Scientific Journal Impact Factor (SJIF): 1.711

e-ISSN: 2349-9745
p-ISSN: 2393-8161

International Journal of Modern Trends in Engineering and Research
www.ijmter.com

SHORT TERM PREDICTION TRAFFIC FLOW USING SOFT COMPUTING SYSTEM

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Abstract— This brief presents with the development of our modern cities, growing traffic problems adversely affect people's traveling convenience more and more, which has become one of the most crucial factors considered in urban planning and design in recent years. Urban traffic congestion is a severe problem that significantly reduces the quality of life in particularly metropolitan areas. It Improved management of flow of traffic, To reduce overall delays through improved planning techniques, To improve traffic flow thought the entire system by providing effective real time information to traffic controllers and thus enhancing the system performance, To improve Optimization time and congestion control. However, frequently constructing new roads is not realistic and untenable in social and economic aspects. In the effort to deal with this intractable problem, so-called intelligent transportation systems (ITS) technologies are successfully implemented widely throughout the world nowadays. Traffic forecasting is a branch of forecasting, and it is an important part of modern transportation planning and intelligent transportation System

Keywords- Fuzzy Logic, Genetic Algorithm

I. INTRODUCTION

Short-term traffic flow prediction has long been regarded as a critical concern for intelligent transportation systems. In particular, such traffic flow forecasting supports 1. development of proactive traffic control strategies in advanced traffic management systems ATMSs; 2.Real-time route guidance in advanced traveler information systems ATISs and 3. evaluation of these dynamic traffic control and guidance strategies as well. In an early report on the architecture of intelligent transportation systems _Cheslow et al. 1992_, it was clearly indicated that the ability to make continuous predictions of traffic flows and link travel times for several minutes into the future, using real-time traffic data, is a major requirement for providing dynamic traffic control and guidance Forecasting is a branch of forecasting, and it is an important part of modern transportation planning and intelligent transportation system. Usually, traffic flow, average speed and travel time etc., are defined as the basic parameters of traffic state Traffic analysis is the process of intercepting and examining messages in order to deduce information from pattern in communication. It can be performed even if the messages are encrypted and cannot be decrypted Traffic analysis task may be supported by dedicated computer software program. Short-term traffic flow prediction has long been regarded as a critical concern for intelligent transportation systems. The data-driven traffic forecasting refers to predicting the future state of a certain transportation system based on the historical data, existing traffic data and the related statistics data On the basis of many existing prediction models, each having good performance only in a particular period, an improved approach is to combine these single predictors together for prediction in a span of periods

Soft Computing System

It is a term used in computer science to refer to problems in computer science whose solutions are unpredictable, uncertain and between 0 and 1. Soft Computing became a formal area of study in Computer Science in the early 1990s. Earlier computational approaches could model and precisely analyze only relatively simple systems. More complex systems arising in biology, medicine, the humanities, management sciences, and similar fields often remained intractable to conventional mathematical and analytical methods. That said, it should be pointed out that simplicity and complexity of systems are relative, and many conventional mathematical models have been both challenging and very productive. Soft computing deals with imprecision, uncertainty, partial truth, and approximation to achieve practicability, robustness and low solution cost. As such it forms the basis of a considerable amount of machine learning techniques. Short-term traffic flow prediction has long been regarded as a critical concern for intelligent transportation systems. In particular, such traffic flow forecasting supports the development of proactive traffic control strategies in advanced traffic management systems, real-time route guidance in advanced traveler information systems and evaluation of these dynamic traffic control.

Short-term Traffic Prediction

The objective of the work in this paper was to predict future traffic variable values over short term intervals. The predicted value may then be either displayed to the traffic operator to allow them to visualise how the predicted value will develop over the near future or to select the best course of action. Traffic monitoring systems generate a large amount of near-real-time and historic traffic data systems at any given Local Authority (LA) at frequent intervals. Traditional data management technologies such as relational databases would be too slow for an on-line IDS that requires near real-time processing to generate the predictions between data collections. Also, the traffic data are often non-stationary so any predictor needs to be able to process non-stationary data while still maintaining fast, flexible processing. Lastly, the predictor should be able to provide accurate multi-step ahead predictions The literature on short-term traffic flow forecasting has undergone great development recently. Many works, describing a wide variety of different approaches, which very often share similar features and ideas, have been published. REAL-TIME evaluation of traffic parameters plays a key role in intelligent transportation systems (ITSs). Forcasting accurate traffic flow conditions have been identified as a proactive approach to regional traffic control, which can be broadly classified as short-term or long-term traffic flow forecasting. Long-term forecasting provides monthly or yearly traffic flow conditions forecasting and is commonly used for long-term planning of transportation Short-term forecasting, on the other hand, focuses on making predictions based on roadway sensor data, about the likely traffic flow changes in the short-term (typically within minutes), and provides the predictive functionality required for a proactive approach to traffic operations and control. This brief focuses on short-term forecasting, where the interest is on producing forecasts after the system receives current traffic flow data from an on-road traffic facility. Advanced traffic management and information system components directly in traffic monitoring data as inputs Furthermore, a more detailed traffic parameter, vehicle classification, provides more useful information. For example, distinguishing and counting.. These system utilize either Historical, current or Projected traffic data Short-term forecasting, focuses on making predictions based on roadway sensor data, likely traffic flow changes in the short-term (typically within minutes)

Fuzzy logic

Fuzzy Logic is an approach to computing based on “Degrees of truth” rather than the usual “true or false ” (0 or 1) Fuzzy logic seems closer to the way our brains work. We aggregate data and form a number of partial truths which in turn when certain threshold are exceeded cause certain

results. A similar kind of process is used in artificial computer neural network and expert system. Fuzzy logic is a form of many-valued logic; it deals with reasoning that is approximate rather than fixed and exact. Compared to traditional binary sets, fuzzy logic variables may have a truth value that ranges in degree between 0 and 1

Genetic Algorithm

In the computer science field of artificial intelligence, a genetic algorithm (GA) is a search heuristic that mimics the process of natural selection. Genetic algorithms belong to the larger class of evolutionary algorithms (EA), which generate solutions to optimization problem using techniques inspired by natural evolution, such as inheritance, mutation, selection, and crossover. Genetic algorithms belong to the larger class of evolutionary algorithms which generate solutions to optimization problems using techniques inspired by natural evolution, such as inheritance, mutation, selection, and crossover. Although alternative approaches such as genetic algorithms and neural network scan perform just as well as fuzzy logic in many cases, fuzzy logic has the advantage that the solution to the problem can be cast in terms that human operators can understand, so that their experience can be used in the design of the controller. In this project generates a population of points at each iteration. The best point in the population approaches an optimal solution. Select the next population by computation which uses the random number generators.

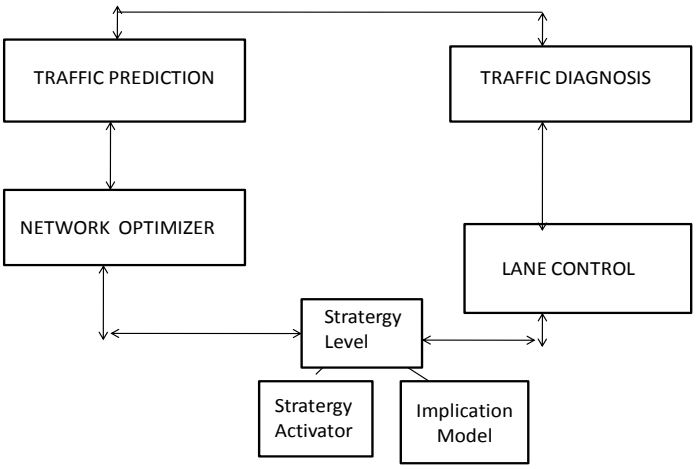

Fig 2: Functional Block Diagram

II. PROBLEM FORMULATION

From Review of Literature We are classified the vehicles according to the speed and configuration by using sensor system and Easse techniniques which are overcome by neural network and traffic flow can be predict by using genetic algorithm which gives the accurate time prediction model by time division method. In this paper We approve and confirm the performance the genetic algorithm and time division neural network using MATLAB software can be carried out. We have design and implement a real-time vehicle classification and counting system based on WSNs Neural networks to develop short-term traffic flow predictors These detector systems usually provide measurements about flow (or volume), speed, and lane occupancy within a transportation network. Prediction problems can therefore be differentiated according to the observed—and predicted, Congestion control and Optimization Problem will be eliminate

III. PREDICTION OF SHORT-TERM TRAFFIC VARIABLES

Fig. 1 shows the common configuration of a section of a freeway, consisting of an on-ramp and an off-ramp at both starting point A and end point B. While drivers at location A intend to go to destination C, forecasting information of future traffic flow condition at B is essential in order for the traffic control center to determine the best route for them. If the traffic flow conditions are forecast to be smooth at B, the traffic control center will allow them to go directly via the freeway to B, leave the freeway by the off-ramp at B, and then reach C. Alternatively, if the traffic flow conditions are forecast to be congested at B, the traffic control center will allow them to leave the freeway by the off-ramp in A, and then use the minor road to reach C.To forecast future traffic flow conditions at B, a short-term traffic flow predictor was eveloped based on traffic flow data collected by five detector stations as illustrated in Fig. 1, where and are located at the off-ramp and on-ramp of respectively, as well as , and are located at the off ramp, on-ramp and through-road of respectively, where traffic flow conditions and at time are captured by the five detection stations and respectively with a sampling period . Fig. 1 shows only the short-term traffic flow predictor which aims to forecast traffic flow conditions at location . In fact, this location can be set at any segment of the freeway, which is important for forecasting the short-term traffic flow conditions. For different segments of the freeway which are important, different short-term traffic flow predictors can be developed. Then, based on the traffic flow conditions forecasts for different segments of the freeway, drivers are more likely to make the correct decision. For example, if two short-term traffic flow predictors are developed to forecast future traffic flow conditions at both locations and , then the future traffic flow conditions at both locations Allow them to go directly via the freeway to B, leave the freeway by the off-ramp at B, and then reach C. Alternatively, if the traffic flow conditions are forecast to be congested at B, the traffic control center will allow them to leave the freeway by the off-ramp in A, and then use the minor road to reach C. To forecast future traffic flow conditions at B, a short-term traffic flow predictor was developed based on traffic

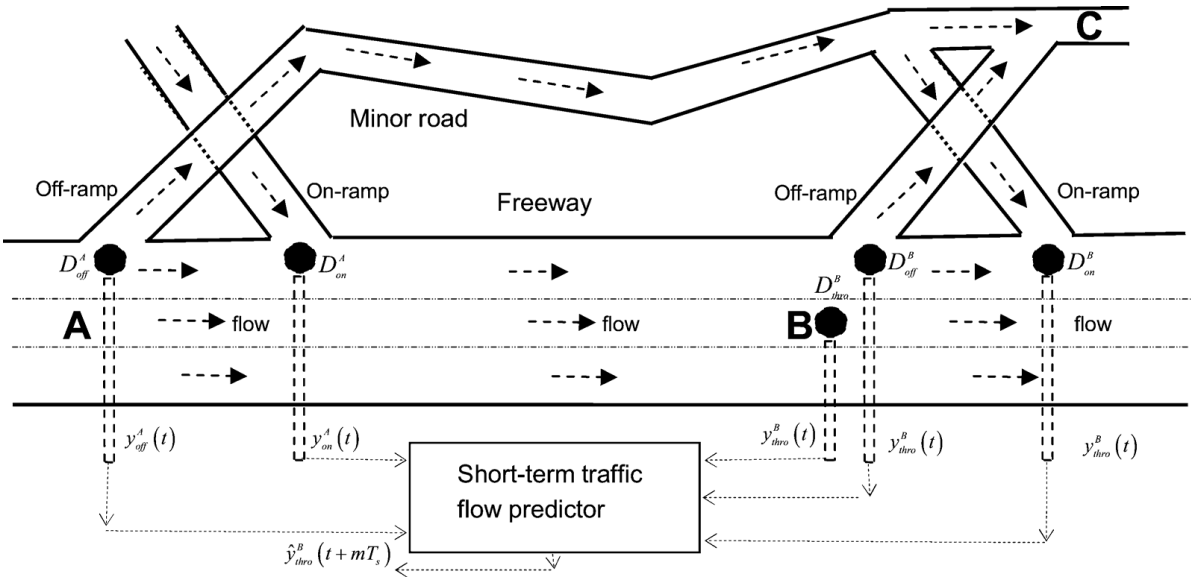

Fig 1: Schematic of short-term traffic flow predictor of a section of the freeway.

flow data collected by five detector stations. and , then the future traffic flow conditions at both locations Allow them to go directly via the freeway leave the freeway by the off-ramp at B, and then reach C. Alternatively, if the traffic flow conditions are forecast to be congested at B, the traffic control center will allow them to leave the freeway by the off-ramp in A, and then use the minor road to reach C. To forecast future traffic flow conditions at B, a short-term traffic flow predictor was developed based on traffic flow data collected by five detector stations.

IV. EXPERIMENTAL RESULTS

S.N.	*HEADING*	*RESULT*
1.	*Prediction of Short-Term Traffic Variables Using Intelligent Swarm-Based Neural Networks*	*APSO uses simple multi-layer NNs to develop short-term flow predictors, which can address the strongly nonlinear characteristics of short-term traffic flow data. Also, these simple multi-layer NNs need much less memory space than that required by the existing hybrid NNs to develop short-term traffic flow predictors,*
2.	*An Intelligent Particle Swarm Optimization for Short-Term Traffic Flow Forecasting Using on-Road Sensor Systems*	*It proposed for the development of short-term traffic flow predictors, By tackling these two time-varying assumptions, the IPSO is developed by integrating the mechanisms of PSO, NN and fuzzy inference systems, to develop short-term traffic flow predictors, whichcan adapt to the time-varying traffic flow data and the time varying configurations of on-road sensor systems*

V. CONCLUSION

1. Improved management of flow of traffic
2. To reduce overall delays through improved planning techniques
3. To improve traffic flow through the entire system by providing effective real time information to traffic controllers and thus enhancing the system performance
4. To improve Optimization time and congestion control

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