ISSN 2395-1621

An Infrastructural Vehicular Cloud Computing Technique for Efficient Traffic Management

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ABSTRACT

Vehicular Ad-Hoc Network is a new technology of wireless sensor network which provides different applications such as Traffic management, vehicle accident avoidance and communication between vehicles. Likewise vehicle's high computation, communication and storage resources are set a ground for vehicular networks to deploy these applications in the future. Now days, vehicular Ad hoc Networks (VANET) has attracted the attention of research area, well-known vehicle manufactures and governments due to its probable applications and explicit characteristics. VCC is a new hybrid technology that has a notable impact on traffic management and road safety by instantly using vehicular resources, like computing, storage and internet for decision making. Upcoming field of wireless network provides different applications such as traffic information for participant vehicles and related authorities. In vehicular cloud computing infrastructure is not fixed, So nodes are highly movable. In VANET, for avoiding the problem of traffic congestion, we have to use clustering.

Keywords:- Vehicular networks ,Road vehicle control ,Intelligent transportation systems ,Cloud computing ,Vehicular cloud computing, VANET, Mobile cloud computing, VANET cloud, Traffic information management, Clustering.

ARTICLE INFO

Article History

Received: 29th May 2017

Received in revised form : 29th May 2017

Accepted: 31st May 2017

Published online : 31st May 2017

I. INTRODUCTION

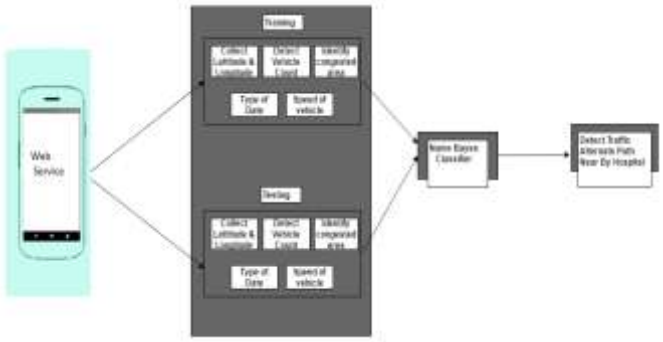
Magnetic Efficient traffic management is becoming of great interest today as traffic congestion becomes a more and more severe problem. Recently, the growth in the number of vehicles on the road has put great stress on transportation systems. This abrupt growth of vehicles has made driving unsafe and hazardous. Throughout the world millions of hours and gallons of fuel are wasted everyday by vehicles stuck in traffic. Therefore, congested flow conditions have a negative impact on the economy, health, and environment. Thus, existing transportation infrastructure requires improvements in traffic safety and efficiency. By using Efficient Traffic Management System, we trying to control the Traffic problem which is increasing day by day. Mobile users in finding the services most suitable for their current task and the best path to reach them start from the current user position. However, due to the lack of information about the current car traffic, the suggested path could not correspond to the optimal one.

We use the Concept of Cloud Computing in this project. Cloud Computing is a type of Internet-based computing that provides shared computer processing resources and data to computers and other devices on demand. It is a model for enabling ubiquitous, on-demand access to a shared pool of configurable computing resources (e.g., computer networks, servers, storage, applications and services), which can be rapidly provisioned and released with minimal management effort. Cloud computing and storage solutions provide users and enterprises with various capabilities to store and process their data in either privately owned, or third-party data centers that may be located far from the user–ranging in distance from across a city to across the world. Cloud computing relies on sharing of resources to achieve coherence and economy of scale, similar to a utility (like the electricity grid) over an electricity network.

II. LITERATURE SURVEY

A Traffic Monitoring System (TMS) is the most important element in the Intelligent Transportation Systems (ITS), especially in a developing country with a mixed traffic flow of vehicles including motor cycles and cars. A traffic flow varies in different daytime, therefore the adoption of the TMS for an adaptive control of the traffic light timing is very essential. The previous TMS system uses one CCD camera mounted to view from the rear of moving vehicles appearing in a distance from a viewed span of the camera to the stop line of the cross-roads, which is denoted by L and statistically determined. The timing of the traffic light can be adaptively adjusted according to the estimated traffic flow which is based on the video sequence captured by the camera in its span on the road, where the gaps between the vehicles are used to determine the density of vehicles appearing in the camera span.

III. SYSTEM MODEL



Training Phase :-

In the training phase, we manually create dataset with the help of the current situation in India. We identify no of the congested area in Pune regions and we recognized that road size is small because lot of ways divided into small parts so traffic is very high. Some of the industrial area has always high traffic. If particular vehicle stuck in particular area that means that place will be a heavy traffic area. Vehicle speed is higher then traffic is very low.

We train Naïve Bayes based on the vehicle available count in that place, that place is congested place, current day has holiday, the speed of that vehicle.

Testing Phase :-

In the testing phase, user provide the source and destination address then system identify latitude and longitude of that places by using Google API. For getting latitude and longitude we need to call web service. We need to generate url based on the given URL.

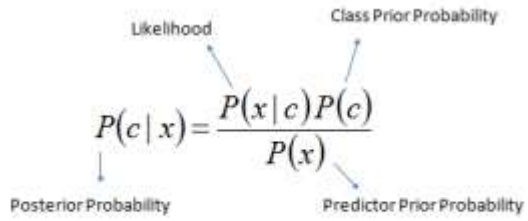
Algorithm:-

We download dataset from and train the Naïve Bayes classifier and classify test instance then we get traffic or not traffic class. Algorithm predicts given place traffic is available or not.

It is a classification technique based on Bayes' Theorem with an assumption of independence among predictors. In simple terms, a Naive Bayes classifier assumes that the presence of a particular feature in a class is unrelated to the presence of any other feature. For example, a fruit may be considered to be an apple if it is red, round, and about 3 inches in diameter. Even if these features depend on each other or upon the existence of the other features, all of these properties independently contribute to the probability that this fruit is an apple and that is why it is known as 'Naive'.

Naive Bayes model is easy to build and particularly useful for very large data sets. Along with simplicity, Naive Bayes is known to outperform even highly sophisticated classification methods.

Bayes theorem provides a way of calculating posterior probability P(c|x) from P(c), P(x) and P(x|c). Look at the equation below:



$$P(c \mid x) = \frac{P(x \mid c)P(c)}{P(x)}$$

$$P(c \mid X) = P(x_1 \mid c) \times P(x_2 \mid c) \times \cdots \times P(x_n \mid c) \times P(c)$$

Above,

P(c|x) is the posterior probability of class (c, target) given predictor (x, attributes).

P(c) is the prior probability of class.

P(x|c) is the likelihood which is the probability of predictor given class.

P(x) is the prior probability of predictor.

Applications of Naive Bayes Algorithms

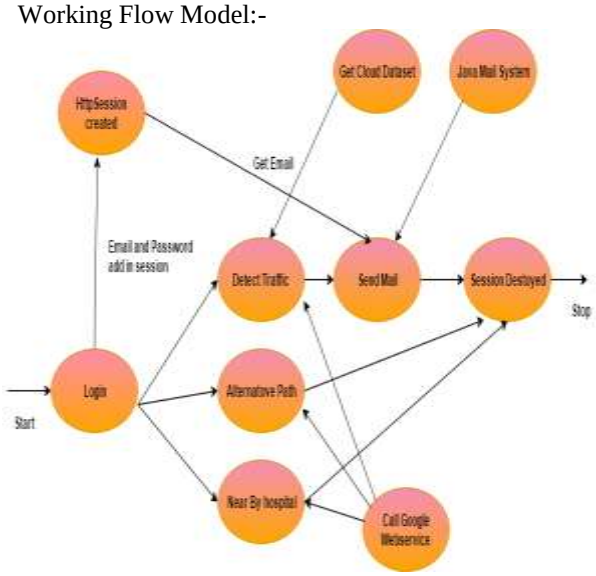
Real time Prediction: Naive Bayes is an eager learning classifier and it is sure fast. Thus, it could be used for making predictions in real time.

Multi class Prediction: This algorithm is also well known for multi class prediction feature. Here we can predict the probability of multiple classes of target variable.

Text classification/ Spam Filtering/ Sentiment Analysis: Naive Bayes classifiers mostly used in text classification (due to better result in multi class problems and independence rule) have higher success rate as compared to other algorithms. As a result, it is widely used in Spam filtering (identify spam e-mail) and Sentiment Analysis (in social media analysis, to identify positive and negative customer sentiments)

Recommendation System: Naive Bayes Classifier and Collaborative Filtering together builds a Recommendation System that uses machine learning and data mining techniques to filter unseen information and predict whether a user would like a given resource or not.

Working Flow Model:-



System functionality:-

When user login then system internally create http session and add all user data in session. This

Session data used in send mail process. When user click on logout system destroy session session.

When we Detect a High Traffic, then it will show the Alternative Path for it .The Web Service will show the Near By Hospital, Near By Restaurants and Near By ATM's which are near from the Source and Destination. For Precaution Purpose When the High Traffic is Detected, the System will send this message by E-mail service to the Registered Emergency Vehicles like Ambulance.

IV. CONCLUSION

Traffic congestion is everyday facing trouble in almost developing and developed countries. This happening makes researchers more interested in and alerts them that Traffic jams is becoming a major challenge. The application of GPS in traffic analysis is proving to be the most effective solution compared to other existing traffic management methods like safety cameras, human inspection, speed governors and tachographs. Mapping of situational road traffic speed at any given time brings out the desired geographic patterns and relationships which are fundamental decision making tools for traffic management

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