Precise Perception, Accurate Analysis, Fine Management, Meticulous Service

Amaps "Four Refinements" Service for High -quality Travel

Reported by Liu Wenchao

In August 2020, the Ministry of Transport issued the *Guiding Opinions on Promoting the Construction of New Infrastructure in the Field of Transport*, proposing that by 2035, the construction of new infrastructure in the field of transport will achieve remarkable results. Advanced information technology deeply enables transportation infrastructure, and improves the ability of precise perception, accurate analysis, fine management and meticulous service, which has become a strong support for accelerating the construction of a country with strong transportation network.

At the "2021 Internet + Urban Traffic Management Innovation Forum" held by Amap and China Road Safety Association in May 12, Dong Zhenning, vice president of Amap, said that after 3 years of development and experience, Amaps intelligent transportation has achieved a new three -dimensional upgrade in the entire technical system from point to line, line to surface and surface to body. The traffic data in the database is processed into available information flow and continuously precipitated to provide users with high-quality integrated travel services every day through precise perception, accurate analysis, fine management and meticulous service.

Vehicle & Pedestrian Recognition Based on Digital Road Network

"The holographic digital road network jointly created by Amap and Aliyun provides precise perception services for urban traffic management." Dong Zhenning introduced that "precise perception" has many application scenarios, including refined traffic dynamic and static base number cognition, real-time visual traffic simulation decision-making, key vehicle detection and control based on trajectory restoration prediction, and rapid handling of traffic accidents, all of which require precise perception of real-time traffic flow in the road network.

"Holographic Digital Road Network" is based on millimeter wave radar and video sensing equipment. For non-motor vehicles and pedestrians, it also applies lidar technology. Through high-precision maps, it realizes road network model and equipment connection, traffic dynamic and static carrying capacity calculation and fine sensing data access, with full coverage, high precision, all-weather, continuous characteristics.

Two-dimensional and three-dimensional integrated map visualization, holographic road network vehicle trajectory restoration, accurate identification and tracking of key vehicles, individual vehicle business linkage, traffic incident push and disposal, and identification of potential traffic safety hazards…These can be achieved through the "holographic digital road network".

Assessment and Diagnosis System Automatically Diagnose Congestion Characteristic

How to achieve "accurate analysis" after realizing "precise perception"? Dong Zhenning said that the key point lies in the efficiency of the algorithm and the operability of the system. In view of the problems faced by traditional comprehensive treatment of traffic congestion, such as inadequate evaluation of traffic operation status, difficult comprehensive diagnosis of traffic congestion causes, slow iteration of treatment measures, etc. Amap has developed and launched the Mirror Intelligent Urban Traffic Assessment, Diagnosis and Treatment Analysis SaaS cloud service system (the "Assessment and Diagnosis System"), which makes comprehensive traffic operation evaluation, problem diagnosis, effect assessment and traffic feature analysis more efficient and accurate.

The assessment, diagnosis and treatment system can realize the active identification and management of traffic congestion points, screen problem intersections and problem sections through big data, by prioritizing the data, it can provide congestion characteristic index analysis and propose governance ideas.

Binjiang District, Hangzhou City, Zhejiang Province, as the only unrestricted area in the main urban area of Hangzhou, has gathered a large number of Internet enterprises such as Alibaba, NetEase and Huawei, and is one of the most congested areas in Hangzhou. The assessment, diagnosis and treatment system automatically diagnose the congestion characteristics: Binjiang District is mainly composed of business districts and office districts, which is a typical "commuting congestion". At the same time, the proportion of the mobility by motor vehicle accounts for 37.6% of the mobility in the region, with prominent parking problems, while the proportion of the mobility by bus and subway accounts for only 28.5%. As a result, there are problems such as low efficiency of travel by bus and too many stops on the bus lines.

Hangzhou Traffic Police and Ministry of Housing and Urban-Rural Development joined hands with Amap and other enterprises to start comprehensive management, adding three pairs of fully variable digital reversible lanes. Through the perception of real-time traffic flow data and the coordination of urban brain parking data, the intelligent closing and opening of variable one-way roads and variable turning lanes are realized, and the congestion delay index is reduced by 15% to 30%, thus maximizing the dynamic utilization of road resources. The traceability function of the assessment, diagnosis and treatment system can also find the source of the blockage caused by the starting point and the end point and mark the prompt.

"The data gives us a lot to think about. In addition to the governance of public transport, congestion, roads and other aspects, we have also many breakthroughs, such as the establishment of online law enforcement centers,

the overall planning of fixed-point parking for online ride-hailing, take-away deliveryman posts, and even the beautification and greening of the city, so as to force the reform of the system with the goal of governance, Binjiang pilot area has taken an important step," said Ma Shaowang, deputy chief of the Traffic Police Detachment of Hangzhou Public Security Bureau.

Data show that the peak congestion index of "Internet Town" has dropped by 11%, and the accident alarm has dropped by 32%. At the same time, the daily passenger flow of bus lines exceeded 40,000 passengers. The number of illegal parking vehicles dropped from a maximum of 1,000 per day to a minimum of 18, thus completing the "evolution" of traffic in "Internet Town".

At present, the first batch of this assessment, diagnosis and treatment system supports 23 cities nationwide to carry out integrated congestion management. Dong Zhenning said that in the future, Amap Intelligent Transportation would help to realize the "evolution" of a citys travel. In the near future, the efficiency of urban traffic analysis will be improved by more than 90%. The workload of the front-line traffic police on duty can reduce by 30 minutes per day, the incidence of secondary accidents has reduced by more than 20%, and urban office workers can have extra 10-minture sleep per day.

Intelligent Networking Releases Traffic Information in Time

"Urban management should be as fine as embroidery," said Dong Zhenning . He added that, among all the factors affecting the safety and smoothness of traffic travel, traffic incidents account for the highest proportion. However, the traditional traffic incident management is extremely difficult. On the one hand, it is impossible to grasp traffic operation information in the first time by means of plan management and manual entry. On the other hand, the traffic incident information of the management department cannot be released to the vast number of travelers in time.

As there are more and more intelligent network vehicles and automatic driving vehicles on the road, the management level of traffic incidents has to be increased. As early as 2018, Amap successively launched a series of Internet of Things products for road safety facilities, vehicle-mounted equipment and roadside equipment, such as smart cone barrels, accident car boxes and accident triangles, and enabled third-party hardware manufacturers through IoT access platforms and hardware modules to achieve refined management of IoT-based business such as safety reminders, operation statistics and event analysis.

A network of intelligent transportation IoT is the Internet of Things of equipment. Through networking of devices, we can realize the fine management of all traffic incidents, traffic operations and facilities and vehicles. Without manual entry and inspection, it can realize the automatic statistics and analysis of all team operation records, which sections are under construction, which are the periods

and spots with high incidence of accidents, how many miles the maintenance vehicles run every month, and how many people are affected by information release, all of which can realize custom query and result export.

"Helping urban traffic to achieve Precise Perception, Accurate Analysis and Fine Management is ultimately to provide　Merticulous Service fo r the majority of travelers," said Dong Zhenning. The intelligent transportation of Amap, from point to line, line to surface, surface to body, helps to realize the intellectualization of urban transportation.

□ Link

Visual Early Warning Helps Road Work Be Safe and Efficient

At the forum, by releasing the "Road Work Vehicle Safety Early Warning System", aiming at the "pain points" of industries with many road operation accidents, slow information release, limited reach and low management efficiency, Amap uses digital means to help road traffic practitioners work more safely and efficiently.

In the past, the commanding and dispatching personnel of operating vehicles needed to use roadside cameras and manual inquiry to determine the real-time road conditions of the vehicle operation site, which was inefficient, while the "Road Work Vehicle Safety Early Warning System" truly realized the whole process visualization of operating vehicles. Through the system management platform, the real-time and historical trajectory, location, speed and other information of all operating vehicles are clear at a glance. The front and rear of the operating vehicles are equipped with video equipment and the whole process is visible, which is convenient for managers to grasp the real-time and comprehensive situation of the operating site and the surrounding vehicles.

Based on video AI lane-level early warning and Internet of Things front-end technology, "Road Work Vehicle Safety Early Warning System" links road work vehicles with Amap to achieve end-to-end accurate reach. Whether the operating vehicle operates at a low speed or at a fixed point, the system will synchronize the location information of the operating vehicle in real time, and send an early warning to the passing vehicle through Amap App to prompt avoidance. The self-release rate of safety warning information reaches 100%, which can greatly reduce the occurrence of rear-end accidents and improve the safety of road work vehicles.

In addition to intelligent early warning and visual scheduling functions, the "Road Work Vehicle Safety Early Warning System" is a complete operation process database. All kinds of data such as road time, driving speed, video images and so on can be viewed and called in real time, which provides a convenient and effective means for daily management.

At present, the "Road Work Vehicle Safety Early Warning System" has taken

the lead in the pilot use of Shanghai-Nanjing Expressway and Lanhai Expressway. Dong Zhenning said that in the future, the "Road Work Vehicle Safety Early Warning System" will explore more possibilities, such as supporting assistant driving, collision warning, lane departure warning, and so on, to build an intelligent safety barrier for high-risk expressway vehicles.