Review on Detection of Driving Behavior by using OBD Simulator

[1]*Shivani Jadhav,*[2]*Shital Parhad,*[3]*Shraddha Mandalkar,*[4]*Sony Birajdar,*[5]*Prof. Ruta A. Kulkarni*
Department of Computer Engineering Zeal College of Engineering & Research, University of Pune.

ABSTRACT
Nowadays, with the mounting number of vehicles problem evolves how to supervise and keep an eye on driving behavior of the populace. Many systems are proposed but none is proficient and uncomplicated to put into operation in real life. So there is necessitate for development of cost efficient and real time arrangement that can be implemented almost with every car. Exercising Smartphone is escalating as fast as forest fires. Features accomplished with Smart phones can be exploited in better way in enlargement and development of new systems. OBD(On-Board diagnostics) device in association with the Smartphone application can be collected into one system to diagnose driving behavior. OBD device gives real time information About Engine Control unit. Alongside with driving behavior we can get information about fuel consumption rate etc. We have projected a client-server real time car monitoring system which can be used by car renting companies to manage their rented cars and a knowledge-based framework for a driving assistance via Smartphone.
Keywords— obd Simulator,smartphone,android application

1. INTRODUCTION

On board diagnostic device

On-board diagnostics (OBD) is an automotive term concerning with vehicle's self-diagnostic capability. OBD systems offer the vehicle owner or repair technician access to the assorted vehicle subsystems. Project proposes sensible and economical thanks to capture inefficient, uneconomical and unsafe driving with the main points regarding Performance, Fuel Consumption, Autonomy and Emission from a Vehicle. Smartphone application is negotiator for information transfer from OBD hardware to the server finish. Computations are going to be enforced by exploitative agglomeration algorithm k-means. Data fusion and classification algorithms permit characteristic and annotation relevant contexts and events in real time. The planned approach has been enforced in an automaton application, and evaluated in real-world. Solely constraints are accessibility of web, no different person than administrator ought to be allowed to access.

2. LITERATURE SURVEY

A. *Knowledge-based period of time automotive observation and driving help (2012)*

Modern vehicles at equipped with many Electronic management Units (ECUs) coordinating and observation internal elements and subsystems, act over one or additional automotive network buses. specially, international rules these days mandate all new vehicles should support the On Board medicine, version a pair of (OBD-II) protocol and be equipped with associate degree OBD-compliant interface to produce direct and normal access to information within the internal automotive network. What is more, just in case of malfunctions, Diagnostic hassle Code (DTC) values ar hold on within the automotive eu and may be later retrieved by maintenance technicians mistreatment correct tools. Recently, access has been granted conjointly to the final public of automotive enthusiasts by the event of OBD-II scan tools, low-cost electronic devices that bridge the OBDII port with normal wired (RS-232, USB) or wireless (Bluetooth, IEEE 802.11) pc communication interfaces. This paper enhances framework in, able to interpret vehicle information extracted via OBD-II, integrate environmental info and notice potential risk factors. Besides providing warnings for that, currently the system offers suggestions throughout driving and evaluates automotive potency and environmental impact. Smart phone primarily based approach to watch driving behavior and sharing of data point (2014): In recent year several scientist and industries are acting on VANET and attempting to implement the ideas in planet. Several VANET systems are planned and tested on simulation however only a few inventors enforced it.

B. *Inefficient and Unsafe Driving Behavior (2012)*

Recently, within the mobile application market, many applications have emerged that try the ability of a mobile device with the data offered through the employment of associate degree OBD-II reader. These applications tend to be directed toward automotive vehicle enthusiasts, developing options that think about measure vehicle performance and troubleshoot mechanical problems. Alternative applications ar egression that specialize in environmental considerations. These applications think about factors like measure a driver's carbon footprint and fuel consumption. A number of these applications embrace options that may notice safety issue (e.g. problems with the vehicle's stability management system). However, these options are centered on detective work mechanical problems with safety instrumentation, not on distinguishing real time considerations with the driver's behavior or setting. In existing system, we discover there's a possible in victimization mechanical phenomenon sensors to totally differentiate between different drivers. Whereas options related to acceleration events failed to play a significant role in differentiating between drivers, features, GPS location. Considering these Parameters we've got planned new Driver's behavior detection system. In existing system with the assistance of acceleration, braking and standardization events we tend to establish changes between totally different drivers in driving designs. Here, unattended rule k-means clump rule is employed and supervised rule Support Vector machine is employed for computation. Human identification victimization mechanical phenomenon sensors and Detection of driving behavior and classification by victimization mechanical phenomenon sensors area unit the most tasks of this technique. Histograms of applied mathematics info area unit created

However not yield abundant vital info does.

3. IMPLEMENTED SYSTEM

Proposed System consists mainly of:
• Server for computation
• ODB Hardware
• Android Smartphone

Fig1.Architecture of system

OBD impacts several audiences for various reasons.
• For Repair Technicians : OBD could be a valuable tool that assists within the service and repair of vehicles by providing a straightforward, quick, and effective thanks to pinpoint issues by retrieving important automobile diagnostics from the OBD systems.
• For State Agencies: OBD plays a vital role wherever vehicle examination and maintenance programs are needed.
• For Vehicle Owners: OBD is AN early warning system that alerts you to the potential would like for vehicle repair through the "Check Engine" light-weight on the dashboard of your vehicle.
• For Vehicle and Engine Manufacturers : OBD systems are needed by independent agency to be put in on light vehicles and trucks, further as heavy-duty engines Communication networks used are Bluetooth, Internet.

Projected system Advantages:
• Less time is needed to urge location of drivers on totally different cars at same time • The entire system may be enforced in an exceedingly} very low price. • High security is provided.
• Alarm system is employed once any quite rash driving is detected. • Continuous and real time observation is provided.
Applications:
• Car transaction firms like Uber, Zoom automobile etc

4. EQUATIONS AND ALGORITHMS

Here, we have used two algorithms according to the requirements of the architecture of system;

1. ***Haversine formula*** and

2. Encryption algorithm AES

i) Haversine formula:
The haversine formula is an equation important in navigation, giving great-circle distances between two points on a sphere from their longitudes and latitudes. It is a special case of a more general formula in spherical trigonometry, the law of haversines, relating the sides and angles of spherical triangles. The first table of haversines in English was published by James Andrew in 1805. Florian Cajori credits an earlier use by José de Mendoza y Ríos in 1801 The term haversine was coined in 1835 by James Inman.These names follow from the fact that they are customarily written in terms of the haversine function, given by haversin(θ) = sin2(θ/2). The formulas could equally be written in terms of any multiple of the haversine, such as the older versine function (twice the haversine).Prior to the advent of computers, the elimination of division and multiplication by factors of two proved convenient enough that tables of haversine values and logarithms were included in 19th and early 20th century navigation and trigonometric texts. These days, the haversine form is also convenient in that it has no coefficient in front of the sin2 function.

For any two points on a sphere, the haversine of the central angle between them is given by

$$\operatorname{hav}\left(\frac{d}{r}\right) = \operatorname{hav}(\varphi_2 - \varphi_1) + \cos(\varphi_1)\cos(\varphi_2)\operatorname{hav}(\lambda_2 - \lambda_1)$$

Where,
hav is the haversine function:

$$\operatorname{hav}(\theta) = \sin^2\left(\frac{\theta}{2}\right) = \frac{1-\cos(\theta)}{2}$$

d is the distance between the two points (along a great circle of the sphere; see spherical distance),
r is the radius of the sphere,
φ1, φ2: latitude of point 1 and latitude of point 2, in radians
λ1, λ2: longitude of point 1 and longitude of point 2, in radians

On the left side of the equals sign d/r is the central angle, assuming angles are measured in radians (note that φ and λ; can be converted from radians to degrees by multiplying by 180/pi as usual).
Solve for d by applying the inverse haversine (if available) or by using the arcsine (inverse sine) function:

$$d = r\operatorname{hav}^{-1}(h) = 2r\arcsin\left(\sqrt{h}\right)$$

where h is hav(d/r), or more explicitly:

$$d = 2r\arcsin\left(\sqrt{\operatorname{hav}(\varphi_2 - \varphi_1) + \cos(\varphi_1)\cos(\varphi_2)\operatorname{hav}(\lambda_2 - \lambda_1)}\right)$$
$$= 2r\arcsin\left(\sqrt{\sin^2\left(\frac{\varphi_2 - \varphi_1}{2}\right) + \cos(\varphi_1)\cos(\varphi_2)\sin^2\left(\frac{\lambda_2 - \lambda_1}{2}\right)}\right)$$

ii)AES is advanced encryption standard

- designed by Rijmen-Daemen in Belgium
- has 128/192/256 bit keys, 128 bit data
- an **iterative** rather than **Feistel** cipher
- processes data as block of 4 columns of 4 bytes
- operates on entire data block in every round
- designed to have:
  - resistance against known attacks

- speed and code compactness on many CPUs
- design simplicity

5. REQUIREMENTS OF SYSTEM

A. Functional Requirements

- Mobile application, running on an Android Smartphone, paired with a compatible OBD-II (On-board diagnostics II) reader
- OBD Interface on phone should display temperature, rpm, vss etc vehicle parameters on phone.
- Vehicle parameters should be logged on to server using Internet/WiFI
- Admin should be able to map vehicle driver's IMEI number and car number
- Driver wise speed and locations of travel should be displayed on the web based application
- Vehicle owner should get location alert and driver speed alert.

B .Other Non-functional Requirements

1. Secure access of confidential data (user's details).
2. High Scalability. The solution should be able to accommodate high number of customers and brokers. Both may be geographically distributed
3. Flexible service based architecture will be highly desirable for future extension
4. Better component design to get better performance at peak time
5. The architecture should be highly scalable for the application and the web site should be tuned for better performance at the peak time.
6. Application and Website should be highly customizable and flexible enough to easily deploy with components to be enabled / disabled.

C. Performance Requirements

- High Speed:

  System should process requested task in parallel for various action to give quick response then system must wait for process completion.

- Accuracy:

  System should correctly execute process, display the result accordingly.

  System output should be in user required format.

D. Safety Requirements

The data safety must be ensured by arranging for a secure and reliable transmission media. The source and destination information must be entered correctly to avoid any misuse or malfunctioning.

E. Software Quality Attributes

Maintainable software should have

1. Encourage in-code documentation (XML docs in javadoc, etc.)
2. use a wiki to maintain the documentation
3. Unit Tests = Good for documenting specifications
4. Comments = Good for documenting design decisions.
5. Unit Tests + Comments = Good for documenting specifications and design decisions. = Easily maintainable software.
6. Faster feedback from any changes made to the system
7. Providing better transparency into the changes happening to the system
8. Propagating environmental changes and code changes more rapidly while maintaining control
9. Ease integration issues by dealing with them earlier in smaller chunks

F. Security Requirements

Secure access of confidential data (user's details).
Information security means protecting information and information systems from unauthorized access, use, disclosure, disruption, modification or destruction.
The terms information security, computer security and information assurance are frequently incorrectly used interchangeably. These fields are interrelated often and share the common goals of protecting the confidentiality, integrity and availability of information; however, there are some subtle differences between them.

1. User password must be stored in encrypted form for the security reason
2. All the user details shall be accessible to only high authority persons.
3. Access will be controlled with usernames and passwords.
4. LAN should be control by only authorized person.

G. Feasibility Requirements

Feasibility studies aim to objectively and rationally uncover the strengths and weaknesses of the existing business or proposed venture, opportunities and threats as presented by the environment, the resources required to carry through, and ultimately the prospects for success. In its simplest term, the two criteria to judge feasibility are cost required and value to be attained. As such, a well-designed feasibility study should provide a historical background of the business or project, description of the product or service.

Feasibility study is conducted after finding out the system's objectives. In order to carry out the feasibility study the following steps should be completed-

*The user's requirement

*Interpreting the existing system

*Analysis of the existing system

*Analysis of the modifications that are going to be implemented

After completing all the above points the feasibility study is carried out by considering the following points or we can say that following types of feasibility needs to be carried out

* Economical feasibility

* Operational feasibility

* Resource feasibility

H. Economic feasibility

Economic analysis is the most frequently used method for evaluating the effectiveness of a new system. If the data is stored in a database then it will be easy job to search for required options any time. The use of Java and ASP does not require very high configuration of hardware. The software can be run on any system with JAVA in minimum requirements.. Also the software though developed in GUI, it is very easy to operate and it is user friendly. Hence the software is technically feasible.

I. Operational feasibility

Operational feasibility is a measure of how well a proposed system solves the problems, and takes advantage of the opportunities identified during scope definition i.e. through previous developed Timesheet system and how it satisfies the requirement identified in the requirements analysis phase of system development.

J. Resource feasibility

This involves questions such as how much time is available to build the new system, when it can be built, whether it interferes with normal business operations, type and amount of resources required, dependencies etc

6. ACKNOWLEDGMENT

It gives us great pleasure in presenting the preliminary project report on Detection of driving behaviour by using OBD simulator We would like to take this opportunity to thank our internal guide Prof. R. A. kulkarni for giving me all the help and guidance we needed. We are really grateful to them for their kind support. Their valuable suggestions were very helpful.

7.CONCLUSION

A Cost efficient system to monitor different drivers of rented organisations is developed in this project,effective utilization of smart phone is observed.Real time information about Location and speed of cars can also be maintained and alerts can also be set to specific cars.This solves the problem of keeping eye on all rented cars at once.

REFERENCES

[1] C.-C. Chang and C.-J. Lin. Libsvm: a library for support vector machines. ACM Transactions on Intelligent Systems and Technology (TIST), 2(3):27, 2011.

[2] A. Doshi and M. M. Trivedi. On the roles of eye gaze and head dynamics in predicting drivers intent to change lanes. In Transactions on Intelligent Transportation Systems, pages 453462. IEEE, 2009.

[3] A. Doshi, B. T. Morris, and M. M. Trivedi. On-road prediction of drivers intent with multimodal sensory cues. In IEEE Pervasive Computing, pages 2234. IEEE, 2011.

[4] A. Doshi and M. M. Trivedi. Examining the impact of driving style on the predictability and responsiveness of the driver: Real-world and simulator analysis. In Intelligent Vehicles Symposium (IV), 2010 IEEE, pages 232237. IEEE, 2010.

[5] T. Gandhi and M. M. Trivedi. Parametric ego-motion estimation for vehicle surround analysis using an omni directional camera. In Machine Vision and Applications, pages 8595. IEEE, 2005

[6] Ruta, M., Scioscia, F., Gramegna, F., Di Sciascio, E.: A Mobile Knowledge-Based System for On-Board Diagnostics and Car Driving Assistance. In: The Fourth International Conference on Mobile Ubiquitous Computing, Systems, Services and Technologies (UBICOMM2010), IARIA (2010) 91–96

[7] Colucci, S., Di Noia, T., Pinto, A., Ragone, A., Ruta, M., Tinelli, E.: A non-monotonic approach to semantic matchmaking and request refinement in emarketplaces. International Journal of Electronic Commerce 12(2) (2007) 127–154

[8] Lin, C., Li, C.C., Yang, S.H., Lin, S.H., Lin, C.Y.: Development of On-Line Diagnostics and Real Time Early Warning System forVehicles. In: Sensors for Industry Conference, 2005. (2005) 45 –51

[9] Lin, C.E., Shiao, Y.S., Li, C.C., Yang, S.H., Lin, S.H., Lin, C.Y.: Real-Time Remote Onboard Diagnostics Using Embedded GPRS Surveillance Technology. Vehicular Technology, IEEE Transactions on 56(3) (2007) 1108–1118

[10] Chen, Y., Xiang, Z., Jian, W., Jiang, W.: Design and implementation of multisource vehicular information monitoring system in real time. In: Automation and Logistics, 2009. ICAL '09. IEEE International Conference on. (August 2009) 1771 –1775

[11] Kargupta, H., Bhargava, R., Liu, K., Powers, M., Blair, P., Bushra, S., Dull, J., Sarkar, K., Klein, M., Vasa, M., Handy, D.: Vedas: A mobile and distributed data stream mining system for real-time vehicle monitoring. In Berry, M.W., Dayal, U., Kamath, C., Skillicorn, D.B., eds.: SDM, SIAM (2004)

[12] Choi, S., Kim, J., Kwak, D., Angkititrakul, P., Hansen, J.: Analysis and Classification of Driver Behavior using In-Vehicle CAN-Bus Information. In: Biennial Workshop on DSP for In-Vehicle and Mobile Systems. (June 2007)

[13] Quintero, M., On˜ate Lopez, J., Rua, J., et al.: Intelligent erratic driving diagnosis based on artificial neural networks. In: ANDESCON 2010, IEEE (2010) 1–6

[14] Ruta, M., Di Noia, T., Di Sciascio, E., Scioscia, F.: Abduction and Contraction for Semantic-based Mobile Dating in P2P Environments. In: Proceedings of 2008 IEEE/WIC/ACM International Conference on Web Intelligence and Intelligent Agent Technology, IEEE (2008) 626–632