Machine Learning Approach for Transportation Services using Vehicular Ad hoc Network

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Abstract-- Vehicular networks are very likely to become the most pervasive and applicable of mobile ad hoc networks in this decade. Vehicular ad-hoc networking is an emerging technology for future on-the-road communications. Due to the virtue of vehicle-to-vehicle and vehicle-to-infrastructure communications, vehicular ad hoc networks (VANETs) are expected to enable a plethora of communication-based automotive applications including diverse in-vehicle infotainment applications and road safety services. Even though vehicles are organized mostly in an ad hoc manner in the network topology, directly applying the existing communication approaches designed for traditional mobile ad hoc networks to large-scale VANETs with fast-moving vehicles can be ineffective and inefficient Via inter-vehicle communications, drivers can be informed of crucial traffic information such as treacherous road conditions and accident sites by communicating with each other and/or with the roadside infrastructure. Vehicle position is one of the most valuable pieces of information in a Vehicular Ad hoc Network (VANET). With better knowledge of traffic conditions, it is plausible that the problem of accidents can be alleviated. Machine learning, as an effective approach to artificial intelligence, can provide a rich set of tools to exploit such data for the benefit of the networks. In this paper, simulation will be carried out in Road Traffic simulator to provide the secure communication between the vehicles and avoid traffic congestion.

Keywords-- *Vehicular ad hoc network (VANET), Road safety, Inter-vehicle communication, road traffic simulation, Machine Learning*

I. INTRODUCTION

Vehicular transportation is one of the crucial means of transportation around the world Millions of people around the world die every year in car accidents and many more are injured. More than 1.2 million victims every year all over the world, car accidents are the leading cause of death for humans aged between 1 and 34. Tens of millions of people are injured or disabled every year. Children, pedestrians, cyclists and the elderly are among the most vulnerable of road users [16], therefore, road traffic safety remains a big concern in our daily life. Implementations of safety information such as speed limits and road conditions are used in many parts of the world but still more work is required. The main solution for accident prevention through a proactive approach is to extend the driver's knowledge about the surrounding environment. A number of interesting and desired applications of Intelligent Transportation Systems[1,2,3] (ITS) have been stimulating the development of a new kind of ad hoc network: Vehicular Ad Hoc Networks[1,2,3,4,5] (VANET). These systems are aimed at addressing critical issues like passenger safety and traffic congestion, by integrating information and communication technologies into transportation infrastructure and vehicles. Furthermore, many Intelligent Transportation Systems (ITS) are proposed to utilize information about vehicle traffic through a communication structure. Such systems are useful in many applications including emergency notification systems, vehicle traffic management, and traval information/support. They are built on top of self-organizing networks, known as a Vehicular Ad hoc networks, vehicles are equipped with communication equipment that allows them to exchange messages with each other in Vehicle-to-Vehicle communication (V2V) and also to exchange messages with a roadside network infrastructure (Vehicle-to-Roadside Communication – V2R).

Machine learning allows computers to find hidden insights through iteratively learning from data, without being explicitly programmed. It has revolutionized the world of computer science by allowing learning with large datasets, which enables machines to change, re-structure and optimize algorithms by themselves. Existing machine learning methods can be divided into three categories, namely, supervised learning, unsupervised learning, and reinforcement learning. Other learning schemes, such as semi-supervised learning, online learning, and transfer learning, can be viewed as variants of these three basic types. In general, machine learning involves two stages, i.e., training and testing. In the training stage, a model is learned based on the training data while in the testing stage, the trained model is applied to produce the prediction.

II. LITERATURE SURVEY

Sr No	Paper Title and publication Year	Publish Conference/ Journal	Observation
1.	Title: "Datadriven intelligent transportation systems: A survey	Author: Zhang, F. Y. Wang, K. Wang,	A novel ITS architecture that relies on edge analytics and deep learning to

	Year:2011	Publication:IEEE conference	optimize its computation, latency, reliability, and overall operation
2.	Title: A Comparative Study on Machine Learning Algorithms for Green Context-Aware Intelligent Transportation Systems Year:2017	Author: Adel Mounir Said1, Emad Abd-Elrahman1 and Hossam Afifi2 Publication:IEEE conference	This paper investigated the framework of route selection using context aware decision system in multimodal traffic stations.
3.	Title: Using a Deep Reinforcement Learning Agent for Traffic Signal Control Year:2016	Author: Wade Gendersa,Saiedeh Razavib Publication:IEEE conference	The simulation results for both techniques indicated the pros and cons for each solution and when and where we can propose them in ITS. .
4.	Title: Traffic Light Control Using Deep Policy-Gradient and Value-Function Based Reinforcement Learning Year:2017	Author:Seyed Sajad Mousavi . Publication:IEEE conference	Deep reinforcement learning algorithms with focusing on both policy and value-function based methods to traffic signal control problem in order to find optimal control policies of signalling, just by using raw visual input data of the traffic simulator snapshots .

III. PROBLEM STATEMENT

Today many researcher facing the challenges faced when modelling the vehicular environment and the solutions adopted in the main simulation tools and many researcher concerned with many different problems, from safety related issues to traffic efficiency and from intersection management to Internet access. In this work, we consider machine learning model with appropriate simulator based on its requirements. Consequently, we will try to make some recommendations which take into account the scope of the simulated scenario and the properties of the simulation frameworks. Develop Machine Learning model for providing vehicular framework for reducing the road accident as well as pollution control.

IV. NEED OF PROPOSED SYSTEM

Skin cancer detection using Svm is basically defined as the process of detecting the presence of cancerous cells in image. Skin cancer detection is implemented by using GLCM and Haar Cascading. Gray Level Co-occurrence Matrix (GLCM) is used to extract features from an image that can be used for classification. Haar Cascade is machine learning technique, mainly used for classification and regression analysis. The proposed system deals with creation of application that helps in diagnosis of skin disease. It uses Image Processing to detect diseases The image processing part deals with applying various filters to the images to remove noise and make them uniform. It is necessary to remove the unwanted elements from the image before processing else it will affect the output efficiency. The diagnosing methodology uses Image processing methods and Haar Cascade algorithm. The dermoscopy image of skin cancer is taken and it goes under various preprocessing technique for noise removal and image enhancement. Then the image is undergone to segmentation and even some features are extracted.

V. ARCHITECTURE OF VANET

Vehicular ad hoc networking is an emerging technology for future on-the-road communications. Due to the virtue of vehicle-to-vehicle and vehicle-to-infrastructure communications, vehicular ad hoc networks (VANETs) are expected to enable a plethora of communication-based automotive applications including diverse in-vehicle infotainment applications and road safety services. VANET-specific communication solutions are imperative. VANET is a subset of MANET [2] where nodes represents vehicles moving at high pace and vehicle traffic determined regularity. Vehicular networks share a number of similarities with MANETs in terms of self-organization, self-management, and low bandwidth. However unlike in MANETs, the network topology in vehicular networks is highly dynamic due to fast movement of vehicles and the topology is often constrained by the road structure. Furthermore, vehicles are likely to encounter many obstacles such as traffic lights, buildings, or trees, resulting in poor channel quality and connectivity. Therefore, protocols developed for traditional MANETs fail to provide reliable, high throughput, and low latency performance in VANETs. The propose techniques takes advantage of broadcast nature of VANET to IVC [1] would likely influence driver behaviour, and strongly advocate the use of simulation.

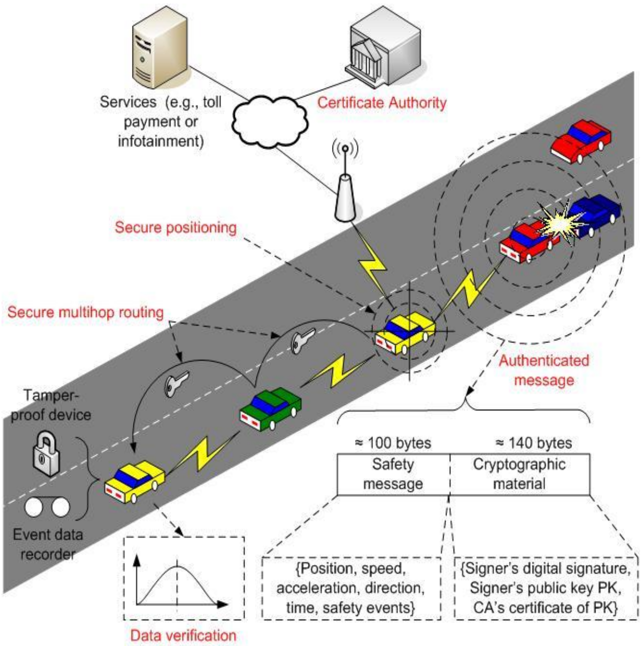

Figure 1: An illustration of a VANET

An illustration of a functional VANET architecture is given in Figure 1. Via wireless communication links, each vehicle communicates with nearby vehicles in a highly dynamic ad hoc networking environment. Traffic-related information can be exchanged via V2V communications (e.g., through periodic beaconing) to allow drivers to be better aware of surrounding traffic conditions. In case of emergency, event-driven messages can be generated and disseminated to the vehicles in the zone of danger (or zone of relevance, ZOR) [14]. Peer-to-peer applications such as information sharing and gaming can also be supported through V2V communications. In the presence of RSUs ,not only can road and traffic conditions (e.g., sharp turns a head)be broad cast to a driver, but drive -thru Internet access(e.g., [15]) can also be made possible for other occupants in the vehicle. Information from are mote data server can be delivered to a vehicle through the Internet backbone and vice versa. Further, the communication service area can been large with the RSU sin place. ThroughV2I communications, infotainment services (such as advertisements, parking lot availability, and automatic tolling) can also be provide with ease.

VI. GOALS AND OBJECTIVE

1. Apply Machine Learning Model for Vehicular Ad Hoc Network.
2. To implement the intelligent transportation system using VANET
3. To analysis the state of vehicles for providing accident free model
4. To analyse is the model with machine learning algorithm for im-proving system

VII. SCOPE

1. Provide the state of vehicle for providing accident free model.
2. Intelligent transportation system using VANET
3. Analyse the pollution

CONCLUSION

As vehicular transportation has become an integrated part of our daily routine, there is a growing demand for inter-vehicle communications and in-vehicle computing. VANETs can realize V2V and V2I communications. This emerging vehicular networking paradigm is considered promising, enabling a wide spectrum of new on-the-road applications including safety, convenience, and comfort services. Vehicular communications are a major component of a future intelligent transportation system. Designed mainly for safety-related reasons, a vehicular network can also be used by applications with a different profile, like traffic management or passenger entertainment. The complexity of analytical models and the financial cost of tests with real hardware have imposed computer simulations as the leading solution for V2X communications research. First point out the factors that differentiate simulating a VANET from modeling a classical MANET. We have briefly introduced the basics of machine learning and then provided some examples of using such tools to learn the dynamics and perform intelligent decision making in vehicular networks. The driver behavior should be considered for designing of delay bounded routing protocols since carry and forward is the mainly approach to deliver packets. Designing an efficient routing protocol for all VANET applications is very hard.

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