A DRIVING DECISION STRATEGY DDS BASED ON MACHINE LEARNING FOR AN AUTONOMOUS VEHICLE

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Abstract — In this paper author proposed a new strategy i.e A Driving Decision Strategy(DDS) Based on Machine learning for an autonomous vehicle" Analysis of both external and internal factors determines the optimal strategy for an autonomous vehicle (consumable conditions, RPM levels etc.). To implement this, the project author has introduced and algorithm called DDS (Driving Decision Strategy) algorithm which is based on genetic algorithm to choose optimal gene values which helps in taking better decision or prediction. DDS algorithm obtained input from sensor and then passes to genetic algorithm to choose optimal value which helps in faster and efficient prediction. Propose DDS with genetic algorithm performance is comparing with existing machine learning algorithm such as Random Forest and MLP (multilayer perceptron algorithm.). Propose DDS shows better prediction accuracy compare to random forest and MLP.

INTRODUCTION

The principle of operation of self-driving cars can be classified into three levels: recognition, judgement and control. As part of the recognition process, vehicles are equipped with various sensors, including GPS, cameras, and radar. As a result of this information, the judgement step determines a driving strategy. When the driving environment is identified, it is analysed and appropriate driving plans are developed and the objectives. Vehicle starts driving on its own after the control step has been completed. In order to reach its destination, an autonomous vehicle performs a series of actions, repeating on its own the steps of recognition, judgement and control. Autonomous vehicles are getting better at recognising data as their performance improves. An increase in these sensors can lead to an overload of the vehicle's electrical system. In-vehicle computers compute data collected by sensors in self-driving vehicles. Due to overload, the speed of judgement and control decreases as the amount of computed data increases. These problems can jeopardise the

vehicle's stability. As a means of preventing sensor overload, some studies have developed hardware that can perform deep-running operations inside a vehicle, while others use cloud computing to compute sensor data.

PROPOSED SYSTEM

K-NN, RF, SVM and Bayes models are existing methods although studies have been done in the medical field with an advanced data exploration using machine learning algorithms, orthopedic disease prediction is still a relatively new area and must be explored further for the accurate prevention and cure. It mines the double layers of hidden states of vehicle historical trajectories, and then selects the parameters of Hidden Markov Model (HMM) by the historical data. In addition, it uses a Viterbi algorithm to find the double layers hidden states sequences corresponding to the just driven trajectory. Finally, it proposes a new algorithm for vehicle trajectory prediction based on the hidden Markov model of double layers hidden states, and predicts the nearest neighbour unit of location information of thenext k stages.

propose an feature selection with MLP and RF algorithm to compute the sensor data to determine the optimal driving strategy of an autonomous vehicle.

LITERATURE SURVEY

1.Ning Ye, Yingya Zhang, Ruchuan Wang, Reza Malekian, "Vehicle trajectory prediction based on Hidden Markov Model, " The KSII Transactions on Internet and Information Systems, Vol. 10, No. 7, 2017

In Intelligent Transportation Systems (ITS), logistics distribution and mobile e- commerce, the real-time, accurate and reliable vehicle trajectory prediction has significant application value. Vehicle trajectory prediction can not only provide accurate location-based services, but also can monitor and predict traffic situation in advance, and then further recommend the optimal route for users. In this paper, firstly, we mine the double layers of hidden states of vehicle historical trajectories, and then determine the parameters of HMM (hidden Markov model) by historical data. Secondly, we adopt Viterbi algorithm to seek the double layers hidden states sequences corresponding to the just driven trajectory. Finally, we propose a new algorithm (DHMTP) for vehicle trajectory prediction based on the hidden Markov model of double layers hidden states, and predict the nearest neighbor unit of location information of the next k stages.

2.Li-Jie Zhao, Tian-You Chai, De-Cheng Yuan, "Selective ensemble extreme learning machine modeling of effluent quality in wastewater treatment plants, " International Journal of Automation and Computing, Vol.9, No.6, 2012

Real-time and reliable measurements of the effluent quality are essential to improve operating efficiency and reduce energy consumption for the wastewater treatment process. Due to the low accuracy and unstable performance of the traditional effluent quality measurements, we propose a selective ensemble extreme learning machine modeling method to enhance the effluent quality predictions. Extreme learning machine algorithm is

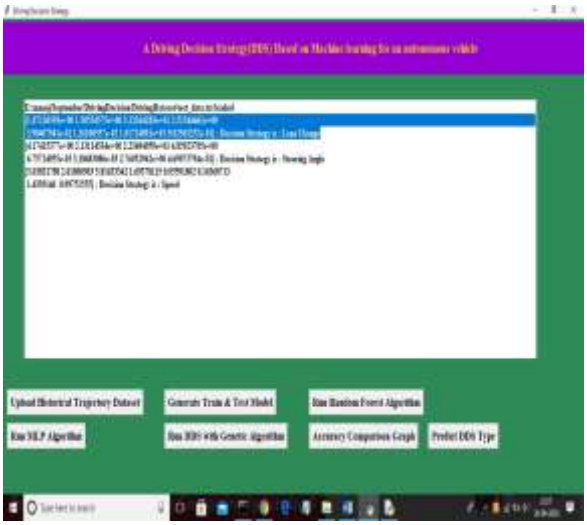
inserted into a selective ensemble frame as the component model since it runs much faster and provides better generalization performance than other popular learning algorithms. Ensemble extreme learning machine models overcome variations in different trials of simulations for single model. Selective ensemble based on genetic algorithm is used to further exclude some bad components from all the available ensembles in order to reduce the computation complexity and improve the generalization performance. The proposed method is verified with the data from an industrial wastewater treatment plant, located in Shenyang, China. Experimental results show that the proposed method has relatively stronger generalization and higher accuracy than partial least square, neural network partial least square, single extreme learning machine and ensemble extreme learning machine model

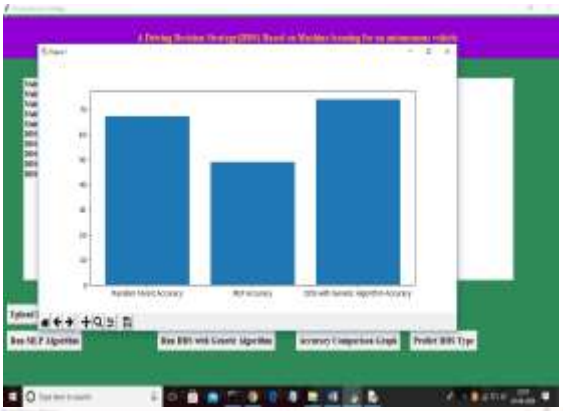
SCOPE OF THE PROJECT

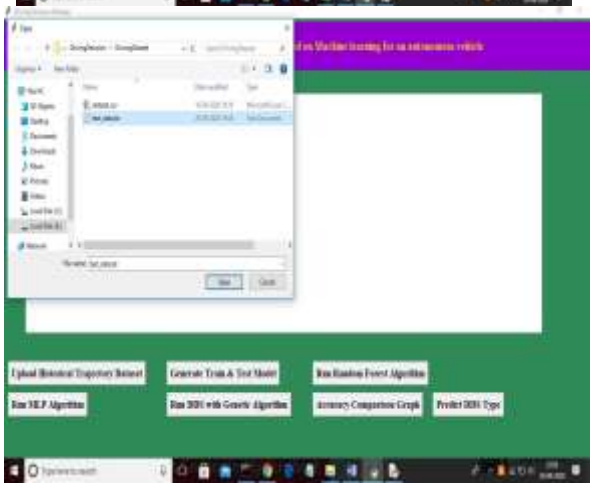
With the rapid growth of the highway transportation system, the number of car ownership has risen year after year which is result in serious traffic conditions [1]. In particular, the incidence of curve accidents and the seriousness of accidents remain high. When the car is turning, there will be a blind zone of sight which is accompanied by increased centrifugal force. The turning radius will decrease and the lateral sliding will occur easily, which is caused collision accidents [2]. In Japan, the traffic accident rate on the curved sections of the road exceeded 41.01% of the total accident rate [3], while the number of traffic accidents on the curved road in China accounted for 7.84% of the total accident. Judging from the severity of the accident, the fatal accidents of the curve occupies 16.3% of all fatal accidents [4]. Other statistics show that the main reasons of accidents in the curved areas are the over-speeding of the turning vehicles during turning, irregularly overtaking lane change and lane occupancy [5]. During driving, many accidents occurred due to driver's inattentiveness or unfamiliarity with the road ahead, especially at the curved road which is the place of the high incidence of accidents [6]. Therefore, if it is possible to detect and recognize the road ahead before the advent of curved road conditions, warn the driver in advance, slowdown and avoid evasion in advance, many unnecessary accidents can be avoided and the safety of life and property can be guaranteed..

The investment sector has always been a profitable business. In earlier days, investing money required a thorough knowledge of domestic as well as international markets. People used to manually study and analyze the trends of the market. The manual analysis required a lot of time. But, nowadays, as the scope of Machine Learning is widening, i can see a lot of mobile applications that provide us assistance within seconds for investment in various sectors. For making a smart investment in the stock market, there is an application called ‘Upstox’. It uses Machine Learning for predicting the future possibilities of the market.

SAMPLE OUTPUT SCREENSHOTS







CONCLUSION

In this paper, It executes the genetic algorithm based on accumulated data to determine the vehicle's optimal driving strategy according to the slope and curvature of the road in which the vehicle is driving and visualizes the driving and consumables conditions of an autonomous vehicle to provide drivers. To verify the validity of the DDS, experiments were conducted on the DDS to select an optimal driving strategy by analyzing data from an autonomous vehicle. Though the DDS has a similar accuracy to the MLP, it determines the optimal driving strategy 40% faster than it. And the DDS has a higher accuracy of 22% than RF and determines the optimal driving strategy 20% faster than it. Thus, the DDS is best suited for determining the optimal driving strategy that requires accuracy and real-time.

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