Driving Pattern Recognition Using Dataset

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***Abstract*—**Travelling in India by road is considered dangerous as traffic conditions are chaotic, the drivers drive recklessly, and the roads are poorly maintained. Therefore, there is need to monitor driver behavior and road condition regularly. In this work, we developed a method that collects data using dataset and analyze driving pattern.. This work will help in analyzing driving pattern and road anomalies to ensure driver safety and maintenance of roads

***Keywords*—** *deiving pattern, dataset, lattitude, longitude, genetic algoprithm.*

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I. INTRODUCTION

Currently, in tune with economic growth in every county, the numbers of the vehicles increase every year. At the same time, the number of non-expert drivers also increases rapidly. Since most novice drivers are unskilled, unfamiliar with the vehicle conditions and no awareness of traffic rules and regulations, drivers' personal factors have become the main reasons of traffic accidents.Previously a lot of work is done in this field but researchers mainly focused on monitoring either driver behavior or road conditions using specialized hardware deployed inside the car [1] [2] [3] [4] [5] [6] or roadside which is expensive and also requires maintenance.

In this proposed system,we going to determine the speed of the vehicle using dataset. Dataset mainly contains the user id, latitude, longitude of the vehicle. Depending on the latitude and longitude the system will calculate the distance. proposed system generate a driving pattern depend on the distance covered by the vehicle and the differente location. This will help to derive the driving pattern of the driver.
The system uses a dataset and generate the output depending on it.

II. RELATED WORK

[A] Using mobile phone sensors to detect driving behavior. In: Proceedings of the 3rd ACM Symposium on Computing for Development
(P. Singh ., Juneja, N., Kapoor, S. ACM (2013))
This application collects data from accelerometers, GPS and also record sounds with the help of microphone, and then data is combined and analyzed to detect rash driving patterns. The various pattern such as speed breaker, lane-change left/right, left/right turn, sudden breaking, sudden acceleration were analyzed and verified using 'Ground Truth'. Correlation of audio and accelerometer data is done to find new patterns. For Example: if a lane change is not accompanied with indicator sound, then this mean rash driving event. The limitation of this work is that machine learning techniques are not used to classify driving patterns.

[B] Safe Driving Using Mobile Phones
(Fazeen, M., Gozick, B., Dantu, R., Bhukhiya, M., Gonzalez, IEEE Transactions on Intelligent Transportation Systems (2012))
. Fazen have proposed a innovative application using a mobile smartphone that are integrated inside an automobile to evaluate driver style. They have used the three-axis accelerometer of an Android-based smartphone to record and analyze various driver behaviors and external road conditions that could potentially be hazardous to the health of the driver. They have utilized x-axis and y-axis accelerometer data to measure the driver's direct control of the vehicle as they steer, accelerate, and apply the brakes. Safe acceleration or deceleration never reach a gforce of more than±0.3 g, and sudden acceleration or deceleration approach ±0.5 g. With this comparison, it is easy to quantify the difference between safe and sudden acceleration or deceleration. Safe right/left lane produce an average g-force of less than ±0.1 g and unsafe or sudden right/left lane produce a g force well over±0.5 g. It was observed that the average time to complete a safe lane change was 75% longer than a sudden lane change. Phone placement locations in a vehicle was also observed and the loc. 1, the center console, gave the best relative data with low engine feedback. The drawback of this work is that the best results of prediction driving behavior were found, when phone was placed on a center dashboard, but in car the phone placement is not necessarily at center dashboard, it's location can be anywhere, so there should be mechanism for virtually re-orienting the accelerometer.

[C] Driving Style Recognition using a smartphone as a sensor platform
(Johnson, D.A., Trivedi, IEEE 14th International Conference on Intelligent Transportation system, October(2011))
proposed a approach for predicting driving style. They categorized driving style into normal, aggressive and very aggressive. They collect data from various sensors (accelerometer, gyroscope, magnetometer, GPS, video) and fused related data into a single classifier based on Dynamic Time Warping (DTW)

[D] Integrated Computing System for measuring Driver Safety Index
(Chigurupa, S., Polavarap, S., Kancherla,Y., Nikhath International Journal of Emerging Technology and Advanced Engineering,ISSN 2250-2459, Volume 2 (2012))
In this proposed system developed a android application which uses data from accelerometer sensor, GPS sensor and video recording is done with the help of camera to give rating to the driver. The feedback can be used to aware the driver and

improve performance. The range of acceleration or deceleration values are given for the safe driving. Whenever the accelerometer values exceed the safe limits it would be considered as an event. X-axis, direction-front and rear, driving pattern-Accelerating / Braking, Safe g value =-3 to +3. Y axis, direction-Left/right, driving pattern-Turning / Swerves / Lane Change, Safe g value =-3 to +3. Z-axis, direction-Up/down, driving pattern-Bumps / Road Anomalies, Safe g value =-8 to-11. The limitation of this work is that entire system is not fully automatic, so there is the need of administrator to analyze the videos..

[E] Driver behavior analysis and route recognition by hidden Markov models.

(Sathyanarayana, A., Boyraz, P., Hansen, J.H.L Vehicular Electronics and Safety, ICVES,IEEE International Conference on IEEE (2008))

says that , Driver Behavior Analysis and Route Recognition by Hidden Markov Models in two different approaches. The first (bottom-to-top) approach takes isolated maneuver recognition with model concatenation to construct a generic route, whereas the second (top-to-bottom). approach models the entire route as a 'phrase' and refines the HMM to discover maneuvers. Only left turn (LT), right turn (RT) and lane change maneuvers are considered.

[F] Analyzing Driver Behavior using Smartphone Sensors: A Survey

(Nidhi Kalra and Divya Bansal
International Journal of Electronic and Electrical Engineering. ISSN 0974-2174 Volume 7, Number 7 (2014))

In this proposed system a Driver Behavior monitoring has evolved tremendously in recent years. Driver safety can be enhanced by monitoring driver behavior, recording their aggressive driving events and giving feedback of recorded events. Monitoring driver behavior using inbuilt sensors of smartphone has been evolving as a new trend because of less cost and considering the fact that many people already own it. This paper surveys various methods of detecting driver behavior. It also presents the challenges faced by researchers in detecting and predicting driver behavior.

III. COLLECTION OF DATASET

dataset contains the information of vehicle such as user id, latitude, longitude, entry number of the vehicle. Dataset is collected from the data repository.

VI.ALGORITHM USED:

Genetic Algorithm (GA) is a stochastic search method which has been widely used by the data mining community for discovering classification rules. The accuracy of the rules that GA finds are comparable and some times even more accurate than the rules obtained by the other classification algorithms. GA shows great promise in complex domains because it operates in an iterative improvement fashion. The search performed by it is probabilistically concentrated towards regions of the given data set that have been found to produce a good classification behavior.

. In Spite of all its advantages most of the GA based classification algorithms use only a small set of training data and the task of the GA is to find out the best rule set which classifies the available instances with the lowest error rate.

IV. PROBLEM STATEMENT

In the existing system, there is no optimum pattern analysis done for the driving patterns, as all the analysis is done based on the rules decided by the researchers. But, this approach does not give an accurate analysis of the driving patterns of the user, as all possible combinations of patterns is not considered. This will make the pattern analysis faulty, and the actions taken on the basis of this analysis will not be correct too, so we need to propose a solution which will improve the accuracy of the driving pattern analysis based on the input dataset.

V.PROPOSED APPROACH

In this approach we will improve the accuracy of the driving pattern analysis based on the input dataset as in the existing system, there is no optimum pattern analysis done for the driving patterns, as all the analysis is done based on the rules decided by the researchers. But, this approach does not give an accurate analysis of the driving patterns of the user, as all possible combinations of patterns is not considered. This will make the pattern analysis faulty, and the actions taken on the basis of this analysis will not be correct too The proposed system evaluates driving patterns of the drivers. In this approach we apply Genetic Algorithm on the dataset to find the patterns of driving. In this approach Genetic algorithm collect the informations from the dataset of the vehicle and generate the solution for the driving patterns. It will trace location . speed as well as the driver's ID. Driver safety can be enhanced by monitoring driver behavior **.**

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