International Journal of Research
International Journal of Research (IJR)
e-ISSN: 2348-6848, p- ISSN: 2348-795X Volume 2, Issue 4, April 2015
Available at http://internationaljournalofresearch.org

Review of Short Term traffic Flow Prediction by Soft Computing Techniques

Shruti O. Sarode[1]

[1]Shruti Sarode, Electronics & Telecommunication/ TGPCET/ RTMNU, India
[1]shruti.sarode16@gmail.com

ABSTRACT
As the problem of urban traffic congestion spreads, there is a pressing need for the introduction of advanced technology and equipment to improve the state of- the-art of traffic control. Traffic problems nowadays are increasing because of the growing number of vehicles and the limited resources provided by current infrastructures. The simplest way for controlling a traffic light uses timer for each phase. This paper presents Fuzzy Traffic control logic with genetic Algorithm for short-term traffic flow prediction. Short-term traffic flow prediction has long been regarded as a critical concern for intelligent transportation systems. On this basis of many existing prediction models, each having good performance only in a particular period with real time traffic control logic. Today, traffic flow forecast as one of the topic in intelligent transportation system. In this paper we have gone through a very brief idea on Genetic Algorithm, which is a very new approach for problems related to Optimization. There are many techniques used to optimize a function but in case of optimizing Multimodal Functions most of these techniques face a common problem of robustness. This can be overcome by using Genetic algorithm. through this paper we will learn how the Genetic Algorithm actually works with proper explanation and with some real time examples based on MATLAB.

Keywords/ Index Term—
Intelligent Transportation Sysytem (ITS), Fuzzy Logic, Genetic Algorithm

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. the 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

International Journal of Research
International Journal of Research (IJR)
e-ISSN: 2348-6848, p- ISSN: 2348-795X Volume 2, Issue 4, April 2015
Available at http://internationaljournalofresearch.org

1. GENERAL TERMS

I) 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.

II) 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)

III) 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

International Journal of Research
International Journal of Research (IJR)
e-ISSN: 2348-6848, p- ISSN: 2348-795X Volume 2, Issue 4, April 2015
Available at http://internationaljournalofresearch.org

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

IV) 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,
nd 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.

3. PROBLEM DEFINATION

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.

We have design and implement a real-time vehicle classification and counting system based on WSNs. 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 output

4. Proposed Work Plan

1. Study of Fuzzy Logic and Genetic algorithm

2. Study of Signal strength and sensing system configuration.

3. Our system is proved to be useful in one road section, our next problem is how to improve our system to be practical on a large scale

3. Feature multiple connection between individual neurons

4. TARGETED RESULT

- It aims to address all the issues related to the development of short-term traffic flow predictors
- Gain More accurate traffic prediction
- Large memory space for implementing short-term traffic flow predictors which is usually not available
- Specification of model structures for short-term traffic flow predictors is required

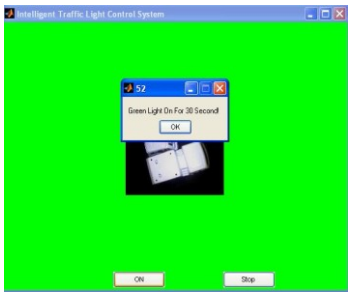
International Journal of Research
International Journal of Research (IJR)
e-ISSN: 2348-6848, p- ISSN: 2348-795X Volume 2, Issue 4, April 2015
Available at http://internationaljournalofresearch.org

Screenshot 1

- Result 1: Matching between 10 to 50% - green light on for 60 seconds

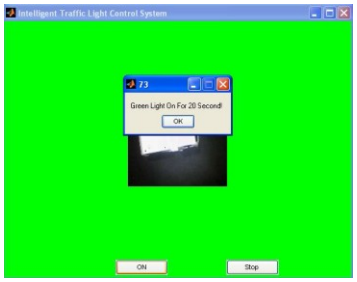
Screenshot 2

- Result 2: Matching between 50 to 70% - green light on for 30 seconds



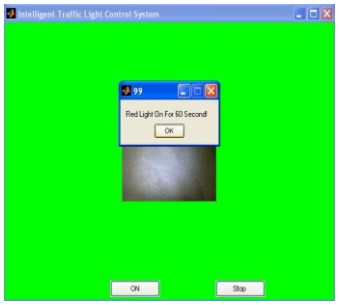
Screenshot 3

- Result 3: Matching between 70 to 90% - green light on for 20 seconds



Screenshot 4

- Result 4: Matching between 90 to 100% - red light on for 60 seconds



5. SUMMARY AND CONCLUSIONS

- It showed that image processing is a better technique to control the state change of the traffic light.
- It shows that it can reduce the traffic congestion and avoids the time being wasted by a green light on an empty road.
- It is also more consistent in detecting vehicle presence because it uses actual traffic images.
- It visualizes the reality so it functions much better than those systems that rely on the detection of the vehicles' metal content.
- Overall, the system is good but it still needs improvement to achieve a hundred percent accuracy
- Genetic Algorithms are Powerful ,Flexible, Easy to use and understand
- Consider using a GA for your next optimization problem

International Journal of Research
International Journal of Research (IJR)
e-ISSN: 2348-6848, p- ISSN: 2348-795X Volume 2, Issue 4, April 2015
Available at http://internationaljournalofresearch.org

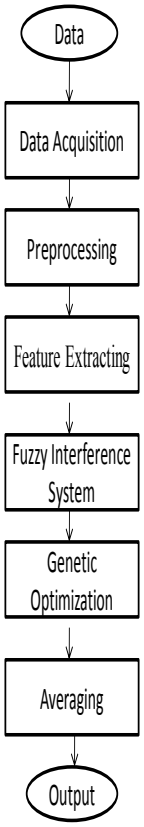


Fig Flowchart of Traffic Flow Forecasting

.

6. OBJECTIVES

The primary objectives of this study can be summarized as follows:

1. Improved management of flow of traffic

2. To reduce overall delays through improved planning techniques

3. To improve traffic flow throught the entire system by providing effective real time information to traffic controllers and thus enhancing the system performance

4. To improve Optimization time and congetion control

7. ACKNOWLEDGMENT

The work reported in this paper forms part of the project, which is supported by the IJREST The project consortium consists of partners including S.Saha HOD ETC TGPCET, Onkar Sarode HOD Govt Poly, Nagpur

8. REFERENCES

[1] Kit Yan Cha Tharam Dillon Elizabeth Chang Jaipaal "Prediction of short term Traffic Variables using Intelligient Swarm based Neural networfk"Technol., vol. 21, pp. 99–124, Jan. 2013.

[2] Saer Taghvaeeyan and Rajesh Rajanmani A. Alessandri, R. Bolla, M. Gaggero, and M. Repetto, "Portable roadside sensor For vehicle Conting and Speed measurment," IEEE Trans. Vol 15 no. February 2014

[3] Vismay Pandit Jinesh Doshi D. J Sanghvi "Smart traffic control system using image Processing" Volume 3, Issue 1, January – February 2014

[4] M. Bottero, B. Dalla Chiara, and F. P. Deflorio, "Wireless sensor networks for traffic monitoring in a logistic center," Transp. Res.— Part C: Emerg. Technol., vol. 26, pp. 99–124, Jan. 2013.

[5] EasiSee:Real-Time Vehicle Classification and Counting via Low-Cost Collaborative Sensing Rui Wang, Member, Lei Zhang, Kejiang Xiao, Rongli Sun, and Li Cui, Member, IEEE TRANSACTIONS ON INTELLIGENT TRANSPORTATION SYSTEMS, VOL. 15, NO. 1, FEBRUARY 2014

[6] M. Bottero, B. Dalla Chiara, and F. P. Deflorio, "Wireless sensor networks for traffic monitoring in a logistic center," Transp. Res.—Part C: Emerg. Technol., vol. 26, pp. 99–124, Jan. 2013.

[7] IEEE TRANSACTIONS ON CONTROL SYSTEMS TECHNOLOGY, VOL. 21, NO. 1, JANUARY 2013 263 Prediction of Short-Term Traffic Variables Using Intelligent Swarm-Based Neural Networks Kit Yan Chan, Member, IEEE, Tharam Dillon, Fellow, IEEE, Elizabeth Chang, Senior Member, IEEE,