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Implementation of Android Client for Vehicular Accident Detection and Reporting System

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Abstract: ***Transportation technology has improved rapidly, offering very robust functionality and performance of vehicles, though attempts have been done to improve engine performance and fuel efficiency, safety of passengers are still not matured. Safety of the passengers in vehicles can be ensured by avoiding accidents that is proactive approach to do that, even after utmost care is taken to avoid injuries during accidents injuries do happen and accidents are also leading causes of death. To avoid deaths causing due to accidents a reactive approach is necessary to communicate an accident occurred to rescue passenger who are injured in accident. Ample of approaches have been suggested by different authors to overcome this demerits of poor emergency services. This paper provides a possible implementation to provide acceptable service as a solution with no extra cost for any dedicated hardware, and wire free environment. Nowadays android powered vehicles are common in the market where, these devices act as in home PDA, implementing an client application to communicate with an dedicated server minimizes deployment cost also vehicles hardware need not be modified. Android powered vehicles have all the sensors along with GSM and GPS services using this client can be implemented.***

Keywords: Implementation, Accident, Detection , Android, Client

1. Introduction

Automobile industries have advanced in the technology in performance and speed perspective in this competitive world; everything is measured in common unit that is time. To cope with this competitive scenario and to save time, automobile industries have designed and developed more advanced transportation systems. Even though vehicles have advanced to offer services which once thought impossible, safety measures taken when accidents occur are not so advanced, here too time plays a very important role i.e. time to provide assistance for one who has met with accident, but who is responsible to intimate regarding accidents and who really knows when will accidents happen, if we say an personal assistance does so, even they must be a passenger of your vehicle, thus an android client is implemented which automatically senses the accident and reports the same to dedicated server and prerecorded contact number. To sense accident client uses in home sensor called accelerometer which senses vibration in all the three dimensions. After sensing the accident application communicates with dedicated server which in turn can be made to communicate with ambulances. If notification message is sent to family members or friends it be more beneficial to do this client sends an text message appending location details to message obtained by GPS module. Client can make use of GSM module to send message. For communication between server client is made to use http. Since server considered in this paper is a web server

2. Literature Survey

Fall detection of elderly patients is detected using uCare application where, application uses android platform to implement. iFall is another application to detect the fall, in these applications accelerometer present in the android smart phone is used detect the Fall. Five phase model is used in this fall detection [1]. Vehicular accident detection using dedicated hardware like GPS Module, GSM Module, LCD Screen, LPC2148 microcontroller gives steps to carry out when accident occur [2].

3. Problem Definition

In Fig 3.1 a block diagram shows an abstract view of modules communicating between them, in this paper modules are divided into dedicated server, Vehicle client, Ambulance client and family or friends mobile. To establish a connection between clients and the server a web based http protocol function is used, for communication between client and family or friend's mobile GSM module is used to send the SMS.

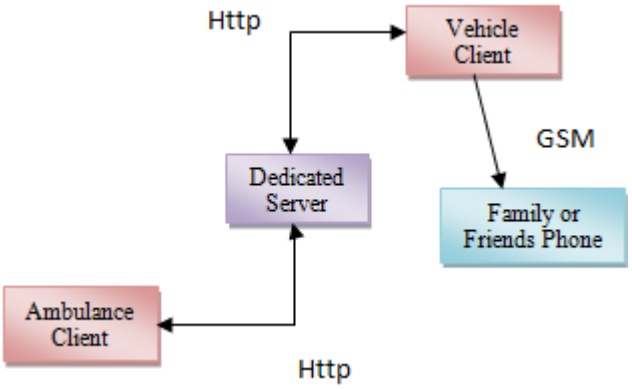
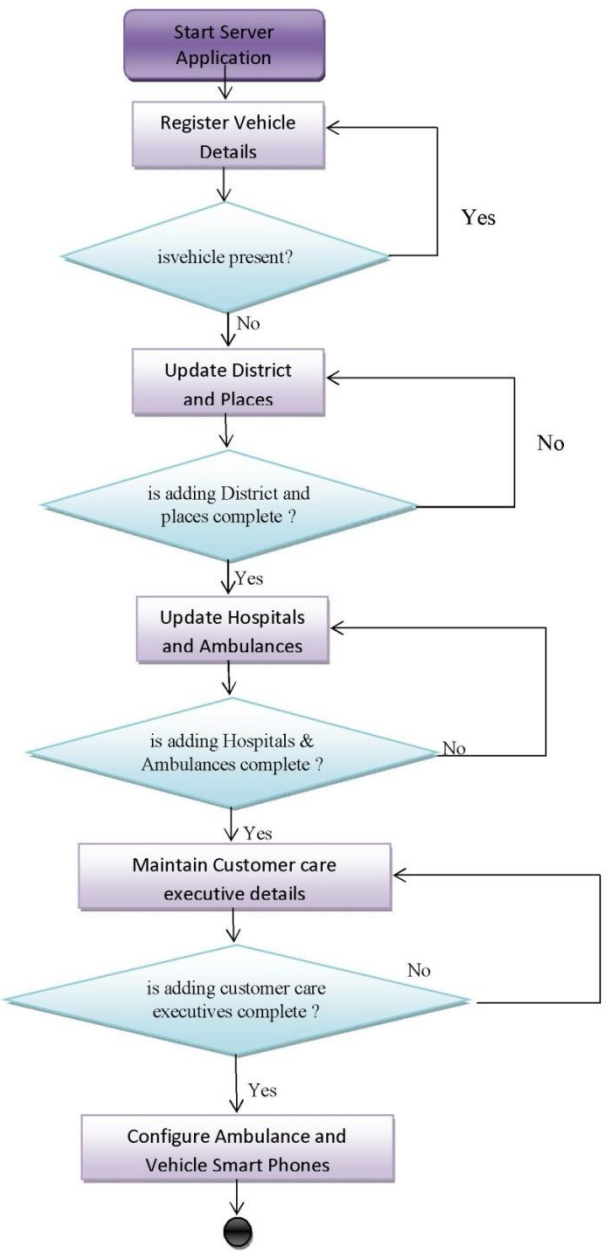


Figure 3.1: Block diagram of module communication

4. Flow Chart



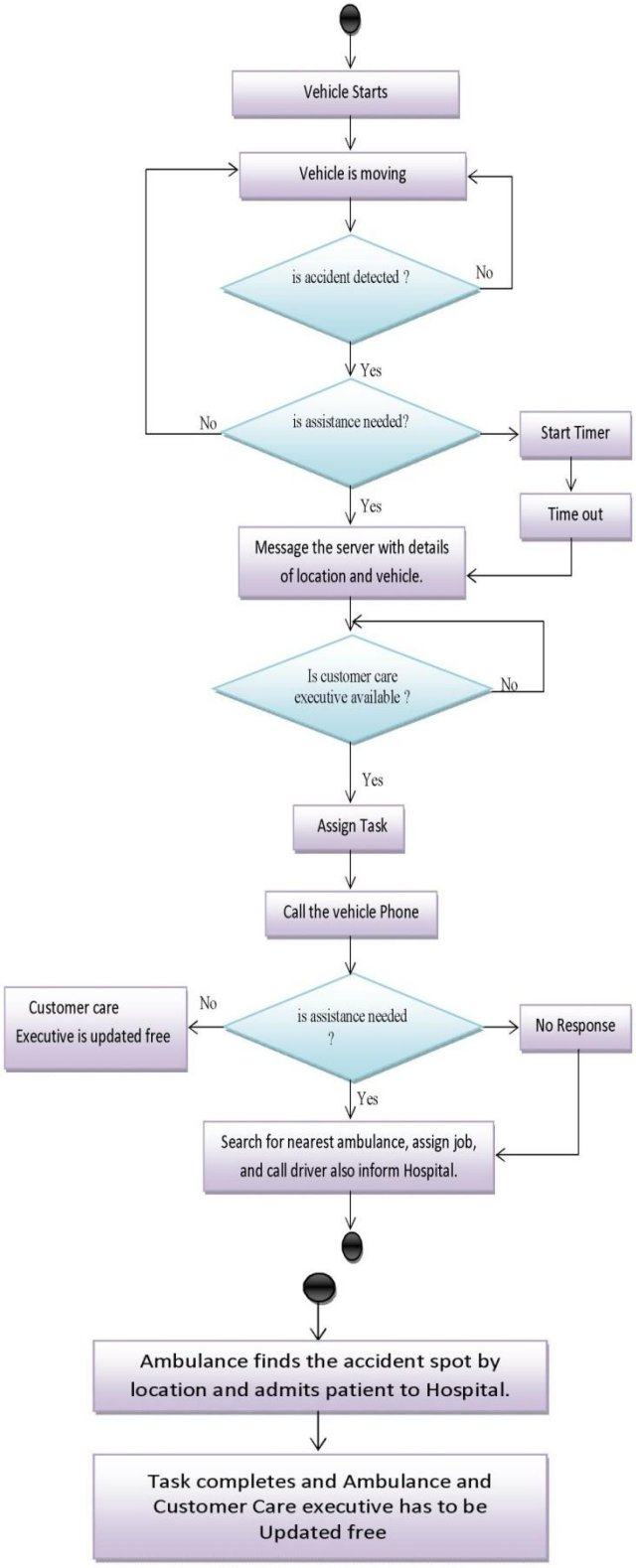


Figure 4: Overall procedure of accident detection

In Fig 4 an overall procedure to detect an accident is given, but in this paper we concentrate only on the vehicle client, we can notice from the above flow diagram, client residing in the vehicles android device need to carry out the following tasks. Firstly client must know to which server it as to report if accident occur, then client has to initialize device by checking whether location service is switched on or not.

Client also needs to ensure whether the data connection is switched on or not, because we have seen that in the block diagram communication is done using http i.e. data connection. Client sends location information to server and through text message for family or friends mobile phone thus, client needs to check location service is working fine or not.

Client needs to detect accident occurred and it has to conform whether passenger need assistance, this is really needed to take care of false positive results. If this cross check is not done precious time and resource of rescue crew may go waste. For this client uses tts to make alert more interactive.

5. Methodology

5.1 Main Activity Implementation

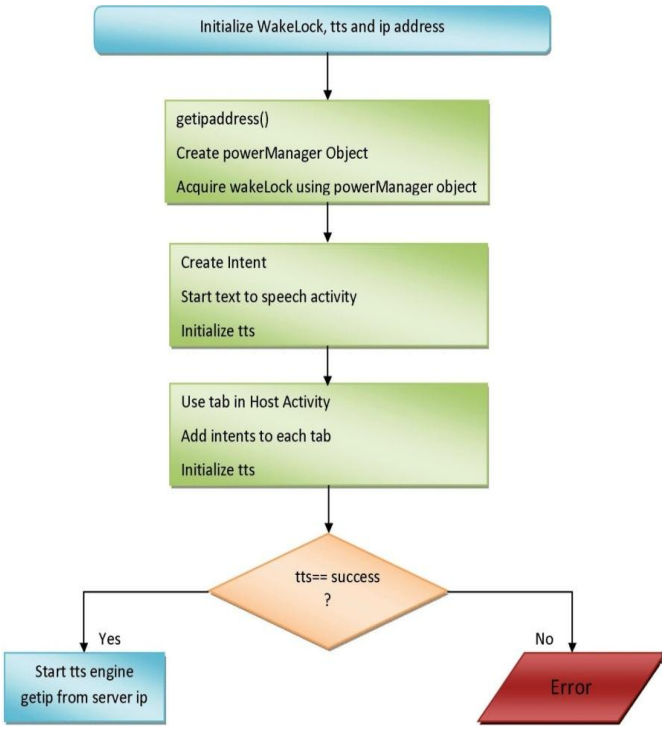


Figure 5.1: Implementation steps of Main Activity

Implementation of Main Activity is shown in Fig 5.1, in this chart it highlights functions which need to be used while creating accident vehicle client's Main Activity, application must be in running state all the time so, wakeLock function is used to achieve this, to get server ip address for http communication an user defined intent has to be called to get the ip address. To store result of getipaddress function an variable has to be initialized, then an object to use text to speech has to be created, if initialization of tts is success work of Main activity is done. Implemented Main Activity is shown in Fig 5.2.2.

5.2 Accident detector Implementation

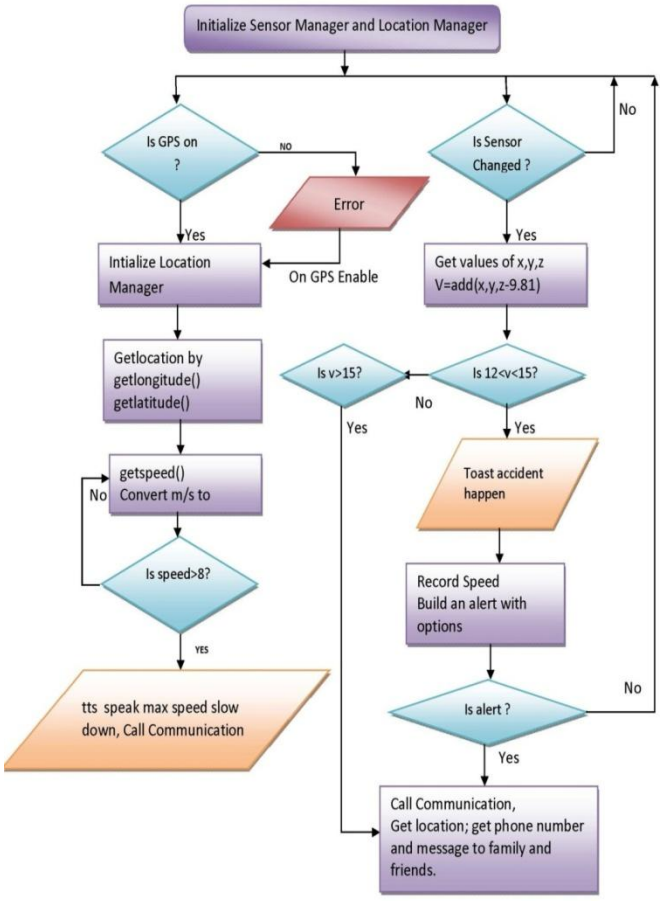


Figure 5.2.1: Accident detector Implementation

Client is designed and implemented to detect accident and report to server and family members, in the Fig 5.2.1 and implementation detail is shown in stepwise what this accident detector function has to do, accident is said to be detected when there is change in accelerometer readings. If no change is observed then no accident as occurred, is change has occurred change m/s unit to km/hr to compare with threshold set, display a popup using toast as shown in Fig 5.2.1 that accident as happened also client is made to record the speed of the vehicle.

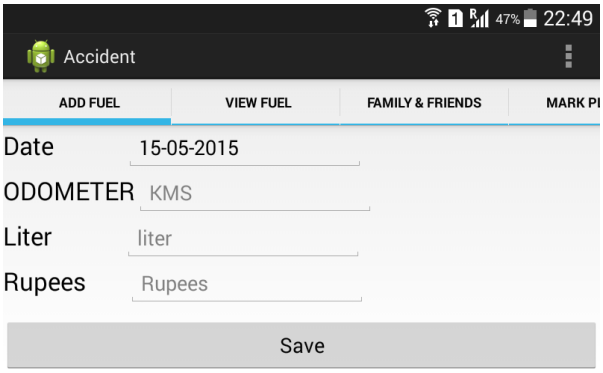


Figure 5.2.2: Main Activity

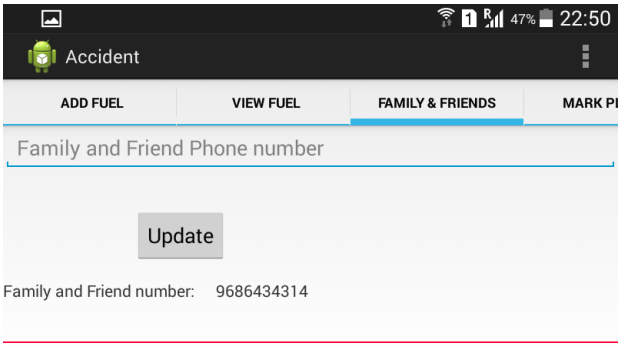


Figure 5.2.3: Family and Friends Intent

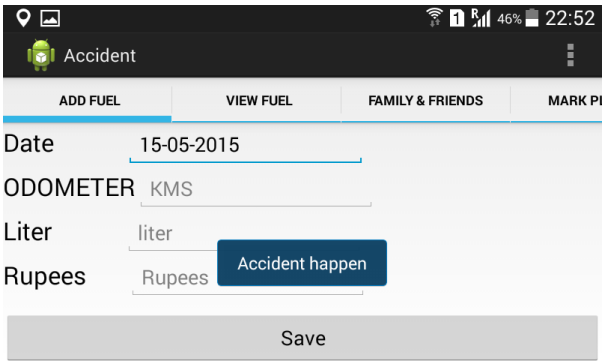


Figure 5.2.4: Detection of Accident

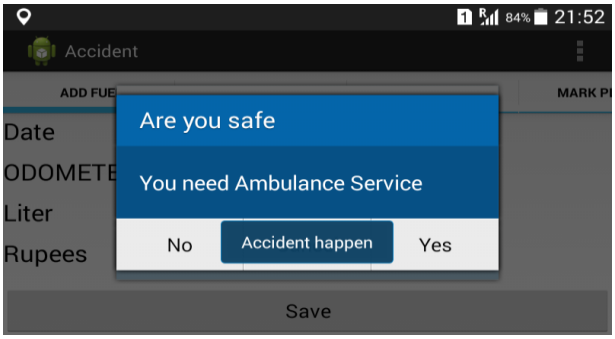


Figure 5.2.5: Accident Conformation

Client needs to conform that accident as occurred so an alert message is built and tts is initialized is client conforms that accident has occurred as shown in Fig 5.2.5. Then location is queried and communication function is called, phone number of family or friend is queried from database which was prerecorded as shown in Fig 5.2.3 and message is sent to that number by building a message as shown in Fig 5.2.6.

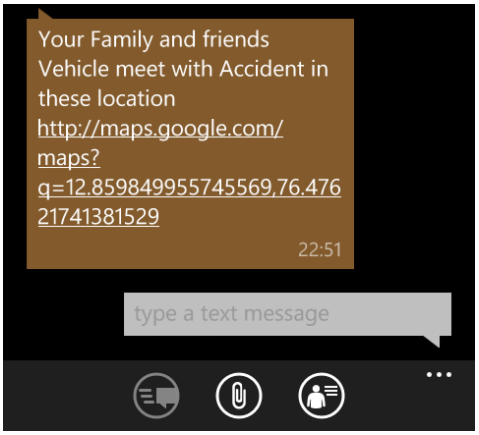


Figure 5.2.6: Accident message to Family or Friend

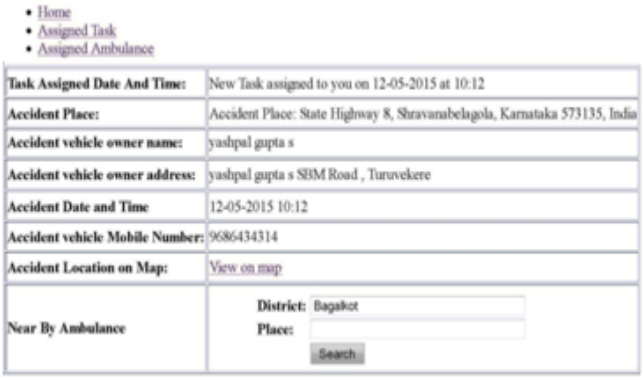


Figure 5.2.7: Accident message sent to Server

Vehicle android client sending information to Family or friend number which was prerecorded is shown in the Fig 5.2.6 and message sent using http communication to server is shown in Fig 5.2.7, using this information server can pass on information to ambulance and rescue team.

6. Results

In the previous section we have shown the results of implementation of android client to detect and report regarding accident. It is observed that there is no chance of false positive drawback since, alert is provided for the user to choose, whether he needs assistance or not.

7. Conclusion

With this approach we have used to assist passengers who have met with accidents rescue teams can be intimated in real time and false positives can be avoided, more importantly vehicle safety has been improved to make passengers more comfortable and feel more secure. This paper shows an approach to detect accident using minimum cost by using already deployed hardware, client is more reliable and available than any other system, client provides more functionalities like messaging the Family or Friend number thus notifying not only server but also to related once.

Accurate decisions can be taken when conformation of accident is done by using alert and text to speech. Even family member can rescue if they can reach accident spot much quicker than ambulance since, location information is also been appended to text message which is sent to family or friend number. Using alert false positive can be avoided which prevents wastage of resources and time of rescue crew.

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