate the information.

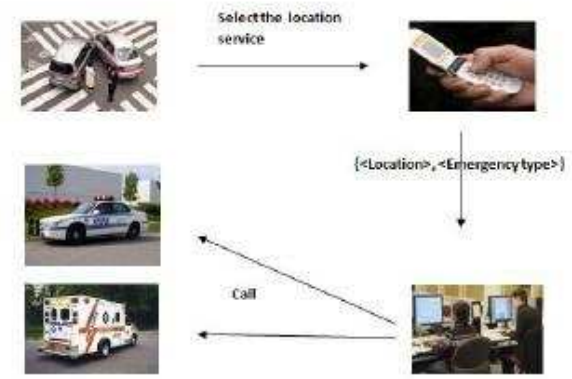

Figure 2.The service architecture

1) The service of the system can be modified to provide additional information that help the emergency personnel to assess the severity of the accident in order to assist them in taking the appropriate actions. If the accident is very sever, the user select an option to directly send a message to the police.

Otherwise the user will have more choices to specify the type of the accident (for example, fire, vehicle crash, and personnel accident), the degree of its seriousness and if possible more details about the location.

2) Since most mobile phones are provided with a camera, we can exploit it to improve the service of the system by allowing the user to take a photo of the accident. The photo will be sent with the request to the emergency personnel.
3) The interface of this service should be designed carefully to make its use fast, simple and useful.

C. Limitations and Potential Solutions

One of the limitations of the proposed system is that the person using the service of the system must be very close to the accident place. This is due to the fact that the user's mobile phone place will be used by the mobile phone company as a reference to the location of the accident.

This is not a big issue due to the following facts:

- Mobile phones are very popular now and most probably someone close to the accident will posses a mobile phone.
- The service itself can be modified so that the user can give an estimate of the distance between him and the accident along with a direction towards the accident. This will help the emergency personnel to approximately locate the accident.

V. CONCLUSION AND FUTURE WORK

We have proposed in this paper a novel system that can be employed to significantly reduce the time required to report and locate accidents. The new system exploits location based services to specify the location of an accident. The proposed system can be adopted with the help of mobile phone companies and its services will be accessible for the users through the use of mobile phones.

As a future work, we are implementing the same technology to the mobiles, here we are using for identifying the location of a mobile using the GPS application that enabled in the mobile.

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