

# Multi-Scale Prediction Method of Highway Traffic Flow Based on Artificial Intelligence

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## Article Info

Volume 83

Page Number: 5753 - 5758

Publication Issue:

July - August 2020

## Abstract

In recent years, as the era of electronic payment has brought about the development of intelligent multi-scale forecasting of highway traffic in my country, it has also been developed because of its late start. Expressway intelligence, in simple terms, is the combination of human operation intelligent technology, digital transmission and analysis and professional skills mastery in the process of highway management. This technology can imitate people's thinking and analysis capabilities to ensure that the original plan is normal run. The core point of the goal of realizing highway intelligence is the relationship between the road, the driving vehicle and the owner and the establishment of a relatively stable and efficient transportation route. From the perspective of intelligent areas that have implemented multi-scale prediction of expressway traffic, it is mainly reflected in the form of ETC, multi-scale prediction of networked traffic, that is, according to the province or larger area, a one-time payment method is adopted for all-in-one cards. Form a complete set of intelligent flow multi-scale prediction system system, maximize the consideration of road users and economic development needs, effectively solve the closed flow multi-scale prediction system generated by different attributions or business entities and improve the efficiency of expressway use and service quality, Reduce the corresponding energy consumption and lay a good foundation for the sustainable development of highways in our country.

**Keywords:** Expressway, Traffic, Forecast;

## Article History

Article Received: 25 April 2020

Revised: 29 May 2020

Accepted: 20 June 2020

Publication: 28 August 2020

## 1. Introduction

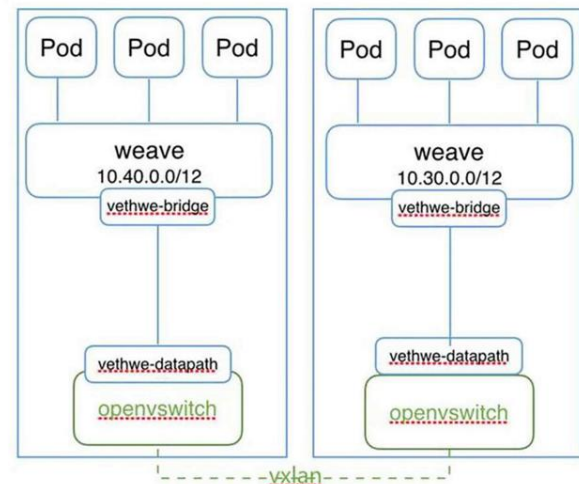
At present, most places are paying more and more attention to the problem of intelligent highway management and there have been more significant results in the development of highways. Internet technology is now popular in all fields and is used in most areas of our country. At the same time, the promotion of Internet smart technology has brought it into a new era and regulatory work has gradually increased. It is easy to see that the integration of Internet technology and highway management can promote the good operation of highways and further promote the economic development of our country.

## 2. Research on artificial intelligence technology

Because the highway intelligent management system

needs a lot of electromechanical equipment, the integration of the Internet and computer information can complete the overall goal of information intelligence and has accumulated experience in the intelligent management process of highways. By collecting and analyzing the monitored vehicle data, real-time monitoring of the road surface is achieved to ensure safety; according to the analysis of the current state of highway development, the distribution of highway monitoring is unreasonable, which makes it impossible for cameras to capture or monitor in many places. In response to this situation, A high-level monitor should be installed to photograph the actual conditions of the road. In the last step, the monitoring of each road surface and the images of the camera can be collected together to

realize the comprehensive monitoring of road monitoring. The establishment of related management units for expressways can improve the perfection of intelligent equipment and can also promote the production of final results and provide humans with a more superior driving environment. At the same time, staff should pay attention to the intelligent management of electromechanical equipment on expressways. The needs of the company are in the first place. For most car owners, reasonable real-time supervision information is particularly important. Therefore, the road conditions can be analyzed through the cameras and map software on the highway and can be transmitted to the car owners on time, so that the car owners have a more correct judgment on the road. Another main link is the safety reminder system of the driving vehicle. When the car is driving on the road, the speed can be measured with the help of positioning and map software and the real-time road condition can be broadcast by voice. If the vehicle exceeds the average speed, the owner will be reminded to slow down and information can be transmitted to each other. Function to ensure the normal operation of the management phase. In order to ensure the establishment of intelligent highway equipment management, it is also necessary to improve the professional knowledge and skills of staff and cultivate their management capabilities, so as to enhance the true level of staff or leaders and ultimately provide more and more intelligent management of highways Professionals<sup>[1]</sup>. The network system is in the figure below.

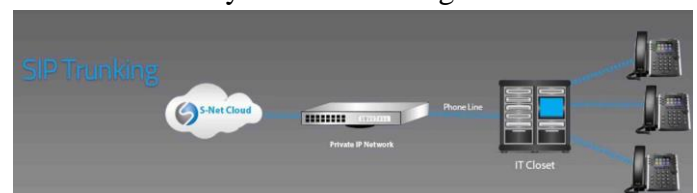


**Figure1.**Network system.

### 3. Expressway flow control

#### 3.1. Reduce computer viruses

Nowadays, modern technology is constantly advancing and computer networks occupy a significant proportion in people's lives. However, with the popularity of computer use, more and more malicious damage has increased sharply and computer viruses are occurring more and more. The more frequently. In response to this problem, a series of solutions are urgently needed. First of all, the most urgent need is to establish a firewall to exert force against computer viruses. Moreover, the use of firewalls should be popularized in various fields, including toll collection and network transmission of information. In this way, viruses can be reduced. The possibility of violation<sup>[2]</sup>. The traffic network system is in the figure below.

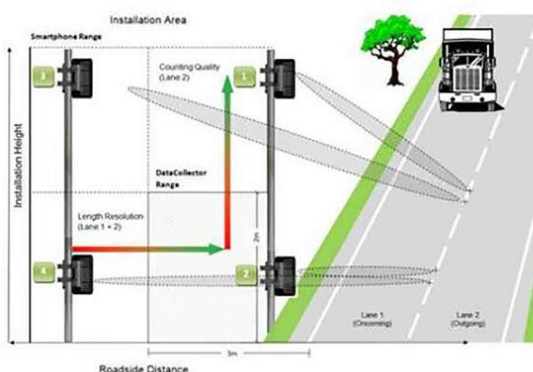


**Figure2.**Network traffic system.

#### 3.2. Reduce network vulnerabilities

Network operation is an integrated and complex process. Therefore, even if it is highly technological, it is prone to some problems and loopholes in operation. In this regard, strict inspection measures should be taken during the handover between networks. For example, special security scanning

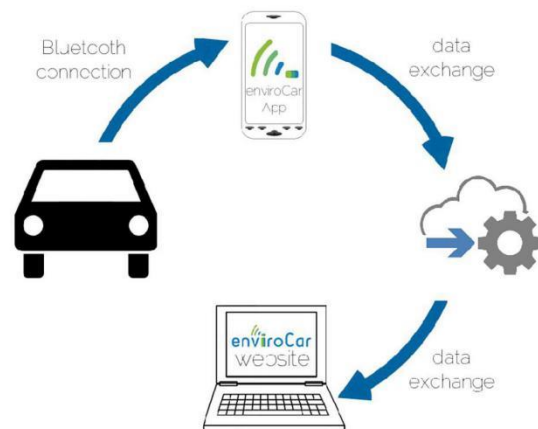
tools can be set up to check whether there are security loopholes in the network. In addition, it can also be used to check the target server and database to obtain rigorous and accurate results about security, which provides a huge force for network security. The use of network security scanning has many positive meanings. First of all, many people do not know how to accurately set up network systems. The emergence of security scanning is the gospel of these people. It can not only provide people with accurate network settings, but also It can test whether the equipment is qualified, scan out the defects in it and scan out all dangerous and extremely problematic software. Second, after scanning the network device, if there are unsafe and uncertain factors, the scanning system can give corresponding suggestions for improvement. Third, network security scanning is convenient and quick. In fact, there are many ways to check for vulnerabilities and one method that everyone can think of is manual inspection, which is to manually check the network system one by one to find out the existing defects. At the same time, this method brings huge challenges to people's work. Faced with such a huge amount of work, the workload of manually finding vulnerabilities and configuring methods is very staggering. The network security scanning system can very well alleviate users. This burden will undoubtedly cause a huge workload to people and there will be no such problems when using a network scanning system<sup>[3]</sup>. The network management system is in the figure below.



**Figure3.**Network management system.

### 3.3. Improve identity authentication

One of the things that cannot be ignored in strengthening network security is the effective inspection of each staff. Therefore, whether it is the traffic multi-scale forecasting department or the information transmission department, it is necessary to stipulate the scope of its relevant staff and strictly control it. Access to other content and supplies that are not within their scope cannot be used at will. When carrying out multi-scale forecasting of traffic and sending messages, the applicant's personal information must be strictly checked and the identity must be checked carefully to avoid any illegal operations by fake personnel. In addition, the confidentiality of files must be strengthened and no one is allowed to access any files without obtaining a satisfactory permission<sup>[4]</sup>. The network design system is in the figure below.

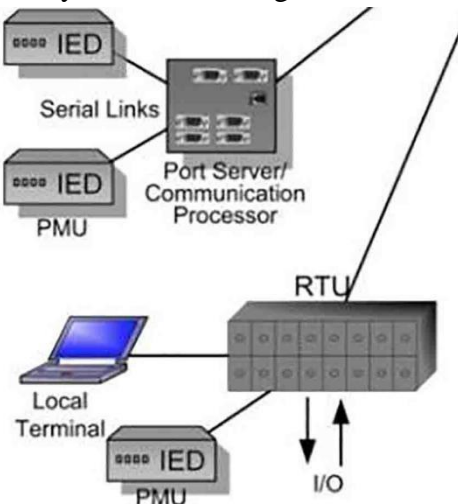


**Figure4.**Network design system.

### 3.4. Strengthen information transmission

In the network security work, the transmitted information is the object that needs to be protected and is the core of the network transmission content. Therefore, ensuring that the information is not arbitrarily tampered with or lost during the transmission process is the basic premise. In addition, users need to be absolutely protected for their privacy when they use the Internet to communicate. Therefore, the privacy of information is also very important. It is a respect for user privacy and there must be no leakage or external

dissemination. For example, as a key content in people's lives, the security of its information concerns the interests of almost everyone. Therefore, the encryption and protection of bank information is an important task of network work. The network system is in the figure below.



**Figure5.**Network system.

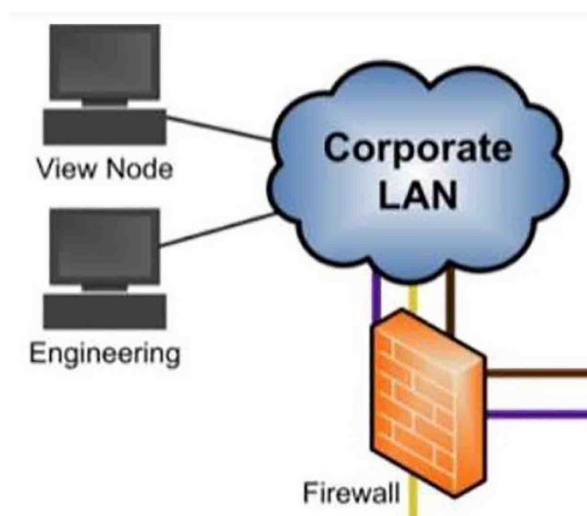
#### **4. Expressway flow optimization**

##### *4.1. Convenience and effectiveness optimization of flow multi-scale forecasting*

The intelligent multi-scale prediction of expressway flow has a positive impact on reducing the operating cost of expressways. The construction of the intelligent network system for multi-scale prediction of expressway flow enables the convenience and effectiveness of the entire multi-scale prediction process of expressway flow to be fully demonstrated. For example, it provides relatively obvious convenience for the corresponding car owners to pay fees. With the help of the Internet platform, the corresponding traffic multi-scale forecasting system and the major payment platforms (WeChat, Alipay, QQ wallet, etc.) The traffic multi-scale prediction system can directly transfer the required fees to the payment platform through the dedicated pass card and the user can directly make real-time recharge and query settings in the background of the dedicated pass card after signing a contract in accordance with the corresponding program terms. In this process, the intelligent

multi-scale prediction of expressway flow fully reflects the convenience and safety of capital flow, realizes the maximum simplification of the flow multi-scale prediction procedure and reduces the participation of relevant flow multi-scale prediction staff, thereby enabling high-speed Road operating costs have been reduced across the board. At the same time, the intelligent multi-scale prediction of expressway flow can improve the efficiency of multi-scale prediction of flow, effectively save the time of corresponding drivers and passengers, ensure that they can realize non-stop payment during high-speed driving and alleviate the problem of highway vehicle congestion during peak traffic flow. , Improve the fluency and effectiveness of expressway traffic. During this period, the intelligent flow multi-scale forecasting has improved the multi-scale forecast settlement rate and settlement accuracy of the entire expressway flow, simplified settlement management procedures and then achieved the goal of reducing operating settlement costs; expressway vehicles are in intelligent flow multi-scale flow When predicting station traffic, compared to traditional traffic multi-scale forecasting, the overall multi-scale forecasting of traffic takes shorter time and the intelligent traffic multi-scale forecasting can minimize the allocation of traffic multi-scale prediction lanes, saving highway space and reducing expressway operators. Construction costs and management costs; it can be seen that the intelligent multi-scale prediction of expressway traffic has a significant effect on reducing expressway operating costs<sup>[5]</sup>. The LAN network system is in the figure below.





**Figure6.**LANNetwork system.

#### 4.2. Increase the profit point of expressway operation

The intelligent multi-scale prediction of expressway traffic can increase the profitability of expressway operations. Its intelligent network system construction makes the application of intelligent touch all-in-one machine, real-time electronic map of road conditions, WeChat official account query and various mobile phone applications widely popularized and more convenient. While meeting people's travel needs, it can also directly understand the local weather conditions and regional road conditions through it; therefore, relevant operators can combine the actual situation to place nearby attractions maps and hotel accommodation advertisements on the application and corresponding Long-term cooperation between tourist attractions and hotel companies and other entertainment venues and regular fees for advertising, are formed to provide convenient information and thoughtful services for high-speed traffic crowds. At the same time, increase operating profit points, comprehensively improve highway profitability and realize The offset of operating costs will then achieve the goal of reducing the operating costs of expressways<sup>[6]</sup>.

#### 5. Conclusion

At present, there are still many shortcomings in our country's highway equipment management process, which has caused many bad factors for the

intelligent development of highways. Therefore, in order to change the current situation, it is necessary to improve the intelligent supervision of equipment, use complete management regulations, infiltrate Internet technology, strengthen the complete combination of network information and electromechanical equipment, complete the ultimate goal of highway intelligence and further ensure the intelligence of highway electromechanical equipment. Significantly improved management technology.

#### Acknowledgments

Hebei Provincial Colleges and Universities Science and Technology Research Project: "AI-based Research on Advanced Forecasting Technology of Expressway Traffic Flow on Major Holidays", project number: QN20200418, project leader: Liu Jie.

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