International Journal of Emerging Technology and Computer Science
ISSN: 2455-9954

Android Auto: Detecting object distance in various environmental conditions with speed detection and Alert system

Preeti Shirsat, Mrs.D.A.Phalke, Aishwarya Jadhav, Aarti Giri, Pallavi Gaikwad
D.Y.Patil College Of Engineering, Akurdi
Computer Department

ABSTRACT

Every year millions of people are being injured in traffic accidents. Various systems have been recently introduced in the market that can significantly reduce the effect of collisions and sometimes avoid them. In order to stop an accident there's a requirement to initial assess and perceive the traffic situation around the vehicle. The current systems used for safety uses radar sensors, cameras and laser based sensors to support environmental sensing, i.e., to position the neighboring vehicles in relation to the host vehicle and the infrastructure (roads, intersections, etc.).

Future safety systems can get extra info by communication with alternative vehicles and also the infrastructure, also by including new sensors like a GPS and a map. Such information may dramatically improve the accuracy of our understanding the traffic situation, but as of now, the design of such systems has not been studied much. This master thesis investigates a way to combine data from several sensors as well as GPS and internal vehicle sensors thus on position the ego vehicle and different objects around the vehicle. Apart from planning the positioning systems, we additionally would like to spot difficulties and perceive totally different elements of the problem. These parts include sensor models, and techniques to handle data that arrives with a time delay.

Keywords - Driving style detection and vehicle, velocity estimation, Speed measurement

I. INTRODUCTION

In order to push driver safety, we, among others, have found that a driver's behavior is comparatively safer once being monitored, once feedback of specific driving events is provided, and when reports of potentially aggressive events are recorded for better understanding. Several companies offer products for fleet management and individual use in order to monitor driving behavior using expensive cameras and equipment, but we believe that we can create a system that is inexpensive, accessible, and intelligently uses the sensors available on a mobile phone. Using mobile phone technology and other applications, the system is both inexpensive and accessible, especially considering that people will already own mobile phones capable of using the application. The system is designed to help prevent incidents by warning a driver if his or her driving style becomes aggressive, and to provide information about incidents to the nearby police stations so that we have a better understanding of what causes them. A Driver Monitor System was created in to observe the driving patterns of the old. This system concerned 3 cameras, a two-axis accelerometer and a GPS receiver attached to a PC. The system had several elements, one of them being detection of erratic driving using accelerometers. Braking and acceleration patterns were detected, also as high speed turns via thresholding. Additionally, the data could be used to determine the driving environment based on acceleration patterns.

II. SCOPE OF THE PROJECT

Proposed system can be useful to reduce accidents happens due to over speeding, opposite direction driving, etc. Proposed system can be used to prevent these problems in various traffic areas.

III. GOALS AND OBJECTIVES

To reduce accidents.

To aware user from other vehicles.

To notify user about over speeding using accelerometer data.

To notify user about other vehicles coming toward user by finding distance between user and those vehicles using haversine algorithm.

IV. MATHEMATICA MODEL

Let S be the Whole system which consists:

S= {I, P, O}.

Where,

I= is the input of the system.

P= is the procedure applied to the system to process the given input.

O= is the output of the system.

Input:

I = {UVI, SI}.

Where,

UVI =User info. And vehicle info.

SI =Stolen vehicle info.

B. Process

P= {RT, DSV, DRV, DWD}

RT = read RFID tags

DSV = Detect stolen vehicles.

DRV = Detect red light violation.

DWD = Detect wrong side driving.

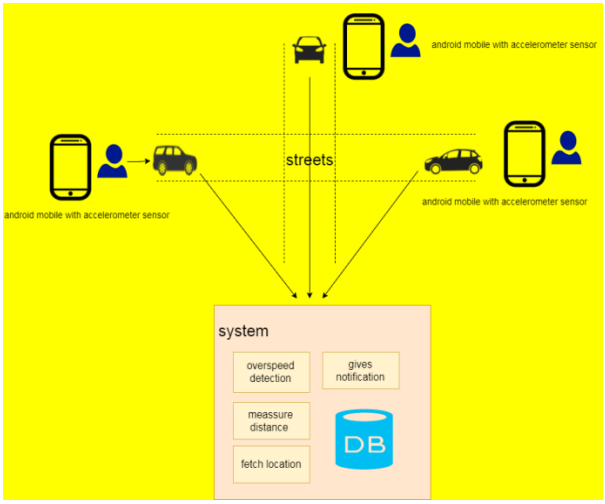
Output:

O= {NU, GF}

NU is Notify user

GF is Generate FIR

V. ARCHITECTURE



In this user get notification of over-speeding through application, application get information through accelerometer sensor and gives notification “drive slow “if user drive over speed limit or fast. User also gets info. Of nearby vehicles through app. If a vehicle comes toward user from front side/back side or any side then user get notification and its location from user. This location gets through haversine algorithm in system.

VI. MODULES OF THE PROJECT

User information:

It contains user information.

Speed detection

Detect speed using accelerometer. And notify user about over speeding.

Distance measure

Measure distance between start point and end point entered by the user.

Algorithm 1:-Haversine Algorithm

Haversine is an algorithm that is sinusoidal in nature, it consists of a portion of a sine wave superimposed on another waveform. The current input waveform to the typical off-line power supply has the form of a haversine. The haversine formula is used in the field of electronics and other applications used for navigation. For example, it helps in finding 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

R is the radius of earth in meters.

Lat_O= latitude of origin point, $Long_O$ = longitude of origin point

Lat_T= latitude of target point, $Long_T$= longitude of target point

Difference in latitude = Lat_O-Lat_T

Difference in longitude = $Long_O$-$Long_T$

Φ =Difference in latitude in radians

Λ =Difference in longitude in radians

O= Lat_O in radians.

T= Lat_T in radians.

A= sin(Φ/2) * sin(Φ/2) + cos(O) *cos(T)*sin(Λ/2)*sin(Λ/2)

B= min(1,sqrt(A))

Distance = 2*R*

VII. CONCLUSION

In today‘s world, the security of the vehicles is at stake. The incidents of theft are common. This compels the consumer to install a tracking device, which will help them to know the location of their lost or stolen vehicle. The vehicle-tracking device provide the user to know his/her vehicle‘s location in real time. The System designed is user-friendly anyone with a little knowledge of smartphone can use the system. It is easy to install the system in the vehicle and it requires low maintenance. The coordinates received show the correct location on the Google map using the android app. In this frame, the present work puts forward a novel mechanism to detect the current maneuver of a vehicle by processing the accelerometer readings of a smartphone. By means of a hierarchy of classifiers and the automatic detection of speed changes, the system is able to accurately perceive the vehicle’s kinematic state. Moreover, we have also considered the limitations of mobile platforms when it comes to coping with computationally-greedy applications.

VIII. FUTURE SCOPE

Proposed system can be useful to reduce accidents happens due to over speeding , opposite direction driving, etc. Proposed system can be used to prevent these problems in various traffic areas.

IX. ACKNOWLEDGMENT

This work was supported in part by NSF awards CCF0238305 and IIS-0456027 and by the IBM Corporation. We thank Gene Tsudik, Susan Hohenberger, Roberto Di Pietro, Luigi Mancini, R˘azvan Mus˘aloiu-E., Seny Kamara, and Brent Waters for their insightful comments.

REFERENCES

[1] Sundar, Rajeshwari, Santhoshs Hebbar, and Varaprasad Golla, "Implementing intelligent traffic control system for congestion control, ambulance clearance, and stolen vehicle detection" IEEE Sensors Journal 15.2 (2015): 1109-1113. https://doi.org/10.1109/JSEN.

2014.2360288

[2] Mittal, Ayush Kr, and Deepika Bhandari, "A novel approach to implement green wave system and detection of stolen vehicles", Advance Computing Conference (IACC), 2013 IEEE 3rd International, 2013

[3] Veera Venkatesh, Nazneen Syed, "Smart Traffic Control System for Emergency Vehicle Clearance", International Journal of Innovative Research in Computer and Communication Engineering, Vol. 3, Issue 8, August 2015.

[4] Abdus Samad Kamal Md, Jun-ichi Imura, Tomohisa Hayakawa, Akira Ohata, and Kazuyuki Aihara (2014), “Smart Driving of a Vehicle Using Model Predictive Control for Improving Traffic Flow", IEEE Trans. Intell. Transp.Syst, vol. 15, no. 2

[5] Andrew Phan and Frank P. Ferrie (2011), “Interpolating Sparse GPS Measurements Via Relaxation Labeling and Belief Propagation for the Redeployment of Ambulances”, IEEE Trans. Intell. Transp. Syst, vol. 12, no. 4. https://doi.org/10.1109/TITS.2011.2165281

[6] Fan, X., Fan, G.: Graphical Models for Joint Segmentation and Recognition of License Plate Characters. IEEE Signal Processing Letters 16(1), 10–14 (2009)

[7] Chen, Z.X., Liu, C.-Y., Chang, F.-L., Wang, G.Y.: Automatic License-Plate Location and Recognition Based on Feature Salience. IEEE Trans. on Vehicular Technology 58(7), 3781–3786 (2009)

[8]Maduro, C., Batista, K., Batista, J.: Estimating Vehicle Velocity Using Image Profiles on Rectified Images. In: Araujo, H., Mendon¸ca, A.M., Pinho, A.J., Torres, M.I. (eds.) IbPRIA 2009. LNCS, vol. 5524, pp. 64–71. Springer, Heidelberg (2009)

[9] Lin, H.Y., Li, K.J., Chang, C.-H.: Vehicle speed detection from a single motion blurred image. Image and Vision Computing 26, 1327–1337 (2006)

[10] Donoser, M., Arth, C., Bischof, H.: Detecting, Tracking and Recognizing License Plates. In: Yagi, Y., Kang, S.B., Kweon, I.S., Zha, H. (eds.) ACCV 2007, Part II. LNCS, vol. 4844, pp. 447–456. Springer, Heidelberg (2007)