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*Retraction*

# Retracted: Study on DTN Routing Protocol of Vehicle Ad Hoc Network Based on Machine Learning

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This article has been retracted by Hindawi following an investigation undertaken by the publisher [1].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] H. Liang, Y. Shang, and S. Wang, "Study on DTN Routing Protocol of Vehicle Ad Hoc Network Based on Machine Learning," *Wireless Communications and Mobile Computing*, vol. 2021, Article ID 7965093, 10 pages, 2021.

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*Research Article*

# Study on DTN Routing Protocol of Vehicle Ad Hoc Network Based on Machine Learning

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The vehicle-mounted self-organizing network is a part of the MANET network. It is placed between the roadside vehicle and the fixed communication equipment. It can serve as a hub for road vehicles and can enable multihorsepower wireless mechanisms to exchange data between vehicles. This article is aimed at studying the DTN routing protocol based on machine learning in the vehicle self-organizing network. When data is forwarded, the node will determine the forwarding route selection according to its own coordinate information, the coordinate information of neighboring nodes, and the coordinate information of the destination node. Usually, the purpose is for the geographic coordinates of the node to be stored in the data packet. And data packets are periodically transmitted between nodes on each network. So that when you publish your own coordinate nodes, you can update the location information of nearby nodes at any time. This paper proposes that routing technology has become one of the most important challenges in vehicle self-organization, and there are many reasons for this. These reasons include frequent changes in the network topology and fast-moving mobile nodes. The experimental results in this paper show that more than 67% of the network data is obtained through the Gawk data extraction tool to quantify GPSR performance indicators and obtain the average driving speed of the current vehicle node. When increasing, the average end-to-end transmission delay of the GPSR routing protocol increases, and the average transmission rate decreases.



## 1. Introduction

In ancient times, people could only walk on their feet. I never thought about what the mountain would look like. Even the people who fell in the most advanced Tang and Song dynasties can only pray for the journey of horses. Do not let them die in foreign countries. Now simple air travel can make us travel easily. The vast ocean and the emergence and development of transportation have brought great convenience to our travel. And it has been integrated into our daily life and work in detail. With the continuous innovation and development of science and technology, new technologies have begun to be applied to daily tools such as automobiles, airplanes, and trains, especially cars, which are now the most important means of transportation for people. From the invention of cars to today, almost every city has its own cars. Wireless network technology can be used as a textbook or self-study book for related majors such as communication and information systems, electronics and information engineering, computer applications, and computer networks and can also be used as a self-study improvement or tool book for engineering and technical personnel and management personnel in the above related majors and the use of technical training in this field. With the increase in speed, vehicles began to spread rapidly on highways and city streets. More and more electronic multimedia devices in cars enable people to easily and conveniently enjoy music, videos, and news prompts at the best time when traveling by car. In areas not covered by the network, the vehicle may temporarily lose communication capabilities and temporarily lose data. Autonomous communication on the Internet not only isolates vehicles from information on the Internet but also informs each other about road conditions and traffic jams [1], with the gradual integration of mobile that is communication technology in vehicles. The hypothesis

dreamed by these researchers became possible, and therefore, the vehicle-mounted self-organizing network came into being. The in-vehicle self-organizing network has entered the automotive field since its birth and quickly gained human dependence. It is not a pure ITS technology, but the most important thing is that it has gradually integrated into people's lives, and people's daily travel has begun. As a necessary factor, therefore, more and more researchers are sweating profusely in the field of automation networks and trying to improve the existing communication methods [2].

The growth and development of wireless network technology have penetrated into all aspects of people's lives and changed our way of life. In recent years, people have designed various in-vehicle wireless communication devices, and the corresponding in-vehicle frequency bands and wireless communication standards are constantly improving and perfecting. It is an outdoor, self-organized vehicle-to-vehicle communication network. It is a special MANET that can adapt to the network topology. VANET is constantly changing and provides communication between vehicles on the road and between vehicles and fixed access points on the road. Vehicles in VANET require communication equipment. And you can use it to communicate with other vehicles, and you can also communicate with road maintenance facilities. VANET provides a wide range of convenient applications, such as safe driving, transportation services, bus services, and business support services, such as Internet access. Special police vehicle speed warning real-time monitoring of traffic routes, weather, and other issues are being forecasted. With the rapid development of wireless networks and the widespread use of mobile smart terminals, the demand for location information services in various industries has grown rapidly [3]. In modern society, the express delivery industry, Didi Express, dating software, and mobile phone positioning and navigation are widely used in traditional fields such as disaster relief and car navigation. All location service systems that use mobile terminals and location data are a combination of location and Internet services. It brings convenience to people's lives and meets the needs of market economy development. Especially in the modernization of cities, the construction of smart cities is inseparable from the support of location data. High-quality and diversified location services can make people's production and life more convenient and faster. High-performance, high-precision placement technology is essential to improve the quality of tracking services [4]. It has also become the basis of location-based services and has attracted the attention of scientific researchers all over the world and has achieved good results. In the research and application of positioning technology, wireless installation technology not only has the advantages of low cost and high precision, but it also performs well in real time and is suitable for various complex environments. It has been a research hotspot for a long time. As people demand for the quality and type of location services, they continue to grow in the same way. Additional requirements for wireless placement have emerged, so the research on wireless placement technology has great commercial value.

Based on the activeness of this research topic, a large number of experts and scholars at home and abroad have launched a heated discussion on the research of the DTN routing protocol of vehicle self-organizing network based on machine learning. Ragab and Flores mentioned that the ad hoc network and its routing protocol have attracted a large number of researchers over the years. This is due to the wide application of ad hoc networks in many fields, especially in the field of unmanned aerial vehicles (UAV). The routing protocols in the ad hoc network have different types due to their characteristics and function in the ad hoc network communication process, which is the main concern. In this article, we will analyze and clarify the performance of ad hoc routing protocols. When three different ad hoc routings are applied, the flying ad hoc network (FANET) and the vehicle ad hoc network (VANET) protocols are, respectively, reactive routing protocol, active routing protocol, and hybrid routing protocol to clarify the fuzzy misunderstanding of the function of self-organizing routing protocol and to choose the best routing protocol to be used and suitable for UAV [5]. Saha et al. believe that delay-tolerant networks (DTN) are characterized by delays and intermittent connections. Satisfactory network functions in DTN depend to a large extent on the coordination between participating nodes. However, in practice, due to possible misbehavior of the relay node, this coordination cannot be taken for granted. Therefore, the routing in DTN is vulnerable to various attacks, which adversely affects network performance. Several strategies have been proposed in the literature to mitigate such vulnerabilities—they vary greatly in throughput, detection time, overhead, and so on. A key challenge is to strike a balance between detection time and overhead. We observe that the existing table-based response strategies to combat denial of service (DoS) attacks in DTN have two main disadvantages: high overhead and slow detection. In this article, we propose three safe, lightweight, and time-saving routing algorithms to detect DoS attacks (black hole and gray hole attacks) in the Spray and Focus routing protocol [6]. Guan et al.'s article pointed out that the vehicle-mounted self-organizing network (VANET) makes it possible to transmit between vehicles without infrastructure. However, self-organizing networks also increase the redundancy of the network. In order to reduce network redundancy and make VANETs more efficient, we have introduced a new routing protocol: Crosspoint-based Forwarding Protocol (IBFP). In the urban area, we set up a virtual port (VP) at each intersection. The virtual port is served by vehicles waiting for traffic lights to stop in front of the intersection. The VP will collect all data packets that need to be forwarded from all passing vehicles. When the VP leaves this intersection, it will transfer all the data packet copies to the next VP. As the VP moves, data packets can be transmitted to various intersections in a very short period of time, just like the epidemic process. The target vehicle can receive data packets with a high success rate. The popular process only exists between VPs. Therefore, under the premise of high success rate, the proposed IBFP can transmit data packets with less delay and redundancy [7].

The abovementioned scholars have done a lot of far-reaching research on the DTN routing protocol of the vehicle self-organizing network, but their exploration in the field of machine learning is not enough. Therefore, the innovative point of this article is based on the machine learning. The network DTN routing protocol is researched, and at the same time, a crossstudy is carried out on the future development of the two fields in order to find a good fit point, so that they can get more long-term use and development.

## 2. DTN Routing Protocol in Vehicle Self-Organizing Network Method Based on Machine Learning

*2.1. Machine Learning.* In recent years, machine learning technology has developed rapidly. As the basic technology of machine learning, virtualization technology has always been a hot topic of research [8]. Virtualization technology has many aspects, such as network virtualization, virtual machine installation, and virtual machine migration. In cloud data centers, in order to improve resource utilization, many virtual machines are usually hosted on the same physical server. The installation of the virtual camera takes many factors into consideration, including reliability power consumption and network resource consumption; a suitable and efficient virtual machine placement algorithm can improve the operating performance of the data center and save operation and maintenance costs. In existing research, most virtual machine placement algorithms use traditional algorithms or heuristic algorithms. Some researchers have applied machine learning technology to the virtual machine installation problem [9]. But most of them are complementary strategies, such as using machine learning techniques to predict demand, but few algorithms directly use machine learning techniques in decision-making. Machine learning has a long history. But the computational burden is huge. It is limited by limited computer performance, and its long-term development is slow. With the emergence of high-performance computers, it can be used quickly. And it has also achieved good applications in the field of artificial intelligence. Fields such as image processing and face recognition make machine learning the hottest research direction. Using machine learning algorithms to achieve positioning has become a new direction of wireless positioning technology research. Machine learning is a multidisciplinary subject [10], including probability theory, statistics, estimation theory, convex analysis, and algorithm complexity theory, and many other topics are over there. Its purpose is to study the use of computers to simulate the cognition and cognitive behavior of the human brain. Learn the new existing knowledge structure, and continuously improve your work efficiency to achieve the required functions. The field of artificial intelligence in machine learning is also an inevitable growth trend. Because the computing power of computers has been significantly improved, there are a large number of algorithms that cannot be executed due to a large number of calculations, and the application of machine learning is becoming more and more integrated [11], from language recognition to image recognition to intelligent robots, driverless cars, etc. Driving a vehicle is controlled by humans [12, 13]. Machine learning is a multidisciplinary professional, covering probability theory knowledge, statistics knowledge, approximate theoretical knowledge, and complex algorithm knowledge. It uses computers as tools and is committed to real and real-time simulation of human learning methods, and the existing content is structured into knowledge divide to effectively improve learning efficiency. Showing some social characteristics, different types of vehicles have different route characteristics. For example, private cars often appear on streets with frequent locations such as homes, companies, and shopping malls. When the taxi has no passengers, they will turn to certain areas to look for passengers because of the owner's preferences. When there are passengers, the shortest route will be planned according to the passenger's destination. Buses have a fixed round-trip route, so they are more likely to encounter frequent buses in the future, and second-hand cars are more sensitive to vehicles. The hub of the car has a high-capacity battery that can provide enough power for the communication unit. Compared with MANET node [14], it is smaller and less durable. There will no longer be power restrictions. This makes the built-in equipment more and more advanced. Vehicle nodes have more powerful processing and storage capabilities than MANET, can temporarily store more data [15], and process more complex algorithms.

*2.2. DTN Routing Protocol of Vehicle Self-Organizing Network.* The in-vehicle self-organizing network makes driving and road conditions more intelligent. The sharing of service security alarm resources such as advance notification has become a reality. Services and applications are separated from messaging. Routing protocol has become an important part of VANET research [16]. The nature of the network leads to frequent changes in the network structure and frequent interruption of communication links. This makes data efficiency very low. Routing uses a mechanism, "store-transmit-forward" to increase the communication opportunities generated that by node movement [17] to increase the data rate. At the same time, vehicle movement is often affected by human social behavior and social relations and shows that it is more important than the link in communication. Wireless network technology refers to a network that can realize the interconnection of various communication devices without wiring. Wireless network technology covers a wide range, including global voice and data networks that allow users to establish long-distance wireless connections. Stable social functions can design more effective routing protocols based on this. Most vehicle intersections drive in urban and suburban environments. And the transmitted wireless signal will have varying degrees of attenuation under the influence of high and low buildings [18, 19]. When the density of vehicles is high, the interference between vehicles cannot be ignored. At the same time, due to the speed of the vehicle, the communication time is long and the distance is also very long, which makes

the communication environment complex and changeable. Vehicle-mounted self-organizing network is a special mobile self-management network, which is an important research field of it in the intelligent transportation system. It also has the characteristics of MANET self-organization, noncentrality, multihop routing, dynamically changes in network topology, limited network capacity, and good scalability. Taking advantage of the uniqueness of high-speed vehicles on the road, VANET can use its unique wireless communication technology [20] to establish a multihop self-organizing network between vehicle nodes to realize data transmission and interaction between vehicles. The in-vehicle self-organizing network covers insecure service applications, that is, user experience service applications. DTN has many positive effects on the network news industry; for example, it is of great significance to the widespread dissemination of network information, and it can effectively protect the security of network information. Most user experience services are dedicated to improving user experience services for vehicle drivers and passengers, such as traffic performance applications, mainly to improve the efficiency of public transportation and personal transportation, such as traffic detection and early warning. Multimedia information service applications such as route planning mainly provide passengers with services such as information exchange, multimedia entertainment, and web browsing. Delay-tolerant network is a self-organizing, durable network that can maintain a connection for a long time, allowing nodes to move messages and use mobility-based messaging opportunities to send messages. Traditional MANET networks provide stable and stable end-to-end connection termination. The end-to-end transmission delay within the communication range can be controlled. And it has features such as low error rate. Unlike traditional MANET networks, DTN is mostly suitable for some private network communications. As a traditional vehicle self-organizing network, VANET mainly refers to MANET network [21]. The nodes in the MANET network are slower. Before sending a message, a fixed link is required between the source node and the target node. This can cause the network transmission to have a performance. However, the VANET network has a high topology and uneven distribution of nodes; that is, vehicle nodes are fast and unevenly distributed. Therefore, it is difficult to create a transmission link. Fix the problem of poor network performance between the source node and the message destination node which has high network packet loss rate and high latency. DTN was originally proposed for star network communication [22]. Intermittent support for communication methods is such as mass delivery delays. Therefore, under the background that the traditional MANET network is no longer suitable for the VANET network, the characteristics of the temporary network are considered to be suitable for the nature of the VANET network provided by VON, and the temporary network is installed in the vehicle. A routing protocol is an online protocol that specifies how data packets are forwarded. The main node equipment of the Internet network is the router, and the router forwards the received data through the routing table. The forwarding strategy can be manually specified. In a network with a smaller scale, there is no problem in manually specifying the forwarding strategy. However, in a large-scale network, if the forwarding strategy is manually specified, it will bring a huge workload to the network administrator, and it will become very difficult to manage and maintain the routing table.

Since the introduction of this vehicle-mounted self-organizing network system, researchers have begun to study and propose a routing strategy based on opportunistic networks. Researchers subsequently proposed various routing algorithms [23], which are suitable for continuous opportunistic networks. The advantage of the routing algorithm is that it is easy to use. This is because the routing rules are set before the message is sent. Therefore, less configuration and control data are required in production. And the message will be sent according to predefined rules. Therefore, the flexibility of the routing algorithm is insufficient. Moreover, the algorithm cannot customize the rules and related algorithms in real time according to the network conditions. Therefore, designing highly flexible routing algorithms can adapt to the most diverse network environments, convenient for users and efficient routing algorithms. High has become a hotspot in the field of routing algorithms. The research classifies different routing algorithms according to factors such as different usage scenarios or different operation methods [24].The DTN routing protocol is convenient, and it is helpful to many aspects in the industry. For example, the DTN routing protocol can perform security checks on wireless networks and provide it with a more convenient platform.

*2.3. Algorithm of Research on DTN Routing Protocol of Vehicle Ad Hoc Network Based on Machine Learning.* The problem of Bayesian reasoning is the problem of conditional probabilistic reasoning. The discussion in this field has very important theoretical and practical significance for revealing people's cognitive processing processes and laws of probability information and guiding people to carry out effective learning and judgment and decision-making. The parameter estimator uses the Bayesian formula to find missing values and calculates the missing data in the next filled part.

$$P(B_i A) = \frac{P(B_i)P(A \mid B_1)}{\sum_{j=1}^{n} p(B_i)P(A \mid B_i)}. \tag{1}$$

The signal strength $B$ has no value, the latitude and longitude coordinates $A$ are known, and the value corresponding to the maximum probability obtained by Bayesian is the missing value [25].

$$h = \frac{1}{1 + e^{-wx-b}} + \frac{1}{1 + e}, \tag{2}$$

$$h_{w,b}(x) = f\left(W^t x\right) + \frac{1}{1 + e^{-x}}. \tag{3}$$

From the above formula, formulas (2) and (3) can be combined to obtain

$$g = f\left(\sum_{i=1}^{3} W_i X_i + b\right),$$
$$z_i^{\,2} = \sum_{j=1}^{n} W_j x_j + b_l^i. \tag{4}$$

The connection unit accepts the parameters of the first unit [26] and associates the parameters with the missing data to make the data disappear. Data and parameters are stored in the same log file.

$$a_1 = f\left(z_i^{(2)} + b_1^i\right) + W_{32}^1 + b_3^i. \tag{5}$$

From the above formula, it can be concluded that the missing data can be found in the future, and we can enumerate the parameter $J$ as shown in the following formula:

$$J(W, b) = \left[\frac{1}{m}\sum_{i=1}^{m} J\left(W, b_1 x^2\right)\right]. \tag{6}$$

Identify entities, and use the same pointer to calculate the similarity of each entity [27, 28]. And set the similar pair that the limit is greater than the standard to export as a set of similar pair files.

$$J(w) = \left[\frac{1}{m}\sum_{t=1}^{m}\left(\frac{1}{2}\|h_w\left(x^i\right) - y^2\right)\right],$$
$$W_j = W_w^i - \alpha\frac{\partial}{\partial W_1} J(W, b). \tag{7}$$

In the process of collecting data through data observation, points with exactly the same latitude and longitude, that is, two points with exactly the same physical location, were discovered.

$$\frac{1}{2}\left|y - h_{w,b}(x)\right|^2 = -(y_i - a_i^n)z_i,$$
$$J = \alpha J\left(W, b, x, y^2\right) = \alpha^{(x+1)}. \tag{8}$$

After processing the repaired data, the data format is restored to the original data format [29]. So you can use data to process big data.

$$\lim\left(1 - \frac{1}{m}\right)^n = \frac{1}{e}\left(-w^2 h^1 - b^2\right). \tag{9}$$

## 3. Experiments on the Research of the DTN Routing Protocol of the Vehicle Ad Hoc Network Based on Machine Learning

*3.1. Experimental Strategies and Experimental Procedures.* The PSR routing algorithm uses a greedy algorithm to calculate the routing path to establish a connection. It is an algorithm that uses geolocation data for routing applications. When the source node wants to send a data packet to the destination node, first, the source node selects the node closest to the destination node among neighboring nodes as the next hop delivery destination and forwards the data packet to the node back and forth until the destination node successfully receives the data packet, or if there is a problem with the best host, the packet will continue to be routed using the forwarding strategy. Obtain information and data on the dynamic and static characteristics of the vehicle through the automatic diagnosis of the on-board equipment, and judge the condition of all the equipment of the car. For vehicle warning, the vehicle is equipped with a collision warning system for lane departure warning, U-turn warning, and rear-end collision warning and tracks the user's driving behavior to stop the behavior that affects safe driving, such as fatigue. As soon as possible, the sensor can also be used to control door and window switches. The reliability of transmission is easily affected by network environment factors. Vehicle nodes in VANET can enter or exit the network as needed. When VANET changes on demand, how to perform reliable transmission is an urgent problem to be solved.

*3.2. DTN Routing Protocol of the Vehicle Ad Hoc Network.* Vehicle wheels move at high speed, and the vehicle nodes in the ad hoc vehicle network have the characteristics of high-speed traffic. This reduces the communication time between nodes. It can also have a negative impact on network news. But because the car is driving along the road, the movement of the vehicle at the intersection is consistent and predictable. Therefore, the use of vehicle node traffic rules to help complete the message is a key research direction of vehicle-borne incidental networks. In a road environment, the number and density of vehicles at different time points in different areas or on the same road section will vary. This is caused by the uneven distribution of traffic flow in the Internet of Vehicles. The topology of the car network changes frequently. When the traffic density is low, the distance between network nodes will be larger, and the topology will be very sparse. The probability of encountering a node is small, and the message success rate is low. The opposite is true when traffic density increases, so the frequently changing network topology poses a huge challenge to seasonal networks. The impact of vehicle nodes on network performance is that most vehicle-mounted networks are multihop networks composed of vehicle nodes. Therefore, vehicle nodes have a significant impact on network performance. Most network node searches include vehicle node parameter statistics. Analysis of the influence of characteristic parameters on vehicle-mounted network and how to use characteristic node parameters is performed to optimize network performance. The resources in the Internet of Vehicles

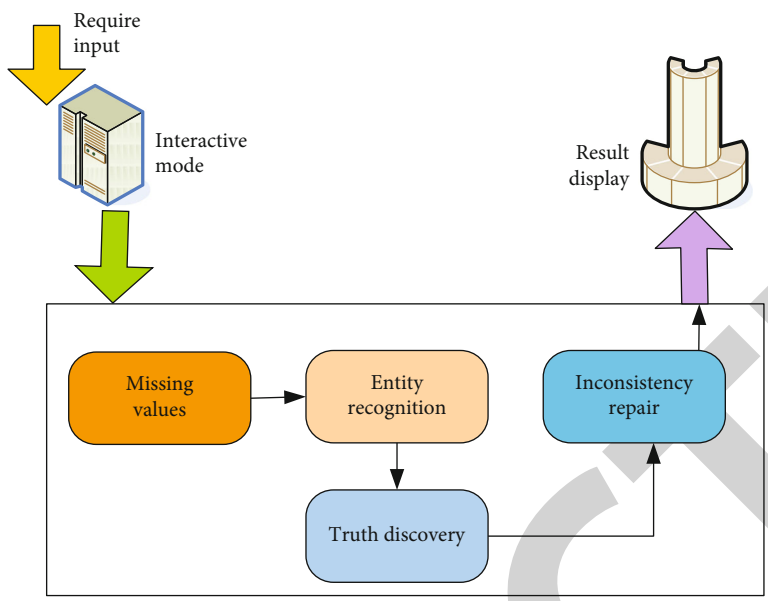


Figure 1: Schematic diagram of big data system.

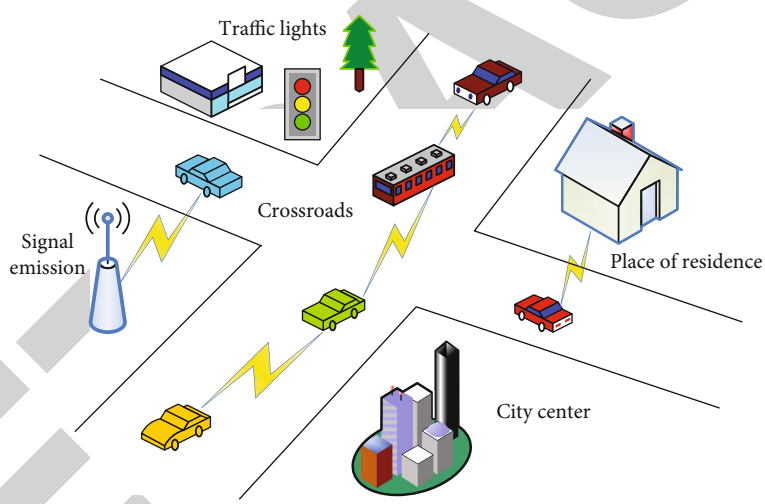


Figure 2: Network communication method.



are limited; for example, the power of the network is limited, and the cache of the network is limited, which limits the efficiency of the Internet of Vehicles to a certain extent. When network resources are insufficient, message delivery fails and transmission delay increases. In severe cases, congestion will also affect network performance, so how to make full use of these limited resources is also a research point of today's Internet of Vehicles.

*3.3. Machine Learning Task Experiment.* The big data cleaning system adopts a more flexible structure to deal with the quality problems of all raw data. In this system, all data quality problems have modules. The counterinteraction module has two interfaces, which are used to input cleaning requirements and cleaning requirements, respectively, as shown in Figure 1.

The vehicle can communicate with surrounding vehicles in a multihop mode, or it can communicate through a base station. The schematic diagram of the specific communication mode is shown in Figure 2.

VDTN is a self-managed DTN network that uses the contact opportunities created by node traffic to create discrete communication links and form a self-managed DTN traffic network, as shown in Figure 3.

Vehicle-mounted ad hoc network routing is an important technology that realizes message transmission, data collection, and content sharing between vehicles and between vehicles and infrastructure through intermittent connectivity. Bayes' theorem is used for investment decision analysis when the data of relevant project B is known, but there is no direct data to prove project A, and the status and probability of occurrence of A project are derived by analyzing the

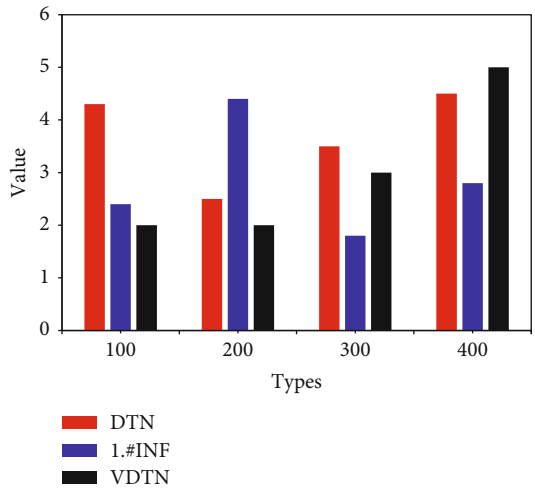


Figure 3: DTN traffic network.

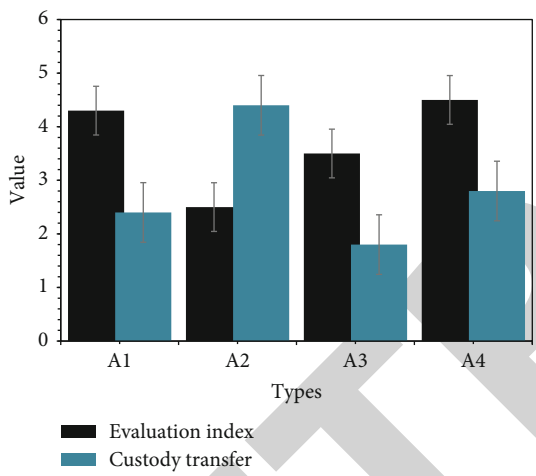


Figure 4: Content sharing.

Table 1: Delivery delay algorithm.

| | Index | Percent | Traditional network |
|---|---|---|---|
| Delivery delay | 21 | 11% | 2.36 |
| Total number | 20 | 20% | 4.21 |
| Created message | 34 | 30% | 5.66 |

relevant status and occurrence probability of B project, as shown in Figure 4.

Delivery delay is another important indicator for evaluating the quality of routing algorithms and refers to the time it takes for a data packet to be sent from the sender to the destination. Because the network connection is interrupted, the delay in the VDTN network is usually much longer than in the traditional network, as shown in Table 1.

Since the concept and system of in-vehicle self-organizing network were proposed, researchers have begun to study and propose routing strategies based on opportunistic networks. The specific manifestations are shown in Table 2.

Table 2: On-board self-organizing network.

| | Internet | Choice net | Information net |
|---|---|---|---|
| VON | 564 | 854 | 632 |
| VANET | 874 | 321 | 523 |
| DC | 446 | 455 | 442 |

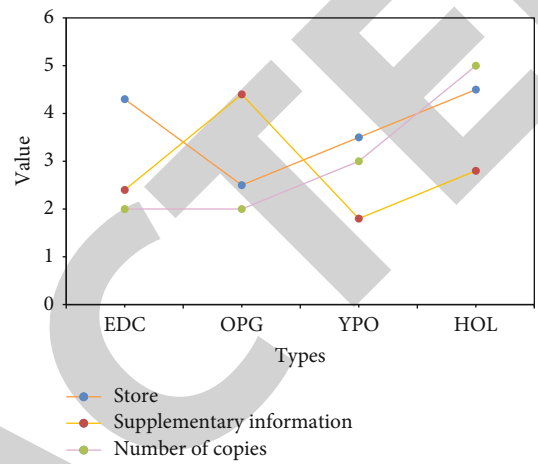


Figure 5: Routing mechanic.

Opportunistic routing based on floods does not require supplementary data. This is because opportunistic routing uses the ability to move between nodes and uses routing mechanisms, as shown in Figure 5.

Experiments conducted with the intelligent model generator make the nodes very close to real vehicles. All data quality issues have modules. The counterinteraction module has two interfaces, which are used to input cleaning requirements and cleaning requirements, respectively. Therefore, the simulation results can better reflect the characteristics of the two routing protocols in the Internet of Vehicles, as is shown in Figure 6.

DTN is an independent platform and simulator software that can support different types of mobile network simulation tools. The specific comparison method is shown in Table 3.

VDTN is a self-managed DTN network. It uses the contact opportunities created by node traffic to create discrete communication links and form a self-managed DTN traffic network. If the routing protocol uses other methods to help forward data packets during the design process, we divide the current VDTN routing algorithm into three types: blind, help, and strategy, and help with installation, as shown in Table 4.

Clustering algorithm is a common machine learning technology, which aggregates certain objects into a cluster according to certain rules. Installing a virtual machine is a virtual machine assembly problem. We can observe its specific performance from the data in Table 5.

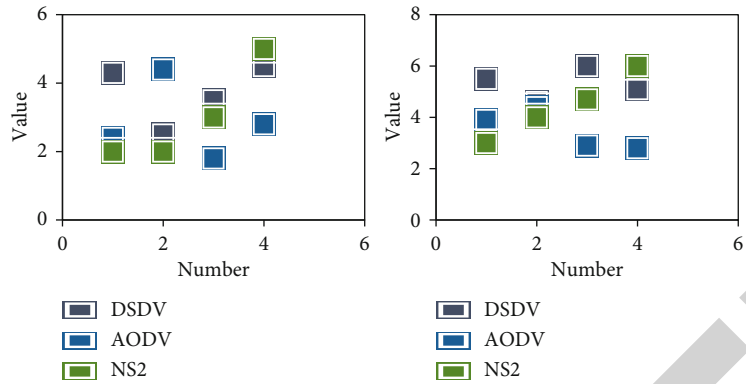


Figure 6: Mobile routing map.

Table 3: Simulator software.

| Bellman-Ford | Environment | Vehicular | Mobility |
|---|---|---|---|
| VANET | 52 | 80 | 45 |
| Mobim | 102 | 56 | 123 |
| Sim | 44 | 205 | 69 |

Table 4: Forwarding packets.

| | Blind | Help | Strategy |
|---|---|---|---|
| VDTN skill | 5.67 | 9.63 | 4.12 |
| Bubble Rap | 6.24 | 8.56 | 6.55 |
| Max Prop | 5.32 | 8.22 | 3.21 |

Table 5: Clustering algorithm.

| | Machine learning | Data center | Virtual machine |
|---|---|---|---|
| Alpha go | 457854 | 6.521 | 885 |
| CPU | 562498 | 9.663 | 447 |
| DQN | 244835 | 5.684 | 963 |

## 4. Discussion

A community is a collection of closely connected nodes in a social network. Compared with community members, community members have stronger social connections, such as relations between relatives. Most nodes of colleagues and classmates have many activities in this community. There are fewer in other communities, so it is easier to find nodes in the same community. The structure of the community greatly affects the movement patterns of nodes. It is convenient to choose the appropriate promotion path. How to deal with the change of high-speed network topology is one of the most important problems that need to be solved in the design process of self-organizing network routing protocol. Although this problem is common in mobile ad hoc networks, it is not clear. However, the centralized network installed in the car is a serious problem, and we also need to consider how to effectively reduce delivery delays. With the rapid development of wireless communication technology, more and more car manufacturers have installed smart computers and wireless communication equipment for their cars. This includes on-board sensors and GPS systems to play an on-board role in the car. The purpose of location-to-location communication between a car and a parked car is to provide a safe driving experience. Effective and more comfortable, these conditions form the basis of a large self-management network installed in the car, because the nodes of the car spread along the road. Self-managed vehicle-mounted networks tend to focus on two common network scenarios—highway scenes and urban scenes. The road topology in the highway environment is simple. And the intersection of the car can move forward and backward along the highway at high speed. In the urban environment, the topological structure of urban streets is very complicated. And the intersection can change the direction of traffic on the intersection or road, and the speed is low. In addition, road restrictions allow the vehicle to travel normally, for example, one-way or two-way movement along a lane with one-dimensional and speed restrictions, so as to predict the approximate trajectory of the vehicle on the road section.

The vehicle ad hoc network is a mobile ad hoc network that runs in a specific environment and performs specific network applications. Therefore, the network application of the vehicle self-management network is unique. This mainly includes road safety network applications and information services. And road safety is one of the most important ones; it embodies the value of having the best self-organizing network in the car. This includes applications such as proactive accident alerts and hidden danger alerts. Whether or not traffic accidents can be effectively avoided and reduced depends on the reliable, fast, and error-free transmission of accident warning data. The in-vehicle network must be able to warn drivers of potential traffic problems, such as road accidents; provide drivers with comfort; and improve work efficiency. Sensors can be installed in the car to monitor the vehicle's driving safety data, such as speed, acceleration, and engine conditions. And braking performance vehicles can report the driving status of surrounding vehicles in real time. When a dangerous situation occurs, the relevant information will be abnormal and remind the surrounding vehicles. Therefore, other drivers are warned to take appropriate measures to avoid road traffic accidents.

## 5. Conclusions

Routing in network communication is a very important issue. Almost all network applications need routing protocol support. As a new type of mobile self-management network, the self-organizing network installed in the car has distributed and self-organizing functions. Also, the characteristics of high-speed data transmission and frequent topology changes are a new challenge for routing algorithm design. Continuous research on routing algorithms for vehicle self-organizing networks based on machine learning is one of the main tasks of network researchers. DTN has many potential applications such as IPN, wireless sensor network, vehicle network, and other restricted network environments. DTN is a network solution mainly for end-to-end connections, and node resources are limited, to meet the reliable delivery of random asynchronous messages. When researching new algorithms and protocols, we must not only analyze theoretical guesses, but we must also perform scientific and sound simulations to verify the correctness of the image. But because are all new algorithms and protocols need to be reviewed, these new algorithms and protocols will inevitably be included in the existing software, and now, we need to integrate these new algorithms and protocols into the software.

## Data Availability

No data were used to support this study.

## Conflicts of Interest

There are no potential competing interests in our paper.

## Authors' Contributions

All authors have seen the manuscript and approved to submit to your journal.

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