Hindawi
Advances in Multimedia
Volume 2023, Article ID 9827657, 1 page
https://doi.org/10.1155/2023/9827657

*Retraction*

# Retracted: Analysis of Intelligent Transportation System Application Based on Internet of Things and Big Data Technology under the Background of Information Society

**Advances in Multimedia**

Received 15 August 2023; Accepted 15 August 2023; Published 16 August 2023

Copyright © 2023 Advances in Multimedia. This is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

This article has been retracted by Hindawi following an investigation undertaken by the publisher [1]. This investigation has uncovered evidence of one or more of the following indicators of systematic manipulation of the publication process:

(1) Discrepancies in scope
(2) Discrepancies in the description of the research reported
(3) Discrepancies between the availability of data and the research described
(4) Inappropriate citations
(5) Incoherent, meaningless and/or irrelevant content included in the article
(6) Peer-review manipulation

The presence of these indicators undermines our confidence in the integrity of the article's content and we cannot, therefore, vouch for its reliability. Please note that this notice is intended solely to alert readers that the content of this article is unreliable. We have not investigated whether authors were aware of or involved in the systematic manipulation of the publication process.

Wiley and Hindawi regrets that the usual quality checks did not identify these issues before publication and have since put additional measures in place to safeguard research integrity.

We wish to credit our own Research Integrity and Research Publishing teams and anonymous and named external researchers and research integrity experts for contributing to this investigation.

The corresponding author, as the representative of all authors, has been given the opportunity to register their agreement or disagreement to this retraction. We have kept a record of any response received.

## References

[1] D. Wang, W. Xu, and X. Jia, "Analysis of Intelligent Transportation System Application Based on Internet of Things and Big Data Technology under the Background of Information Society," *Advances in Multimedia*, vol. 2022, Article ID 6001355, 11 pages, 2022.

Hindawi
Advances in Multimedia
Volume 2022, Article ID 6001355, 11 pages
https://doi.org/10.1155/2022/6001355

*Research Article*

# Analysis of Intelligent Transportation System Application Based on Internet of Things and Big Data Technology under the Background of Information Society

**Di Wang, Weijing Xu, and Xuesong Jia**

*School of Information and Control Engineering, Shenyang Urban Construction University, Shenyang Liaoning 110000, China*

Correspondence should be addressed to Di Wang; 160301102@stu.cuz.edu.cn

Received 26 August 2022; Accepted 29 September 2022; Published 17 November 2022

Academic Editor: Tao Zhou

Copyright © 2022 Di Wang et al. This is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

With the growth of national economic strength, urban modernization has become an indispensable part. Among them, urban road traffic congestion has become the main problem affecting work and traffic. Traffic pressure promotes the massive use of Internet of Things and other technologies in the transportation system. The integration of computer, Internet of Things and transportation system forms a new intelligent transportation concept. With the advent of intelligent information society, the application of intelligent transportation is imminent. In view of the shortcomings of urban intelligent transportation, this paper uses Internet of Things technology and big data technology to study it. Firstly, it analyzes the function and value of IoT intelligent transportation, analyzes the system components from the construction principle, and makes full use of intelligent technology to improve the transportation system. Secondly, the optimal path algorithm is proposed in the IoT urban intelligent transportation system model. The advantages and disadvantages of genetic algorithm and heuristic algorithm are analyzed, and ant colony algorithm is used for further optimization. In order to verify the feasibility of the intelligent transportation system, technologies such as big data edge computing are also used to comprehensively evaluate and study the use of the system. Finally, we analyze the results of the practical application of the intelligent transportation system under the Internet of Things technology. The research results show that the urban intelligent transportation system, supported by the Internet of Things technology, can realize the dynamic planning of the optimal route, help the people to improve their driving experience in the high safety and intellectualization, and greatly avoid a series of problems caused by congestion.

RETRACTED

## 1. Introduction

At present, the population has a great impact on the traffic environment. With the rapid development of China's economy and society, cars have become the means of travel for more and more people, which have led to serious traffic problems in China in recent years. At the same time, our society is in the tide of intelligent and information technology, and intelligent transportation comes into being. Many cities have begun to study how to integrate intelligent systems into traffic operations [1]. The rapid increase in the number of vehicles, urban road congestion, traffic accidents, and the impact of natural ecological environment are all the contents that need to be considered in the intelligent transportation system. In order to speed up the urban informatization construction and ensure the people's living needs, countries first integrate the Internet of Things technology with transportation to solve the common problems of urban transportation [2]. The computer academic community has carried out more in-depth research in this area, with the purpose of making the interaction between people and machines more convenient and efficient [3, 4]. The intelligent transportation system is a design based on the traditional transportation system, which uses sensors and tracking and positioning functions to improve the intelligent level. Among them, communication transmission, sensor transmission, and the Internet mobile are common [5]. Developed countries are relatively early in facing the increase of population and number of vehicles, so they have used many modern technologies in traffic optimization and integrated different technologies to realize the extensive functions of intelligent transportation system [6].

Intelligent transportation system is a new urban transportation system, which integrates information technology, automation technology, sensor technology, computer processing system, etc., and applies it to the whole ground urban transportation system reasonably. In this way, it can give full play to its intelligent control function, promote the operation efficiency of urban transportation system, reduce traffic congestion, traffic accidents, and fuel consumption in traffic jams. It not only reduces travel costs and saves travel time but also realizes energy conservation and environmental protection. Most intelligent traffic management uses sensors to collect data and upload it to the central control area, and the control platform generates passwords and instructions to assist manual work, so as to ease the traffic by layering and restricting traffic. The manual intervention in this management mode is quite obvious. It needs three aspects of simultaneous management to improve the traffic efficiency of the road [7]. With the improvement of related technologies, the automatic management of IoT based on perception and sensing has effectively solved the above problems [8]. This technology needs to be based on 5 g and big data to improve the judgment and analysis ability of the system from a global perspective. In order to realize the maximum utilization of road resources, active intelligent traffic management also needs to effectively collect and analyze data [9]. Therefore, we need to comply with the following points in building the IoT intelligent transportation system: first, select the appropriate data processing technology to collect information in real time during the operation of the intelligent transportation system, and complete the analysis and mastery of the data. Secondly, in the system construction, application function analysis should be carried out for multiple scenarios, which needs to have a global view and the whole system to avoid the waste of system resources [10, 11]. Finally, it is necessary to comprehensively and continuously monitor and master the urban traffic operation status.

## 2. Materials and Methods

With the rapid development of Internet of Things technology, intelligent transportation system has been widely used in urban traffic design in various countries. By installing sensing devices in roads, bridges, and vehicles, remote positioning and navigation can be realized with the help of satellite positioning systems, overcoming the difficulties in time and distance, and achieving real-time supervision and control. Wireless sensor network technology is mainly used in intelligent transportation. This technology can better know the position and movement of objects. It is composed of one sensing node after another. It can continuously collect various information of objects through sensors, and has a wide range of applications. In the process of using the intelligent system, our requirements for ITS informatization development are also constantly improving [12]. The introduction of advanced Internet of Things technology can provide more effective transportation assistance for residents' life, work, and travel. It can be seen that the integration of IoT technology and intelligent transportation requires the intelligent setting of the transportation system [13]. Collecting and detecting real-time data through intelligent transportation system can reduce the time of manual management and free people's hands [14]. In addition, the application of Internet of Things technology in intelligent transportation system is also an important process to improve command and dispatching, and plays an indispensable role in avoiding large-scale traffic paralysis and improving travel convenience [15]. Finally, the intelligent transportation system also needs to promote driving safety and standardization. Before the establishment of the system, the traffic rules in the complex environment should be integrated into it, and the vehicle navigation should be used as the carrier to realize the monitoring of the driving path in combination with internet data transmission [16].

Since the 1970s, the United States has paid attention to energy and traffic problems, and tried to develop a new management system to solve traffic efficiency and congestion [17]. This kind of management strategy has significantly improved energy conservation and traffic convenience, which is also the initial form of intelligent transportation system [18]. Today, the penetration rate of ITS in the United States has reached more than 85%, and even more than 90% in some regions, such as Los Angeles and New York, and the relevant technologies are more advanced. In the transportation system of the United States, 40% of its intelligent transportation applications are mainly in vehicle safety. Moreover, relevant facilities such as ETC and electronic toll collection also account for almost 20%. Finally, the management technology of road vehicles and the positioning and navigation systems of traffic vehicles, ships and aviation also account for 15%. The last 10% are applied in commercial vehicle management systems. At present, the key technologies and fast developing countries of urban intelligent transportation system are still developed countries in Europe and America. They believe that solving traffic pollution and alleviating traffic pressure is the key to urban construction. In addition, the intelligent transportation system also puts forward new strategic directions for industrial development, international competition, safety improvement, and other issues [19–21]. The research on dynamic development level in Japan is not as good as that in Europe and America. The actual situation of their traffic is that the road surface is narrow and the information collection points are few [22–24]. The management of vehicles and roads is relatively separated. Although the intelligent system has been initially built, it cannot operate completely and independently. Therefore, the acquisition of traffic information and data is relatively simple, and the accuracy and timeliness cannot be guaranteed. Their country's traffic management is still based on the monitoring of street light signals, and manual management and intervention are adopted. This way is relatively lack of overall planning and planning of routes. The construction of intelligent transportation system in China is also relatively late, and there is no targeted implementation standard, and there is a lack of resource allocation. This

RETRACTED

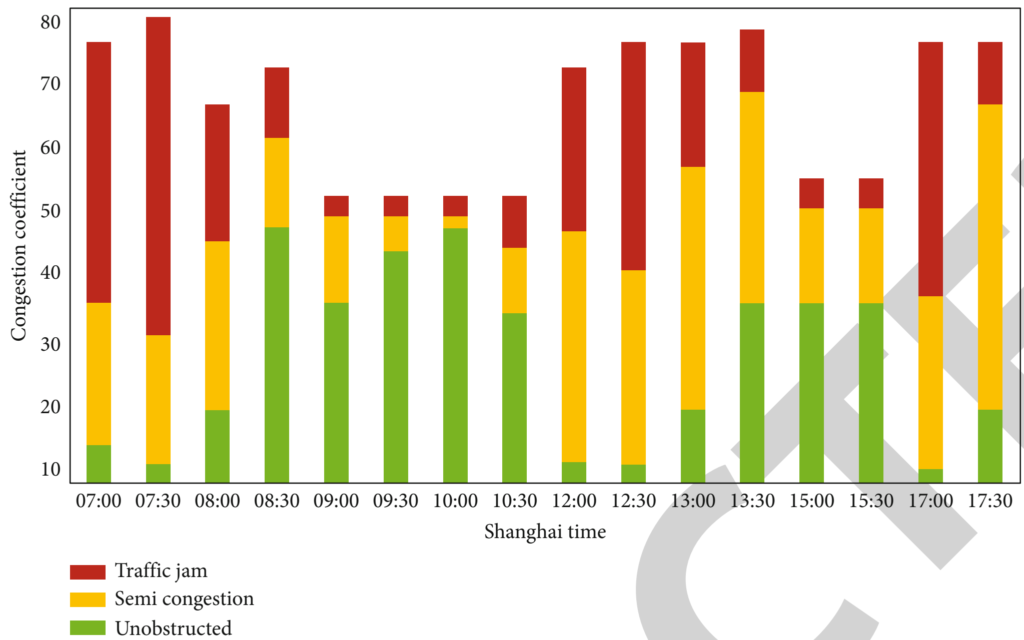


Figure 1: Congestion in different time periods.

leads to a gap in the design of transportation systems between cities. In order to improve the performance of domestic transportation system, this paper builds an intelligent transportation system based on Internet of Things and big data technology based on the above situation. Explore the application and effect evaluation of intelligent transportation system from the aspects of dynamic interaction of traffic command and optimal route optimization.

## 3. Results and Discussion

*3.1. Research on Optimal Path Algorithm of Urban Intelligent Transportation System Based on Internet of Things Technology.* The core of intelligent transportation system is the path planning problem of dynamic vehicles. How to improve the speed of path planning algorithm is the premise to ensure the better and faster development of the whole intelligent transportation system. At present, the representative shortest path algorithm is Dijkstra's algorithm, whose time complexity is $O(n^2)$. However, because Dijkstra's algorithm is a NP complete algorithm, it is difficult to meet the real-time requirements of navigation system due to its high time complexity in the face of many nodes of urban traffic network.

China's economy is developing rapidly, and the scale of urban construction is also expanding. The explosive population growth has brought about significant changes in the distance and scope of personnel movement. Traffic demand has become the main problem to be solved in modern urban construction. With the advent of the information society, intelligent transportation supported by the Internet of Things in science and technology has always been the key content of urban modernization. We randomly selected a city and compared its traffic congestion over time, as shown in Figure 1.

It can be seen from Figure 1 that the red part represents the extremely serious traffic congestion during this period, and the green part represents the normal traffic. According to the figure, the traffic pressure is high in the morning, middle, and evening of Shanghai. It can be seen that the gap between urban areas and development levels has different demands on the transportation system. However, the traditional traffic planning system is not comprehensive and accurate enough in processing data and information. At this time, the intelligent transportation system brings new solutions for traffic. This integration of automatic analysis can not only realize the dynamic acquisition of information but also ensure efficiency and accuracy in the process of re transmission. Compared with the traditional transportation mode, the intelligent transportation system can alleviate the specific problems of urban traffic. For example, when taking the bullet train, you can use the mobile phone to make data online payment. When waiting for the train, you can dynamically monitor the arrival of the vehicle and understand the waiting time through the Internet. If you lose something in the process of taking the bus, you can also find the vehicle running path by intelligent positioning. There are many research literatures on intelligent transportation systems in European and American countries, and we make statistical comparison, respectively, as shown in Figure 2.

It can be seen from Figure 2 that in terms of years, the research on intelligent transportation system in the United States is earlier and there are many published documents. The number of studies in Japan, Britain, and other countries is comparable. Although China started late in the intelligent transportation system, the number has also been significantly improved. According to the literature, the functions of the intelligent transportation system can be reflected in the following ways: first, the understanding of the road condition information. In the intelligent system, users can understand the real-time road conditions in their travel activities; grasp the precautions for travel and relevant

RETRACTED

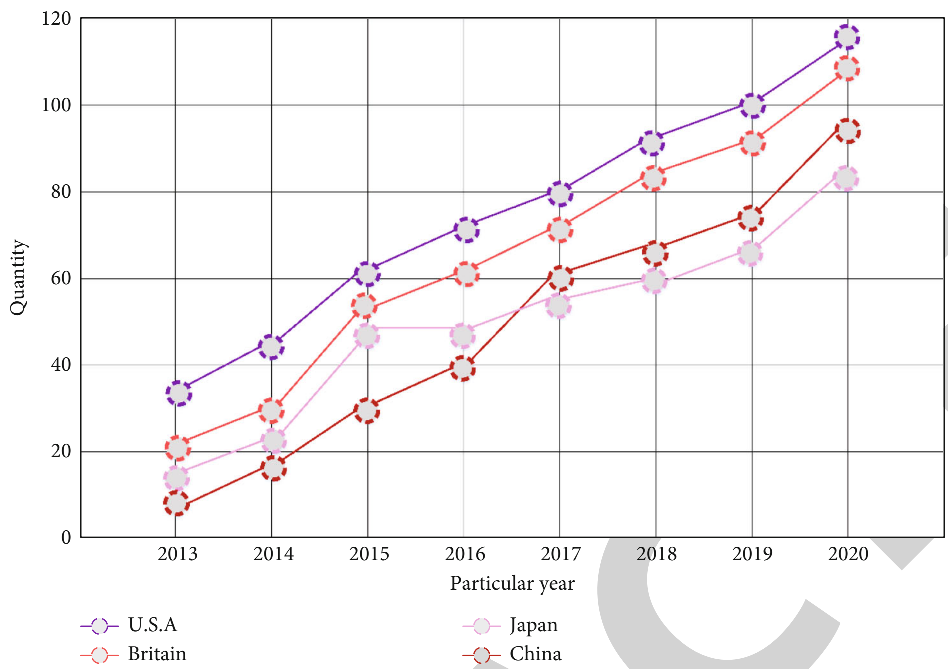


FIGURE 2: Literature study on intelligent transportation system in different countries.

vehicle dynamic information. Among them, the dynamic situation of the road is mainly recorded by the timing shooting of the collection point. After the data is analyzed, the system generates the representations of congestion, semicongestion, and smoothness on the intelligent terminal. On this basis, people use software tools combined with maps to distinguish the road traffic conditions and choose the driving path suitable for their own needs. Secondly, the intelligent transportation system also needs to meet the residents' query service, and view and obtain the vehicle related information and operation specifications. Checking the vehicle's violation records and illegal operations before boarding can greatly avoid the probability of traffic accidents. Finally, the safety warning function can not only popularize traffic rules but also judge driving operations, improve people's safety when traveling, and put forward targeted suggestions to solve traffic problems according to different situations. The overall functional framework of the intelligent transportation system planned in this paper is shown in Figure 3.

It can be seen from Figure 3 that the application system includes not only the road phase but also parking assistance and vehicle management. It can be seen from the operating platform that the framework uses the structure of IoT application, network, and transport layer. The main function of the application layer is to collect data from the traffic perception network, and further analyze and apply the data information to support various intelligent traffic services. Among them, the most typical application systems mainly include traffic control system and dynamic control system. The IoT platform and mobile communication technology are used as the structural support of the system. In addition to terminals and wireless sensor networks, collecting data information is also one of the important functions of the system. The intelligent control center can monitor the traffic and transportation conditions and detect and analyze the status of road vehicles. Finally, link with the user's vehicle navigation, map positioning, guidance system, and other links in the information service platform to complete the information sharing and use of traffic data. According to the above requirements, we find that the intelligent transportation system needs to be updated from the real-time data. In the process of processing a large amount of data, the efficiency and accuracy of route retrieval and search will inevitably occur. Therefore, our intelligent transportation system should put forward new requirements for optimal path planning. Some scholars proposed to use heuristic algorithm to predict and build an algorithm model based on intuitive experience. The solution formula of this static path is

$$F(\beta) = g^1(\beta) + h^2(\beta), \quad (1)$$

where in, $F(\beta)$ represents the initial passing potential, after each node reaches the expected goal, the correlation function is replaced. In addition, there is a way to search the optimal solution based on genetic algorithm. The elimination theory is used to determine the path position that meets the demand, and the counter is initialized to randomly generate a population set. Individual evaluation is used to calculate the correlation value of each fitness. The purpose of this selection is to obtain the best result under repeated genetic calculation.

The traditional guidance path algorithm only selects the route according to the number of starting points and ending points, which is not comprehensive and cannot dynamically meet the monitoring needs. In order to satisfy all travelers, we need to propose ant colony algorithm based on this method for optimization. According to the cooperation between ant colony algorithms, the optimal solution to solve

RETRACTED

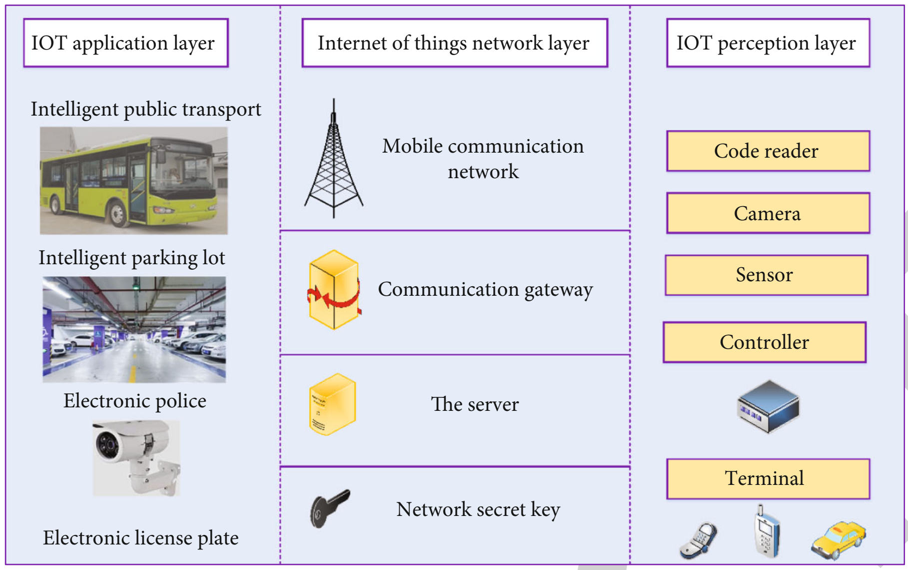


Figure 3: Overall functional framework of intelligent transportation system.

the global convergence problem is searched to improve the accuracy of path planning. In our current transportation system, the expected effects we want to achieve include the following: first, we should try our best to avoid congestion and ensure smooth traffic. Second, it can quickly solve traffic accidents and display road condition information in real time. Third, we can make full use of the limited road resources and reduce the emission of automobile exhaust as far as possible.

Since the search path of the common ant colony algorithm in the complex network has no direction, we need to modify the parameters to make the solution in the shortest time conform to the correct direction as follows:

$$\eta_{jk} = 1/\left(1 + w_{jk} * \theta_{kjt}\right), \tag{2}$$

where in, $\theta_{kjt}$ represents the departure time node. Three points are randomly selected as the size of the composition angle, and the possible transfer direction is predicted. If the angle between the range of the three paths and the final point is the smallest, the transfer probability will be greater when the weight values are the same. In order to avoid excessive accumulation of road data, we also need to use the local convergence problem when searching by formula

$$\tau(j, k) = \tau_{jk} - \Delta\tau^{a}_{jk}. \tag{3}$$

According to the formula, the diversity of path calculation can be ensured, and the optimal solution can be found by comparing different choices. The calculation method from the ant colony model is as follows:

$$P^{a}_{jk} = \begin{cases} Q_{d,} & (j, k), \\ 0, & other. \end{cases} \tag{4}$$

The data density is expressed according to the information constant, and the convergence speed can be influenced under appropriate adjustment. The improved path algorithm flow is shown in Figure 4.

We use ant colony optimization to change the directionality of data processing, and reorganize the classification of information and the update of data. This intelligent transportation system can explore new processing methods and improve the effectiveness of Countermeasures in complex traffic environment. Next, this paper also needs to evaluate and analyze the actual application of IoT intelligent transportation system by using data analysis algorithms in the big data environment.

*3.2. Research on Comprehensive Evaluation of Intelligent Transportation System Based on Internet of Things Technology and Big Data Edge Computing.* The intelligent transportation system in the Internet of Things environment needs functional analysis in combination with the daily needs of the masses. In the modern society, people find that the economic loss caused by traffic congestion and other problems is large, so it is very necessary to use the terminal platform to monitor the traffic situation. Therefore, in addition to using the Internet of Things technology to achieve interactive functions, the intelligent transportation system processing also needs to meet the analysis and sharing of data resources. The system structure can be divided into several levels, such as perception system, communication system, network system, data processing, and cognitive system. The related contents of the sensing system include automatic acquisition of information data, intelligent processing, and collaborative operation of control information, collect road related information and data of transportation and supply network with the help of terminal sensing equipment to provide basic information support for the platform database. In the communication system, the Internet of Things can be integrated and constructed, and the traffic situation can be obtained in the satellite positioning and communication, so as to ensure the normal operation of vehicles. The network system not only needs to create an orderly

RETRACTED

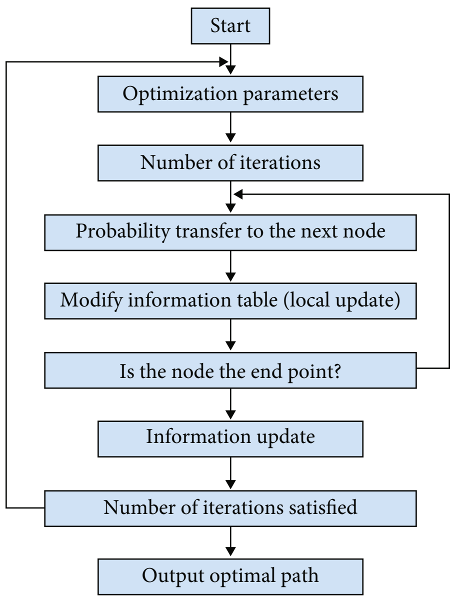


Figure 4: Improved path algorithm flow.

environment but also needs to solve the problems of resource allocation and path search. According to the actual situation of the road, the traffic path can be planned, and the current information can be transmitted in the special situation stage, so as to reasonably allocate the traffic route for other vehicles. From the basic route division, wireless sensor technology can be used to realize the actual flow and monitoring of road vehicles. At the same time, in order to meet a variety of needs, the driving experience of the vehicle should be optimized according to the weather conditions and congestion conditions. Finally, in the data processing level, the database, the exchange platform, the road information management platform, and other contents should complete the data exchange and processing at the same time. Information sharing needs to be distributed by system balance. Data extraction and model analysis are used to optimize the decision of vehicle routing. In this paper, edge computing is selected to process the data source. Edge computing is a practice of distributed information technology architecture, in which the data of the client is processed at the edge of the network, as close to the original source as possible. Because it moves data and storage resources closer to the original point of data generation, it reduces the distance and time required for key information to move. This enables faster access to data and reduces the cost of data movement. The relevant structure is shown in Figure 5.

It can be seen from Figure 5 that in the edge computing model, the information transmitted by the IoT terminal will be processed and stored in the adjacent locations. It is not necessary to upload all the information to the cloud of the traffic management system. This method can effectively reduce the amount of information transmission, and in the face of massive data, the distributed method can be used to shorten the corresponding time. At the same time, the distribution mode of edge computing also has the characteristics of low delay, high efficiency, and intelligence. In the real-

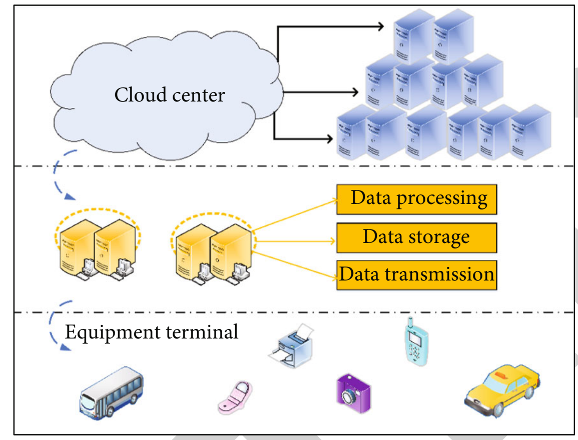


Figure 5: Structure diagram of edge computing model.

time processing of dynamic data of intelligent transportation, it can improve the response speed and service quality of events. We will compare the response speed of the intelligent transportation system before and after edge computing, as shown in Figure 6.

It can be seen from Figure 6 that before edge computing is adopted, the processing speed of the intelligent transportation system decreases with the increase of the data volume in the big data environment. This indicates that the amount of data will affect the operation efficiency of the system at a certain base. After using edge computing to improve the dynamic data processing process, the response speed of the system has been significantly improved. In order to further verify the effectiveness of the system, we use the level analysis model to quantitatively compare the use evaluation of the system. After statistical evaluation index, determine the judgment matrix. First, quantify the impact of possible factors in traffic operation on the target:

$$W_i = \frac{\sqrt{\prod_{Q=1} a_{ij}}}{\sum_{Q=1}^{\alpha} a_{ij}}, Q = 1, 2, \cdots, \Re, \tag{5}$$

$$\sum_{k=1}^{\beta} Q_{ij} = W, W = 1, 2, \cdots, \Re. \tag{6}$$

The results in the matrix can be obtained by a normalization process, $W$ is the weight coefficient of the obtained matrix. After the judgment matrix is established, the maximum and minimum characteristic variables can be calculated to obtain the data results of the consistency test. The formula is as follows:

$$C_1 = (\lambda_M - \chi)/(\chi - 1), \tag{7}$$

$$C_\partial = C_0/\partial|. \tag{8}$$

In the formula, $n$ represents the number of judgment levels, the consistency index is $C_\partial$. Its main function is to judge the difference between each influencing factor. When the consistency variable is greater than 0.1, it means that the test fails. If multiple groups score the objectives, different

RETRACTED

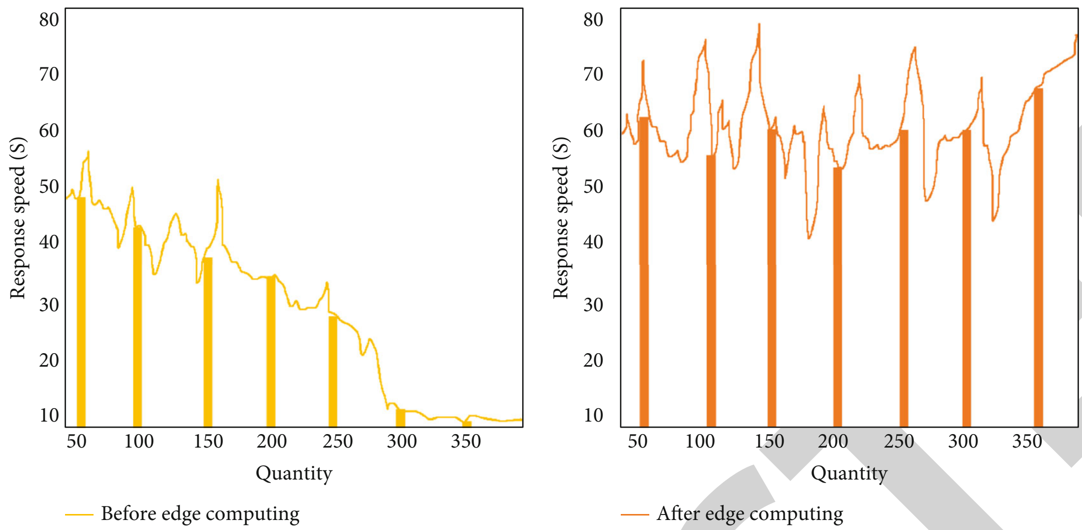


Figure 6: Changes in response speed of intelligent transportation system before and after edge computing.

probabilities may occur according to the evaluation statistics. At this time, the group evaluation formula is

$$R = \begin{bmatrix} Qn_1 \\ Qn_2 \\ Qn_3 \end{bmatrix} = \begin{bmatrix} qn_{11}, qn_{12}, \cdots, qn_{1n} \\ qn_{21}, qn_{22}, \cdots, qn_{2n} \\ qn_{31}, qn_{32}, \cdots, qn_{3n} \end{bmatrix}. \quad (9)$$

Similarly, the system characteristics and information level are obtained, and the model formula with fuzzy comprehensive evaluation is

$$H_i = W_i R_i. \quad (10)$$

The final results of the comprehensive evaluation are quantified by the weighting algorithm. The score formula is

$$E = \frac{h_{jvi}}{\sum_{k=1} H_i}. \quad (11)$$

$h_{jvi}$ represents an element of the evaluation set. Most people's cognition of intelligent transportation system is in the primary stage, so we need to combine qualitative and quantitative analysis. The evaluation index of this level is still based on the vector matrix, and the function expression is

$$w_i = \sum_{j=1} \frac{a_{ij}}{a_{jk}}, \quad (12)$$

$$C = \frac{\lambda_{\max} - n}{n - 1}. \quad (13)$$

The maximization of the evaluation expectation and the consistency solution in the formula can verify the effectiveness of the system. Conventional data can be calculated by the above formula. In the dynamic data volume, it is also necessary to calculate the consistency ratio

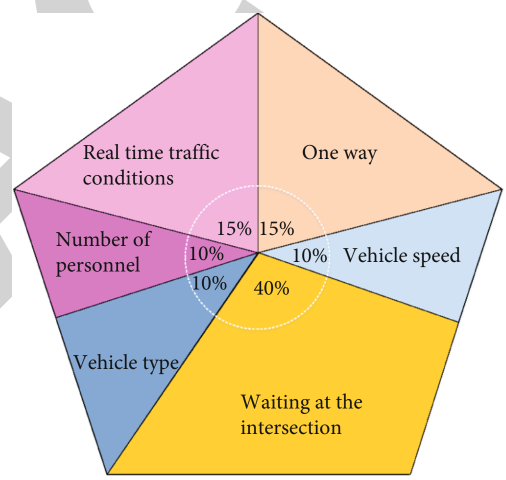


Figure 7: Proportion of influencing factors in intelligent transportation system.

$$P = \frac{C_{ij}}{R_{jk}}. \quad (14)$$

In the formula, $P$ is the consistency ratio. When less than 0.1, the entire matrix can be optimized as follows:

$$A \cdot R = (a_1, a_2, \cdots, a_n) \begin{vmatrix} r_{11} r_{12} \\ r_{21} r_{22} \\ r_{31} r_{32} \end{vmatrix} = B. \quad (15)$$

In the matrix formula, fuzzy evaluation is used to deal with the characteristic function. This mathematical method determines the membership variables through multiple subsets. The final result is applicable to the dynamic data volume in the intelligent transportation system.

RETRACTED

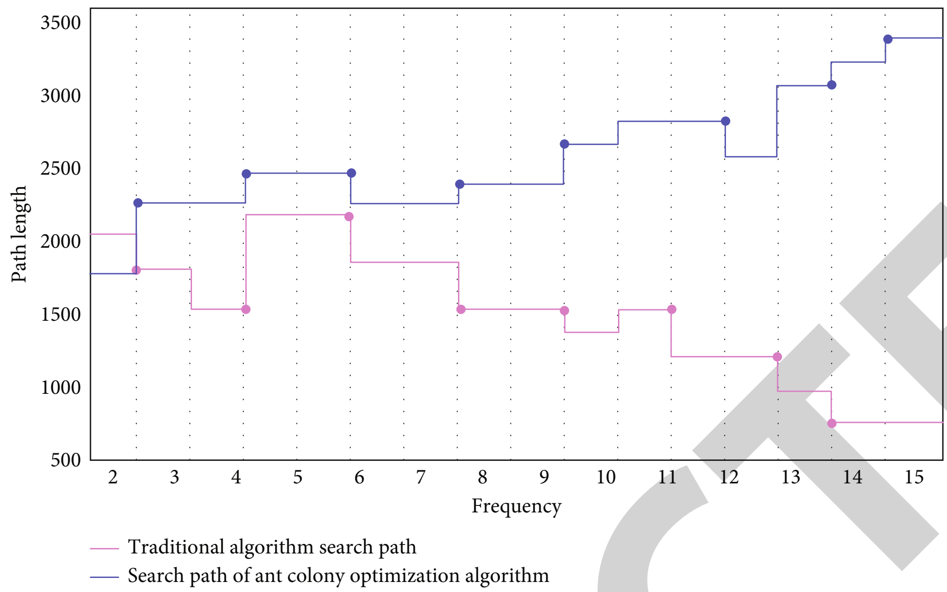


Figure 8: Comparison of search path between traditional algorithm and ant colony optimization algorithm.

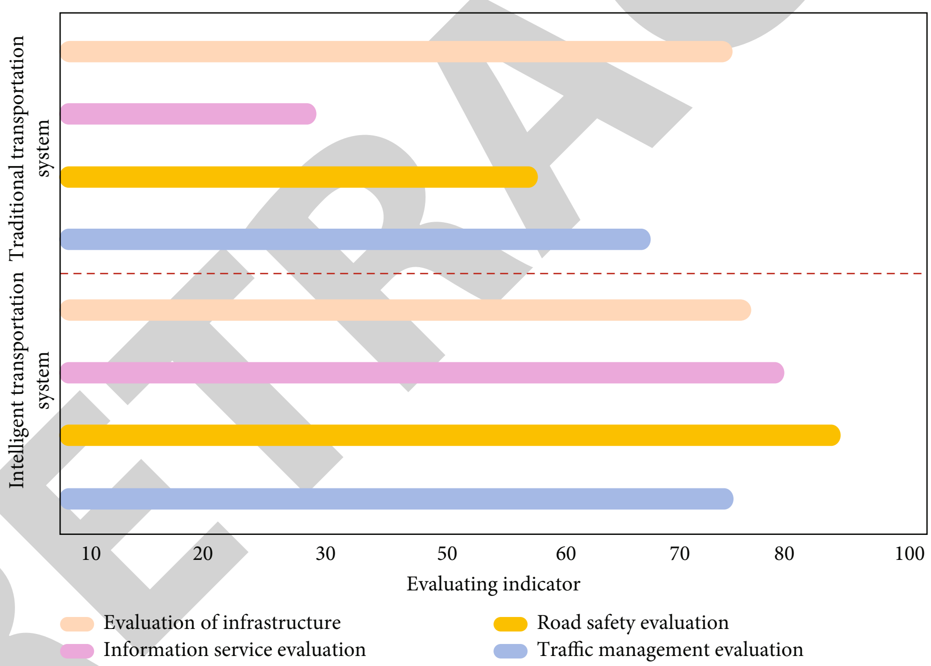


Figure 9: Comparison of evaluation indexes between traditional transportation system and intelligent transportation system.

RETRACTED

## 4. Analysis of Application Research Results of Intelligent Transportation System Based on Internet of Things and Big Data Technology

*4.1. Analysis of Research Results of Optimal Path Algorithm of Urban Intelligent Transportation System Based on Internet of Things Technology.* In the actual traffic situation, the best path selection of the road distribution network is based on whether the path is the shortest. Road conditions include one-way driving, intersection, three-way crossing, and two-way driving. Different driving modes correspond to different restrictions. People prefer the shortest route and the lowest cost in controlling the driving distance. Therefore, travel time and route selection criteria have become the main factors affecting the intelligent transportation system. In addition, the relevant factors are as follows: first, the real-time traffic situation. If there are many vehicles traveling from the departure point to the destination, beyond the road carrying capacity, there will be traffic congestion. In order to improve the selection accuracy of the optimal route, we must quantitatively analyze the congestion degree according to the traffic flow. Among them, the average speed of vehicle monitoring can be used to judge the congestion status of vehicles, and the onboard information

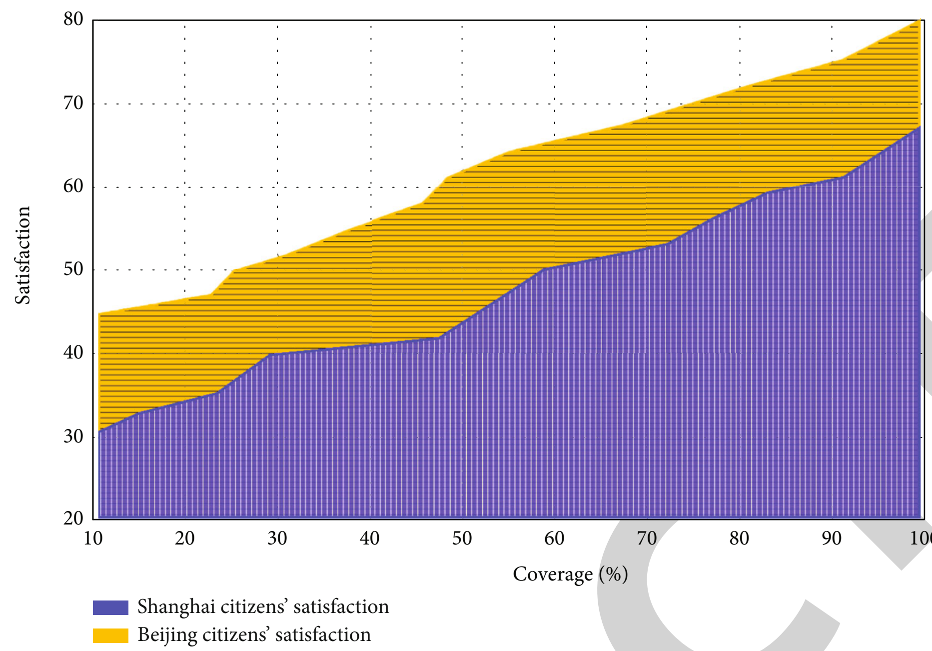


FIGURE 10: Changes in people's travel satisfaction under different conditions of intelligent transportation system coverage.

RETRACTED

can be divided into congestion, semicongestion, and unblocked. Secondly, when the road is one-way traffic, this one-way traffic will lead to a large number of traffic jams in the morning, middle, and evening peak hours. The purpose of one-way line is to optimize the road conditions of some sections, but the traffic flow is sharply reduced. At this time, it is not in line with the actual demand to follow the specified route. The last is the waiting time at the intersection. Waiting for the signal light is always considered as the delay time in the optimal route selection. We make statistics on the influence proportion of the above influencing factors in the intelligent transportation system, as shown in Figure 7.

It can be seen from Figure 7 that the waiting at the intersection in the traffic road is the most influential part, followed by the reduction of the traffic flow caused by the single lane. In the innovation of intelligent transportation system, according to the concepts of genetic algorithm and heuristic algorithm, we propose ant colony algorithm to optimize the best driving path. In order to verify the effectiveness of the algorithm, the search paths of the traditional algorithm and the ant colony optimization algorithm are, respectively, represented, as shown in Figure 8.

As can be seen from Figure 8, the two algorithms, respectively, represent the optimal path length found in each round of path search. Under the continuous cycle times, the ant colony optimization algorithm can find a longer optimal path, which can make the intelligent transportation system more sensitive and practical.

*4.2. Analysis of Comprehensive Evaluation Research Results of Intelligent Transportation System Based on Internet of Things Technology and Big Data Edge Computing.* In a broad sense, intelligent transportation includes intelligent driving, Internet of Things, urban intelligent construction, and other aspects. Its main content is to use big data and Internet of Things technology to manage and optimize the urban transportation system. Through the comprehensive evaluation and analysis of the technical achievements and practical application effects, the intelligent transportation system focuses more on the improvement of technology and the optimization and extension of routes. The system evaluation can be divided into the following links: first, the evaluation of relevant infrastructure, mainly modern equipment. The facilities completed by road detection devices such as monitoring probes, infrared sensors, and terminal sensors can provide information and data support for the intelligent transportation system. The second is the evaluation of information service level. This system based on big data and computer network needs to improve the information service level to meet the demand of intelligent traffic command. Through the mobile terminal, people can judge the actual driving situation of the road and choose the optimal path that meets their own needs to reach the destination. Finally, the evaluation of road safety and intelligent management is explored. This intelligent concept is the core of changing the traditional traffic management and realizing intelligent traffic management and control under the condition of reducing the working hours of human resources. At the same time, a variety of road monitoring methods are adopted to ensure the normal operation and smooth safety of the system and avoid major traffic accidents. We compare the traditional transportation system with the intelligent transportation system from the above evaluation indicators, as shown in Figure 9.

It can be seen from the figure that the evaluation index of the information service level of the general system is low, and the evaluation index of the information service level and road safety management of the intelligent transportation system are high. It can be seen that the traditional transportation system does not have the ability of real-time monitoring data and information transmission and sharing,

RETRACTED

and the intelligent transportation system has great advantages in the process of handling road traffic. Finally, we randomly selected two cities and analyzed the changes of people's travel satisfaction under the conditions of different coverage of the intelligent transportation system, as shown in Figure 10.

It can be seen from Figure 10 that with the improvement of the coverage rate of the intelligent transportation system, the travel satisfaction of the masses is also significantly increased. It can be seen that the public have a high use frequency and evaluation index of the intelligent transportation system. In the follow-up study, the traffic information in big data can be further obtained to provide diversified data support for the evaluation.

The emergence of big data has changed the limitations of traditional data. With the unified storage and rapid analysis functions of a large number of data, it has effectively broken the regional restrictions of intelligent transportation systems, connected cities and provinces through data, and can provide comprehensive data for traffic managers to make management decisions, so that managers can make the most reasonable optimization, improve road traffic efficiency and city satisfaction.

## 5. Conclusion

With the construction of modern cities, people's living standards are getting better and better, and the travel time and times of residents are obviously increasing. This travel demand has higher requirements for road traffic. In the traditional traffic management system, we added the Internet of Things, big data technology and other contents, and proposed the application and research of intelligent transportation system. The purpose is to optimize the urban road congestion, improve the people's travel satisfaction, and reduce the probability of major road risks. This paper first analyzes the relevant concepts of intelligent transportation, and discusses the functional changes of the Internet of Things in combination with the traffic management system. Based on people's demand for information-based transportation, the optimal route in the transportation process is selected. On the basis of traditional heuristic algorithm and genetic algorithm, this paper uses ant colony algorithm to optimize the optimal path design of ITS. Secondly, taking the actual traffic situation as an example, this paper discusses the relevant factors affecting the road situation and analyzes the impact of the influencing factors on the optimal route selection. In the input and use of the intelligent transportation system, the big data technology edge computing and analytic hierarchy process are used to comprehensively evaluate the system. Finally, different cities are randomly selected to analyze the mass satisfaction under the coverage of intelligent transportation system. The experiment shows that the intelligent transportation system based on the Internet of Things technology can effectively alleviate the urban traffic congestion and provide more convenient and fast driving paths for people.

The development of intelligent transportation construction is an important prerequisite for the realization of smart city construction. With the advent of the era of big data, the application of Internet of Things technology provides greater technical support for intelligent transportation construction, solves the problem of urban traffic congestion to a great extent, promotes the improvement of transportation stability and security, and promotes the construction of a three-dimensional urban transportation system. At the same time, the future application of Internet of Things technology in intelligent transportation should focus on energy conservation and environmental protection, which has important practical significance for the realization of social benefits and economic coordinated development.

## Data Availability

The figures used to support the findings of this study are included in the article.

## Conflicts of Interest

The authors declare that they have no conflicts of interest.

## Acknowledgments

The authors would like to show sincere thanks are due to those techniques who have contributed to this research.

## References

[1] Z. Wenjian, "A spatial decision-making model of smart transportation and urban planning based on coupling principle and Internet of Things," *Computers and Electrical Engineering*, vol. 102, article 108222, 2022.

[2] H. Yinglei, Q. Dexin, and Z. Shengyuan, "Smart transportation travel model based on multiple data sources fusion for defense systems," *Soft Computing*, vol. 26, no. 7, pp. 3247–3259, 2022.

[3] Z. D. Hui, "Intelligent transport surveillance memory enhanced method for detection of abnormal behavior in video," *Journal of Advanced Transportation*, vol. 2022, Article ID 5631281, 12 pages, 2022.

[4] W. E. I. WU, "Research on urban congestion control strategy based on smart traffic management system," *Journal of Humanities and Social Sciences Studies*, vol. 4, no. 1, pp. 89–96, 2022.

[5] H. Mohapatra, A. K. Rath, and N. Panda, "IoT infrastructure for the accident avoidance: an approach of smart transportation," *International Journal of Information Technology*, vol. 14, no. 2, pp. 761–768, 2022, prepublish.

[6] S. B. Kelley, B. W. Lane, B. W. Stanley, K. Kane, E. Nielsen, and S. Strachan, "Smart transportation for all? A typology of recent US smart transportation projects in midsized cities," *Annals of the American Association of Geographers*, vol. 110, no. 2, pp. 547–558, 2020.

[7] L. Li, P. Park, and S. B. Yang, "The role of public-private partnership in constructing the smart transportation city: a case of the bike sharing platform," *Asia Pacific Journal of Tourism Research*, vol. 26, no. 4, pp. 428–439, 2021.

[8] C. Aoonrot and Y. Chunho, "Developing evaluation framework for intelligent transport system on public transportation in Bangkok metropolitan regions using fuzzy AHP," *Infrastructures*, vol. 6, no. 12, p. 182, 2021.

[9] Z. Congyu and W. Kun, “Is smart transportation associated with reduced carbon emissions? The case of China,” *Energy Economics*, vol. 105, p. 105715, 2022.

[10] T. E. Julita, “Barriers related to the implementation of intelligent transport systems in cities - the Polish local government’s perspective,” *Engineering Management in Production and Services*, vol. 13, no. 4, pp. 131–147, 2021.

[11] L. Zdeněk, Š. Martin, V. Miroslav, and M. Michal, “Methodology of functional and technical evaluation of cooperative intelligent transport systems and its practical application,” *Applied Sciences*, vol. 11, no. 20, p. 9700, 2021.

[12] M. T. Bashir, M. D. Daniyal, A. M. Alzara, E. K. Elkady, and A. A. Armghan, “Self-sensing cement composite for traffic monitoring in intelligent transport system,” *Magazine of Civil Engineering*, vol. 22, no. 105, 2021.

[13] K. Goloskokov, V. Korotkov, A. Nyrkov, and T. Knysh, “Error correction algorithms in on-board intelligent transport data transmission systems,” *Journal of Physics: Conference Series*, vol. 2061, no. 1, article 012097, 2021.

[14] S. Radhya, S. H. Alsamhi, K. N. Brown, O.’. S. Donna, and M. C. Conor, “Blockchain-Empowered Digital Twins Collaboration: Smart Transportation Use Case,” *Machines*, vol. 9, no. 9, p. 193, 2021.

[15] H. Cheng, J. Wei, and Z. Cheng, “Study on sedimentary facies and reservoir characteristics of paleogene sandstone in Yingmaili Block, Tarim Basin,” *Tarim basin. Geofluids*, vol. 44, pp. 1–14, 2022.

[16] T. A. Elyor, K. S. Bokhodir, A. O. Merenkov et al., “In the network of roads application of the intelligent transport system,” *ACADEMICIA: An International Multidisciplinary Research Journal*, vol. 11, no. 9, pp. 415–418, 2021.

[17] X. Bo and G. Thakur, “Correction to: introduction to the special issue on smart transportation,” *Geo Informatica*, vol. 25, no. 3, p. 419, 2021, prepublish.

[18] L. Mai, “Urban smart transportation based on big data,” *Journal of Physics: Conference Series*, vol. 1972, no. 1, p. 012092, 2021.

[19] J. Zhang, S. Li, and Y. Wang, “Shaping a smart transportation system for sustainable value co-creation,” *Information Systems Frontiers*, 2021, prepublish.

[20] Z. K. Hou, H. L. Cheng, S. W. Sun, J. Chen, D. Q. Qi, and Z. B. Liu, “Crack propagation and hydraulic fracturing in different lithologies,” *Applied Geophysics*, vol. 16, no. 2, pp. 243–251, 2019.

[21] H. Cheng, Y. Dong, C. Lu, Q. Qin, and D. Cadasse, “Intelligent Oil Production Stratified Water Injection Technology,” *Wireless Communications and Mobile Computing*, vol. 2022, Article ID 3954446, 2022.

[22] M. Mostafa and D. Das, “Smart transportation is the future: UKZN STRg research,” *Civil Engineering: Magazine of the South African Institution of Civil Engineering*, vol. 29, no. 8, 2021.

[23] H. Cheng, P. Ma, G. Dong, S. Zhang, J. Wei, and Q. Qin, “Characteristics of Carboniferous volcanic reservoirs in Beisantai Oilfield, Junggar Basin,” *Junggar Basin. Mathematical Problems in Engineering*, vol. 2022, pp. 1–10, 2022.

[24] Z. Jun, W. Yichuan, L. Shuyang, and S. Shuaiyi, “An architecture for IoT-enabled smart transportation security system: a geospatial approach,” *IEEE Internet of Things Journal*, vol. 8, no. 8, pp. 6205–6213, 2021.

RETRACTED