

Smart Vehicle Tracking System Haversine Algorithm

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Abstract— Smart vehicle tracking system is an application for providing a platform to Bikers, Travelers and people who want to track their fellow mates and family members while travelling. It is a used for determining the location of a vehicle. The location is determined using GPS and while traveling with friends and family in separate vehicle could be problematic. Accelerometer sensor is used to detect accident and GPS give location of vehicle.

1. INTRODUCTION

Smart vehicle tracking system uses GPS(Global Positioning System) to track the exact location of the individual user. It will help use inbuilt accelerometer and GPS module which is present in mobile devices. This android application will help group of riders or traveler while going on trip. It is a used for determining the location of a vehicle. The location is determined using GPS and while traveling with friends and family in separate vehicle could be problematic. Proposed system will help to solve those problem. Proposed system allow all group members into synch. It is also capable to detect accident incident by using inbuilt mobile accelerometer sensor.

2. LITERATURE SURVEY

A. "Development of vehicle tracking system using GPS and GSM modem" by Hoang Dat Pham, IEEE conference in Dec, 2013:

To track vehicle is important as it provides security of private vehicle, public transport and other. Now days number of vehicles are also increasing rapidly. That's why there's is need to develop some system that will help to track the vehicle using gps and gsm modem. It will make it more convenient for the user and also helps them to take control of the location sharing.

B. "Wireless black box using MEMS accelerometer and GPS tracking for accidental monitoring of vehicles" by Watthanawisuth, N., IEEE conference in Jan, 2012: This survey show the overview of MEMS accelerometer and GPS to track the location of accident that happened. When accident happens this system will generate some information and send it via GSM module to remote server so that it can provide help on emergency. It has some algorithm that is used to identify that accident happened or what. It detects some predefined ratings that will be used to get the assurity of the accident that happened. It has speed related algorithm that will identify the impact of the vehicle.

3. FUTURE SCOPE

1. The smart vehicle tracking system for group users is not present. The ability to track vehicles is useful in many applications including security of private vehicles, public transport and others.

2. It will help to to track fellow travelers which have joined group. To detect accidents, occur while driving. To convey message

while traveling. Leader and emergency contact can get notifications regarding users activity.

A. Proposed System

1. Proposed system is very helpful to traveling in group where one will be leader and others will be follower. Leader has the right to choose path and destination. Every group member can view decided path and destination by leader and they can also view location of each group member along the navigation path in google map.

2. Leader can also add information of halt, stop, break locations and he can also change navigation route and update it on google map. With respected to each group member one emergency mobile provided at the time of registration, so relative can monitor user's current location.

3. This system also allows tracking live location of all group members including leader. Application will monitor incidences of accident of any group member and send notification to relatives and group members. And inform nearest hospital about accident.

B. System Architecture.

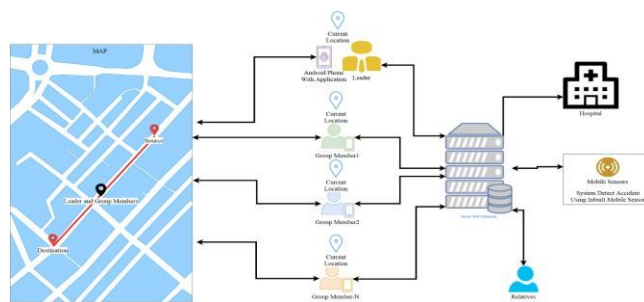


Figure: System Architecture of Proposed System

C. SYSTEM SPECIFICATION

Hardware Requirements

- Processor : intel i3
- CPU Speed : 2 GHz and above.
- RAM : 4gb and Above

Software Requirements:

Operating system : Windows 7 and above.
Coding Language : Java
IDE : Android Studio, Xampp Server
Database : MYSQL

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A. Algorithms

Haversine

The haversine formula is used in electronics and other applications such as navigation. For example, it helps in finding out the distance between two points on a sphere.

The haversine formula determines the great-circle distance between two points on a sphere given their longitudes and latitudes.

Haversine algorithm to calculate the distance from target point to origin point

1. R is the radius of earth in meters.

LatO = latitude of origin point, LongO = longitude of origin point

LatT = latitude of target point, LongT = longitude of target point

2. Difference in latitude = LatO-LatT

Difference in longitude = LongO - LongT

3. Φ = Difference in latitude in radians Λ = Difference in

longitude in radians O = LatO in radians.

T = LatT in radians.

$$4. A = \sin(\Phi/2) * \sin(\Phi/2) + \cos(O) * \cos(T) * \sin(\Lambda/2) * \sin(\Lambda/2)$$

$$5. B = \min(1, \sqrt{A}) \text{ Distance} = 2 * R * B$$

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