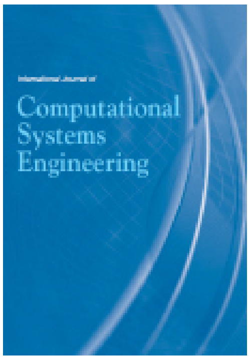

International Journal of Computational Systems Engineering

ISSN online: 2046-3405 - ISSN print: 2046-3391
https://www.inderscience.com/ijcsyse

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DOI: 10.1504/IJCSYSE.2025.10060247

Article History:

Received:	31 May 2023
Last revised:	17 July 2023
Accepted:	28 July 2023
Published online:	08 October 2025

Application of electronic information technology based on optical sensors in intelligent transportation systems

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Abstract: Electronic information technology plays an important role in intelligent transportation systems, providing efficient, convenient and safe solutions for traffic management. This article explored the application of electronic information technology based on optical sensors in Intelligent transportation systems (ITS) and optimised ITS through electronic information technology. The algorithm used was a transportation path optimisation algorithm based on electronic information technology, which can optimise the transportation path, thereby improving transportation efficiency and reducing transportation costs. Through experiments, it showed that the recognition accuracy of traditional transportation path optimisation algorithms for the shape of goods, colour of goods, length of roads, and length of tunnels was 91.26%, 93.63%, 94.51%, and 92.45%, respectively. However, based on this algorithm, the recognition accuracy for various indicators was 95.47%, 96.22%, 98.91%, and 97.84%, respectively, which indicated that the algorithm proposed in this paper has better recognition performance.

Keywords: intelligent transportation systems; ITS; electronic information technology; optical sensors; transport experience.

Reference to this paper should be made as follows: Wang, L., Luo, G. and Lv, J. (2025) 'Application of electronic information technology based on optical sensors in intelligent transportation systems', *Int. J. Computational Systems Engineering*, Vol. 9, No. 16, pp.1–9.

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1 Introduction

Intelligent transportation system (ITS) refers to a system that utilises technologies such as artificial intelligence, the internet of things (IoT), and big data to intelligently manage and optimise the transportation process. It can achieve real-time tracking of goods, intelligent planning of transportation routes, dynamic allocation of transportation resources, optimisation of transportation costs, and other functions, thereby achieving the goals of improving transportation efficiency, reducing costs, improving service quality, and customer satisfaction. As an important technology, electronic information technology has a wide range of applications. It greatly optimises the way people live and work, and increases productivity and efficiency, thus contributing to socio-economic development. Therefore, ITS can be optimised through electronic information technology. In this paper, the transportation system will be optimised through electronic information technology to improve the transportation efficiency and reduce the transportation cost.

After consulting relevant materials, the following scholars' research on ITS is listed. Venkadavarahan Marimutu believed that urban freight systems play a very important role. He analysed various characteristics of the supply chain, and studied freight travel and freight time travel patterns in different industries and institutions. He initially studied the dynamics and robustness of the supply chain characteristics involved in the urban freight system at the micro level. At the same time, he conducted correlation tests to understand the relationship between supply chain characteristics and freight itinerary under different confidence intervals. The freight rates of different industrial sectors were estimated, and compared with various Goodness of fit indicators. The time travel model of urban freight was evaluated and visualised (Venkadavarahan and Marisamynathan, 2021). Li pointed out that nowadays, the pressure on urban logistics is increasing, and public transportation operators are facing huge challenges and trade-offs. Therefore, he proposed a mixed integer linear programming model to help the urban freight service network minimise the total freight time of the station hub. In addition, he also designed an efficient improved optimisation algorithm based on artificial bee colony algorithm, which reduced the congestion level of logistics transportation (Li, 2022). Shramenko studied the planning mode of tram freight operations in green logistics system, and pointed out that the concept of ecological logistics is seen as an effective material management method and related flow to reduce environmental and economic damage. In addition, he also developed a simulation model that was used to study the concept of green logistics with variable supply and transportation demands for small goods implemented through electric vehicles (Shramenko, 2022). Beheshtian studied the impact of extreme weather on regional freight systems, and pointed out that freight systems are highly susceptible to climate disasters when exposed to them. To this end, he studied the impact of extreme weather on long-term inter regional commodity flows, and investigated the vulnerability of transportation infrastructure and changes in the allocation of commodity flow routes (Beheshtian et al., 2018). For the research work of this topic, the above research topic has explored ITS from multiple directions, which has certain reference value.

After consulting the materials, the following research literature on ITS and electronic information technology was found. Mesnik believed that the use of information technology is one of the factors contributing to the innovation potential of transportation enterprises. With the emergence of the digital economy, transportation companies have strengthened their influence on the international market by introducing information systems and automatic indexing technology tools. He pointed out that artificial intelligence and electronic information technology would become indispensable tools for transportation enterprises and service organisations, and the rapid development of digital ecology and information technology in transportation enterprise activities would become important boosters for the development of the freight logistics market (Mesnik, 2020). Kherbach studied electronic information technology and systems in the transportation supply chain. He believed that the transportation and movement of goods are one of the most important human needs, and the operation of transportation determines the efficiency of product movement. The progress of information technology can improve the delivery speed, service quality, and operating costs of freight. Moreover, he fully explored the logistics process in supply chain management and the application prospects of information technology in the field of transportation logistics (Kherbach et al., 2022). After reading the above article, it can be seen that the research of the above scholars provides an excellent research direction for this topic. However, these studies are limited to the theoretical level and lack practicality and authenticity.

In this study, electronic information technology was used to optimise the ITS. By using electronic information technology based transportation path optimisation algorithms, rapid planning of transportation paths was achieved, thereby improving the transportation experience. It was proved through experiments that in the process of 1–10 Km transport path optimisation, the traditional transport path optimisation algorithm's path optimisation time increased from 547 ms to 843 ms, while the path optimisation time of this paper's algorithm increased from 539 ms to 757 ms. This showed that this paper's algorithm was faster in path optimisation and can complete the transport path optimisation operation in a shorter time. The innovation of this article lies in the use of optical sensors and electronic information technology to improve ITS, thereby optimising transportation routes, saving transportation costs, and improving transportation experience.

2 ITS and electronic information technology

2.1 *Definition and operation process of ITS*

ITS refers to a system that utilises advanced computer, network, and communication technologies to comprehensively manage and optimise the logistics transportation process (Fried, 2018; Singh et al., 2021). It can achieve real-time monitoring and management of goods, vehicles, warehouses, and other information, while improving the efficiency, safety, and reliability of logistics transportation through data analysis and algorithm optimisation. The operation process of an ITS generally includes the following steps:

2.1.1 Data collection and transmission

By utilising IoT technology, real-time monitoring and collection of goods, vehicles, warehouses, and other information are carried out, and data is transmitted to the system through the internet. The accuracy and stability of data collection and transmission have a significant impact on subsequent transportation path planning, vehicle scheduling, and other aspects. Therefore, it is necessary to strictly control data quality, and to continuously improve and optimise data collection and transmission methods. The main steps include as follows:

- Equipment selection and layout: It is necessary to select suitable equipment for data collection based on the actual situation of logistics transportation, such as GPS (Global Position System) locators, sensors, etc. and arrange the equipment according to the plan.
- Data collection: real-time monitoring and collection of goods, vehicles, warehouses, and other information are carried out using equipment, and relevant data indicators are collected, such as quantity of goods, temperature, humidity, weight, speed, etc.
- Data reprocessing: before sending the data to the system, the data must be pre-processed and cleaned to ensure its accuracy and validity. First, data compression is a common pre-processing operation. By compressing the data, we can reduce the occupation of storage space and improve the efficiency of data transmission. Compression techniques can be implemented according to different algorithms, such as lossless compression and lossy compression, by choosing the appropriate compression methods according to the data type and requirements. Second, filtering is another common reprocessing operation. Filtering technology can help to remove the noise and interference in the data and extract an effective signal. This is particularly important for signal processing and sensor data, where different filtering algorithms such as low pass, high pass and band pass filtering can be applied to accommodate different data features and requirements. In addition, removal is also an important part in the pretreatment process. In large-scale data processing, repeated data records will often occur, which will increase the burden and error of data processing. By removing operation, duplicate data can be eliminated and the efficiency and accuracy of data processing can be improved. Finally, the format conversion is a necessary step in the pre-processing process. Different systems and applications may have different requirements on the format of the data, so it may be necessary to transmit the data to the system to ensure the validity and compatibility of the data.
- Data transmission: using IoT technology, pre-processed data is transmitted to cloud servers through wireless networks. Common transmission methods include wired data transmission, wireless network transmission, Bluetooth, etc.

2.1.2 Data storage and processing

The collected data is stored on a cloud server and processed using big data analysis technology to extract valuable information and patterns. The quality and efficiency of data storage and processing have a decisive impact on the operational effectiveness of the entire ITS. Therefore, it is necessary to adopt advanced data management technologies and related tools to continuously optimise and improve database structure and algorithm models, and pay attention to data security and privacy protection. The main steps include as follows:

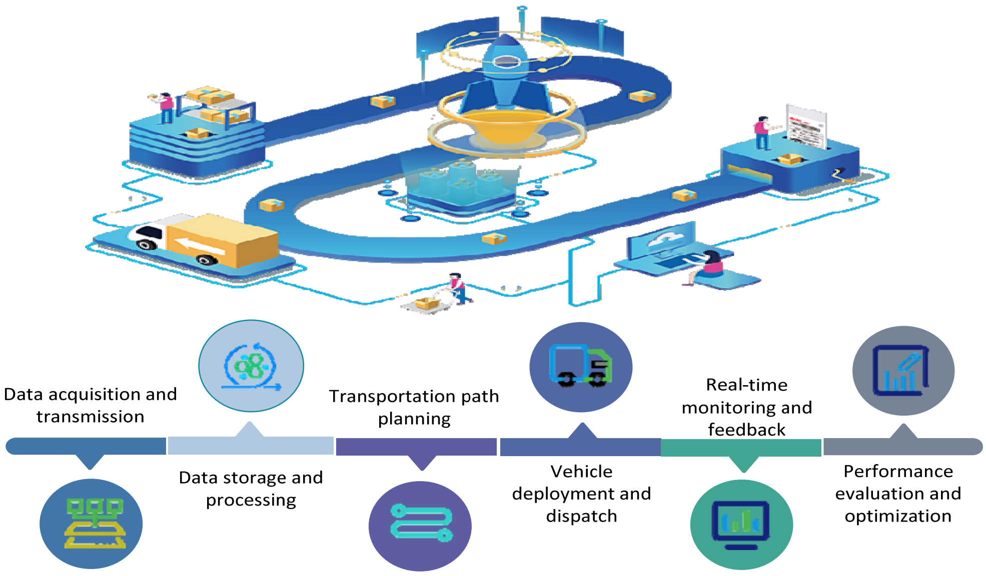
- Data reception and processing: through IoT technology, the collected data is transmitted to the cloud server and processed accordingly. These operations include data cleaning, data compression, format conversion, data standardisation, etc.
- Data analysis and mining: using big data analysis techniques, stored data is researched and mined in depth, so that patterns and trends behind the data can be discovered, and valuable information and knowledge can be extracted.
- Data backup and recovery: to avoid data loss or damage, it is necessary to regularly backup the data on the cloud server, and set up corresponding fault tolerance mechanisms and emergency recovery plans.

2.1.3 Transportation path planning

Based on data analysis and algorithm optimisation, optimised transportation plans and paths can be developed to improve the efficiency and safety of logistics transportation. In addition, it is necessary to select appropriate algorithms and technical means, and make corresponding adjustments and optimisations based on actual scenarios, in order to continuously improve and improve the efficiency and quality of path planning. The main steps are as follows:

- Path planning algorithm selection: it is necessary to select the appropriate path planning algorithm based on specific logistics transportation scenarios and needs. The aim is to optimise the delivery path, delivery time, and reduce costs of goods, thereby improving overall transportation efficiency and customer satisfaction.
- Transportation demand analysis: it is necessary to clarify transportation goals, constraints, and optimisation goals based on transportation needs and cargo characteristics, such as minimum time, shortest distance, minimum cost, etc.
- Map data preparation: It is necessary to build a map database suitable for transportation scenarios, including information such as roads, transportation facilities, and traffic flow, in order for path planning algorithms to calculate.

Figure 1 Operation flowchart of ITS (see online version for colours)



- Path calculation and optimisation: based on the above information, the optimal transportation path is calculated using a path planning algorithm, and corresponding optimisation and adjustment are made.
- Result presentation and feedback: the calculation results are presented to relevant personnel through a visual interface, and corresponding feedback and warning information are provided to support real-time decision-making and management.
- Real-time update and iteration: as the transportation process changes and data updates, it is necessary to update and iterate the path planning in a timely manner to ensure the optimisation and reliability of logistics transportation.

2.1.4 *Vehicle allocation and scheduling*

In ITS, dispatching and scheduling vehicles based on transportation plans and paths is a key step in ensuring the timeliness and accuracy of logistics transportation (Centobelli et al., 2020; McKinnon, 2021). Vehicles need to be deployed and dispatched through intelligent algorithms and data analysis techniques, and in conjunction with real-time road conditions, cargo types, traffic conditions and other factors. This maximises the use of vehicle resources, thus ensuring the timeliness and accuracy of logistics transport. The key processes are detailed as follows:

- Determination of transport needs: it needs to determine the type, quantity, destination and time requirements of the transported goods according to customer needs and transportation plans, so as to facilitate subsequent scheduling arrangements.
- Transportation plan generation: based on existing vehicle information, transportation needs, and other factors, a reasonable transportation plan has been designed, including vehicle configuration, route planning, distribution planning, etc. This can maximise the utilisation of vehicle resources, thereby improving transportation efficiency and service quality.
- Vehicle dispatch: tasks should be assigned to appropriate vehicles based on the transportation plan and vehicle status, and corresponding starting and ending points should be specified to ensure that vehicles arrive at their destination on time and complete the task.
- Vehicle scheduling: after the vehicle departs, real-time monitoring and communication methods can be used to obtain vehicle location and status information. Based on factors such as road conditions, urgency of goods, traffic conditions, etc. vehicle driving routes and delivery plans can be adjusted in a timely manner to ensure timely completion of tasks.

2.1.5 *Real-time monitoring and feedback*

In ITS, real-time monitoring and management of goods, vehicles, etc. can be achieved through IoT technology, enabling timely detection of abnormal situations and providing early warning feedback. This is conducive to solving problems and improving service quality and user satisfaction (Atz, 2019; Bidisse, 2021). The following is a detailed explanation of its main process:

- Sensor collection: through IoT sensors, various data such as temperature, humidity, and vibration of goods can be collected in real-time and uploaded to cloud platforms for processing.
- Early warning and feedback: Through cloud platforms, automatic warning and feedback of abnormal situations can be achieved, and warning information and abnormal reports can be sent to relevant personnel, thereby promoting timely resolution of problems.

- Real-time monitoring: by using IoT devices to monitor and track goods and vehicles in real-time, including data on cargo location, vehicle travel status and transport progress, transport efficiency and service quality can be improved.

2.1.6 Performance evaluation and optimisation

Performance evaluation and optimisation of various links in the transportation process through data analysis and feedback information is one of the important links in ITS. Through continuous optimisation and improvement, the quality and efficiency of logistics transportation can be improved, and user satisfaction and enterprise competitiveness can be enhanced. The main process is as follows:

- Performance evaluation: based on the results of data analysis, vehicle dispatch, distribution plans, transportation routes have been evaluated, and an evaluation index system has been developed, such as cargo accuracy, timely delivery rate, transportation costs, etc. which can facilitate subsequent performance optimisation.
- Performance optimisation: based on the evaluation, combined with business needs and user feedback, optimisation plans have been developed, such as adjusting vehicle configuration, optimising transportation routes, improving distribution plans, etc. which can improve transportation efficiency and service quality.
- Feedback information: through channels such as cloud platforms and mobile applications, timely feedback on performance evaluation and optimisation plans can be provided to users, transportation personnel, and management personnel for timely adjustment and improvement.
- Continuous improvement: in the process of performance optimisation, it is necessary to continuously collect user feedback, market trends and other information, and continuously improve and innovate business processes, technical means to keep up with the pace of industry development.

The operational process of the ITS is shown in Figure 1.

2.2 Application of electronic information technology in intelligent transportation

ITS include various technological means, such as electronic information technology, the IoT, cloud computing, big data analysis, artificial intelligence, etc. which can be applied to various fields of logistics transportation, such as urban distribution, cross-border e-commerce, cold chain logistics, etc. (Furtak, 2021; Mustapha et al., 2022). Through ITS, enterprises can reduce operational costs and improve the quality of logistics services, thereby meeting the growing needs of consumers. At the same time, it also helps to achieve green and low-carbon logistics, which can promote the sustainable development of the logistics industry. Among them, the application of electronic information technology in ITS mainly includes the following aspects:

2.2.1 Traffic information collection and processing

Traffic information collection and processing is the process of collecting traffic data using sensors, cameras, and other devices, and then analysing and processing it using electronic information technology. These data can cover content such as traffic flow, speed, and vehicle location, and can be used for real-time monitoring and prediction of traffic conditions. Through in-depth analysis of these data, traffic managers can develop better transportation planning and route design, thus improving traffic efficiency and reducing congestion.

2.2.2 Traffic control and dispatch

Traffic control and scheduling is the process of using electronic information technology to control and schedule traffic signals, traffic signs, etc. which can optimise road flow and reduce congestion. Through electronic information technology, the time of signal lights and the display content of traffic signs can be automatically adjusted based on real-time traffic conditions, which can maximise traffic efficiency and safety. In addition, it can be integrated with other traffic management systems to better coordinate road traffic and achieve more efficient urban traffic management.

2.2.3 Intelligent navigation and path planning

By utilising technologies such as electronic information, electronic maps, and GPS, real-time road condition information and navigation guidance can be provided to drivers, which can optimise path planning and improve transportation efficiency. In ITS, the best route can be recommended based on real-time data of traffic conditions and vehicle locations, which can avoid congestion and congested roads and help drivers reach their destination faster and safer. In addition, intelligent navigation can also provide other services, such as voice prompts, upcoming landmarks and service facilities, search for nearby shops and restaurants, etc. which can improve the driver's driving experience.

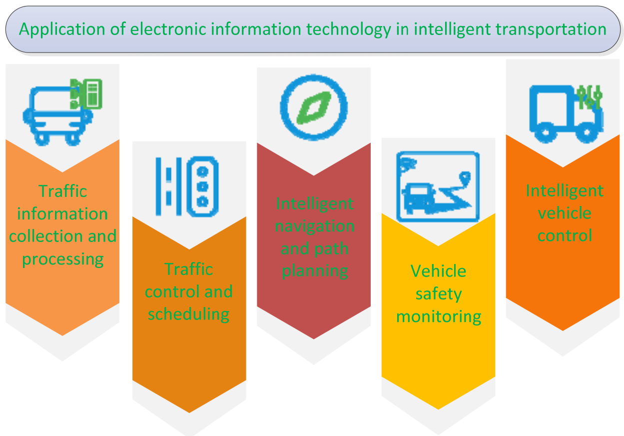
2.2.4 Vehicle safety monitoring

In ITS, electronic information technology can be used to monitor the driving status of vehicles in real-time, such as speed, braking, steering, etc. by installing onboard cameras, sensors, and other devices, in order to improve the safety of vehicles (Boykov and Kulapat, 2018). By detecting the behaviour of drivers and the condition of vehicles, and issuing alerts or taking other necessary measures based on this data, such as automatic braking, reducing speed, and reminding drivers to pay attention to safety, traffic accidents can be reduced. In addition, it can also record and store vehicle driving data for subsequent analysis and investigation, and help improve driver behaviour and vehicle design to further improve vehicle safety.

2.2.5 Intelligent control of vehicles

In the process of vehicle transportation, electronic information technology can be used to intelligently control the vehicle, including functions such as autonomous driving and automatic parking, which can improve the driving efficiency and safety of the vehicle. By using sensors, cameras, radar and other devices to perceive the surrounding environment, and utilising algorithms and artificial intelligence technology for data analysis and decision-making, autonomous driving operations can be achieved. This can help drivers reduce fatigue and improve driving comfort. At the same time, it can also reduce traffic accidents caused by driver negligence or error. In addition, automatic parking technology can be utilised to reduce the time drivers spend searching for parking spaces in parking lots, thereby improving the parking efficiency of vehicles.

Figure 2 Application of electronic information technology in intelligent transportation (see online version for colours)



The application of electronic information technology in intelligent transportation is shown in Figure 2.

3 Transportation path optimisation algorithm based on electronic information technology

When optimising the transportation path, optical sensors are first used to identify the goods to obtain information such as their shape and colour, and automatic classification, recognition, and counting functions are implemented. This can improve the efficiency and accuracy of logistics processing. After that, optical sensors can be used to obtain information such as the height and width of objects such as roads, bridges, and tunnels, which can provide more accurate path planning and navigation services for logistics transportation.

In the logistics warehouse, in order to improve the transportation efficiency, the required goods are usually concentrated in a transport vehicle for transport. For example, operations can simplify the logistics process and ensure that the goods can be delivered to the destination quickly and accurately. You can say it in this way:

$$\sum\nolimits_{j=1}^{n} G_{ij} = 1 \quad (1)$$

Among them, G_{ij} is the matrix data of logistics warehouses and transportation vehicles.

In order to ensure safety and effectiveness, it is necessary to ensure that the total amount of cargo carried by the transport vehicle does not exceed its maximum load capacity. Restrictions are designed to ensure the stability and handling of the transport vehicle on the road and to prevent accidents from exceeding the carrying capacity. The total amount of goods transported shall not exceed the maximum load of the transport vehicle, namely:

$$T_j \geq \sum\nolimits_{i=1}^{k} P_i \quad (2)$$

Among them, T_j is the maximum load of the j^{th} transport vehicle; vehicle j needs to transport a total of k warehouses of goods; P_i is the receiving quantity of logistics warehouse i.

After that, it is necessary to calculate the penalty cost for vehicles transporting goods beyond the time limit:

$$T_p = \beta * \left(D_{ij} - E_i\right) \quad (3)$$

Among them, β is the overtime cost coefficient per unit time. E_i is the latest acceptance time for unloading. D_{ij} is the time when the j^{th} transport vehicle arrives at the i^{th} logistics.

The total time required for all transportation vehicles to deliver the goods is:

$$S_a = \sum\nolimits_{j=1}^{k} \left(V_s - V_e^k\right) \quad (4)$$

Among them, V_s is the time when the vehicle departs from the logistics centre. V_e^k is the time when the k^{th} logistics item returns to the logistics centre after the vehicle is transported.

Finally, the total cost of logistics transportation is calculated as:

$$L = \sum\nolimits_{j=1}^{q} \sum\nolimits_{i=1}^{k} M_{km} * R_{ij} + T_p \quad (5)$$

Among them, q is the number of vehicles transported. R_{ij} is the distance between logistics warehouse i and logistics warehouse j. M_{km} is the transportation cost per kilometre of the vehicle.

The transportation path optimisation algorithm based on electronic information technology is an algorithm that utilises computer technology and information processing technology to optimise the path during the transportation process. It can collect and analyse relevant logistics transportation data, and solve the optimal path through algorithms, thereby achieving efficient, fast, and safe operation of the logistics system.

Through the above algorithms, the optimisation of the logistics and transportation path can be realised. This algorithm takes into account cargo classification, identification and counting, as well as information on roads, bridges, tunnels, etc. while also considering the maximum load and time limit of the transport vehicle. It can realise the optimisation of logistics transportation path, improve logistics efficiency, reduce costs, and ensure that goods can be delivered to the destination on time and safely.

4 Implementation and testing of ITS based on electronic information technology

During transportation, detecting and identifying the status of goods and road conditions is a very important operational step, therefore, it is necessary to conduct experimental tests on the recognition ability of this algorithm. In the experiment, four recognition objects were selected: the shape of the goods, the colour of the goods, the length of the road, and the length of the tunnel. The experiments tested the recognition ability of traditional transportation path optimisation algorithms and transportation path optimisation algorithms based on electronic information technology. The recognition accuracy is shown in Table 1.

In Table 1, the recognition accuracy of traditional transportation path optimisation algorithms for the shape and colour of goods was 91.26% and 93.63%, respectively, and the recognition accuracy for the length of roads and tunnels was 94.51% and 92.45%, respectively. The recognition accuracy of the transportation path optimisation algorithm in electronic information technology for the shape of goods, colour of goods, length of roads, and length of tunnels was 95.47%, 96.22%, 98.91%, and 97.84%, respectively. It was evident that the transportation path optimisation algorithm based on electronic information technology had significantly improved its recognition accuracy after the use of optical sensors.

Table 1 Recognition accuracy of different algorithms

	Traditional transport path optimisation algorithm	*Transport path optimisation algorithm based on electronic information technology*
The shape of the goods	91.26%	95.47%
The colour of the goods	93.63%	96.22%
The length of the road	94.51%	98.91%
The length of the tunnel	92.45%	97.84%

After that, the path optimisation speed of the algorithm was tested. This indicator is also very important, as it directly affects the efficiency and performance of the algorithm and is related to the time taken for transportation. The experimental data is shown in Figure 3.

By analysing the data in Figures 3(a) and 3(b), it was found that the path optimisation time of traditional transportation path optimisation algorithms increased from 547 ms to 843 ms in a path of 1–10 km, while the path optimisation time of transportation path optimisation algorithms based on electronic information technology increased from 539 ms to 757 ms. This indicated that the path optimisation of the algorithm in this paper was faster, and it can complete the optimisation calculation of the transportation path in a shorter time.

Figure 3 Path optimisation time of different algorithms, (a) the path optimisation time of traditional transportation path optimisation algorithms, (b) path optimisation time of transportation path optimisation algorithm based on electronic information technology (see online version for colours)

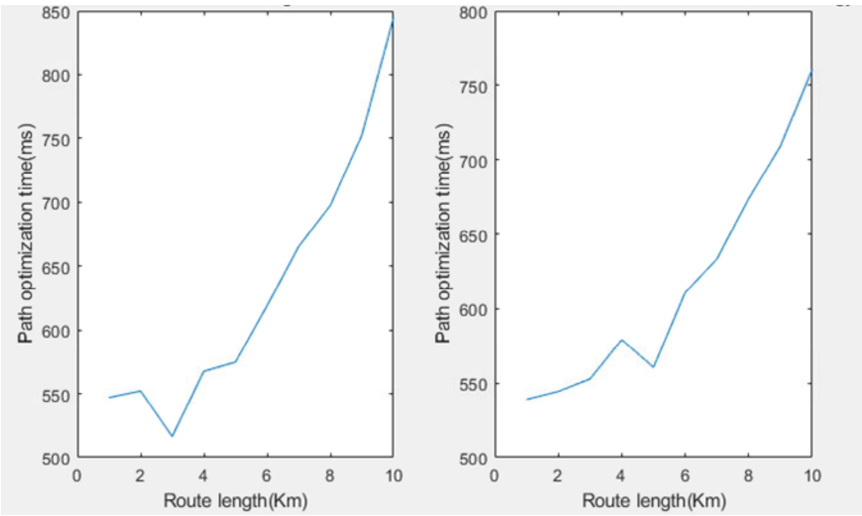


Figure 4 Evaluation diagram before and after using the ITS, (a) evaluation chart before using ITS, (b) evaluation chart after using ITS (see online version for colours)

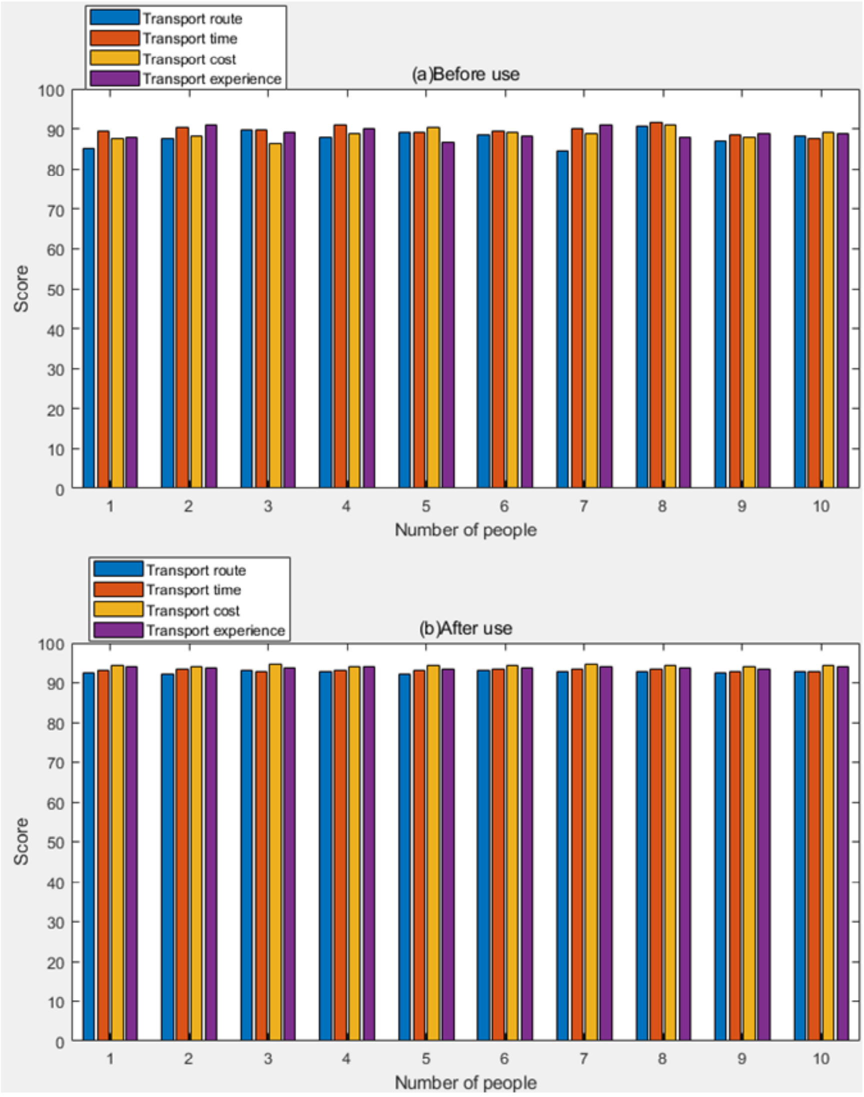


Table 2 Basic information of employees

Gender		*Length of service*		
Male	*Female*	*Age ≤ 3*	*3 < Age ≤ 5*	*5 < Age*
52.32%	47.68%	32.25%	33.71%	34.04%

In the experimental part of this study, the actual usage effect of an ITS constructed based on electronic information technology was tested. In the experimental survey, a certain logistics and transportation company was first selected, and then basic information about the employees of that logistics and transportation company was collected and counted. The statistical results are shown in Table 2.

According to the employee information of the logistics company in Table 2, it can be seen that the company had slightly more male employees than female employees. In addition, their seniority distribution was relatively balanced. In the experimental survey, four evaluation indicators were selected: transportation route, transportation time, transportation cost, and transportation experience, and survey questionnaires were distributed to employees. The questionnaire surveyed employees' satisfaction with various evaluation indicators before and after using the ITS, with a total score of 100. The survey results are shown in Figure 4.

According to the data in Figures 4(a) and 4(b), before using the ITS, the employees of the company rated the transportation route, transportation time, transportation cost, and transportation experience as 87.79, 90.13, 88.62, and 89.34, respectively. After using the ITS, employees' evaluation scores for transportation routes, transportation time, transportation costs, and transportation experience were 92.65, 93.33, 94.54, and 93.76, respectively. Obviously, after using the ITS, the various transportation indicators of the logistics company were optimised. It not only optimised transportation routes and reduced transportation time, but also saved transportation costs and improved transportation experience.

In the field of ITS, the latest research pays more attention to the comprehensive use of cutting-edge technologies such as artificial intelligence, big data analysis and cloud computing to optimise ITS. For example, the latest paper mentions the use of deep learning algorithms to predict traffic congestion in order to adjust traffic plans and routes in a timely manner (Nguyen, 2018). In addition, a security scheme based on blockchain technology is proposed to protect the security and integrity of transport data (Pournader, 2020). In this paper, through electronic information technology, goods and roads can accurately identify, and it also can provide a fast path optimisation speed, which can complete the optimisation calculation of the transportation path in a shorter time.

5 Conclusions

In the era of rapid growth in the logistics economy, ITS have gained widespread adoption in modern logistics transportation fields due to their significant advantages and practicality. These systems have become a vital means of improving logistics efficiency and reducing costs. This article focused on utilising electronic information technology to optimise and enhance the ITS. By employing optical sensors and leveraging real-time monitoring and analysis of transportation data, accurate transport plans and routes can be formulated, leading to improved transportation efficiency and reduced costs. Furthermore, this system ensures transportation safety and enhances the overall customer experience. Additionally, through integration with other logistics systems, it enhances the overall efficiency and service quality of the logistics supply chain. The article also introduced a transportation path optimisation algorithm based on electronic information technology. To explore the optimisation degree of this technology on ITS, questionnaire surveys were conducted during the experiment. The results showed that the use of ITS by logistics companies optimised all transportation indicators. It not only improves the transportation route, shortens the transportation time, saves costs, and also enhances the transportation experience. However, the transportation path optimisation algorithm based on electronic information technology used in this article still has the following shortcomings: due to the knowledge involved in multiple fields, the optimisation algorithm needs to comprehensively consider various parameters of the logistics system, resulting in complex practical operations. In addition, due to insufficient security in algorithm design, there are risks such as hacker attacks and data leakage.

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