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# Artificial Intelligence-Generated Content in Intelligent Transportation Systems: Learning to Copy, Change, and Create!

As artificial intelligence (AI), cloud computing, and chip technologies surge forward, AI-generated content (AIGC) is changing incredibly with each passing day. From the perspective of cognition and learning, just as the human learning process goes from imitation to improvement and then to creation, AIGC is going through the process of moving from sensing and twinning the real world (learning to copy) to predicting and improving the real world (learning to change) and, finally, to evaluating and creating the digital world (learning to create).

With advantages of “automation and efficiency,” “creative expansion and diversity,” and “large-scale personalization and customization,” the application of AIGC in intelligent transportation systems (ITSs) has been launched, such as real-time traffic navigation, but more scenarios are still being explored. Next, I talk about possible scenarios or areas of AIGC in ITSs from perspectives of management, drivers, and public participation.

## For Management

### Full-Modal Data Generation

The key point in ITSs is full-modal data collection, fusion, and perception of the real world. However, due to unevenly distributed transportation infrastructure, insufficient data collection, and imprecise information perception of related facilities, roads and environments are notorious headaches in ITSs. Through digital enhancement, digital translation, and 2D/3D reconstruction technologies, AIGC can achieve full-modal data generation with precise restoration of missing and damaged data, high-quality enhancement of low-quality data, and multimodal presentation of single-modal data so as to provide a numerical basis for subsequent scenarios.

### Full Real-Time Scene Generation

AIGC can generate three types of scenes:

- 1) *Scenarios for management and control:* Based on multimodal inputs, including data, text, pictures, voice, and videos, AIGC can accurately reproduce city maps, traffic flows, and surrounding environments with one click.
- 2) *Scenarios for improvement and optimization:* With real city layouts and traffic change requirements as inputs, AIGC can produce new layouts or optimal solutions.
- 3) *Imaginary scenarios for emergency and other events:* Through rule reasoning or conceiving, AIGC could propose various event scenarios for backup plans, learning, and training; assessment and evaluation; and future traffic modes yet to come.

### *Around-the-Clock Agent Learning*

In the preceding scenarios, including planning, prediction, control, guidance, and automatic driving, agents can learn for 24 h without rest, at lightning-fast speed, evolving into “one specialty, multiple-capability,” “multispecialty, multi-capability” agents and handling various events swiftly, especially those that are unprecedented. Finally, in the form of models as a service, those agents can be transferred from the virtual world to the real world to optimize and empower transportation, which exactly realizes the principle of “remote complex, local simple” in agent-based control, proposed by Fei-Yue Wang in 1994.

### **For Drivers**

#### *Personalized Multidimensional Navigation*

Based on traffic information, catering, accommodation, transportation, weather, and other personalized preferences, through 3D scene reconstruction and relatively simple human–computer interactions, AIGC can generate multidimensional navigation video or interactive agents to meet customized needs, including real-time traffic navigation, tourism planning, ticketing and dining, and attraction navigation and introduction, so as to save travelers precious time on planning and let them enjoy relaxing travel without worrying about anything.

#### *Personalized Driving Reminders*

By learning drivers’ behavior, AIGC can get to know in which scenarios drivers are prone to nervousness or anxiety and under which situations they are prone to driving deviations. Based on drivers’ psychological characteristics and real-time driving situation, AIGC can generate warm, tough, or other personalized tones to warn drivers in advance to prevent accidents.

### **And Participants**

#### *Participatory Traffic Management*

Traffic participants, as real traffic experiencers and users, are truly familiar

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with pain points and traffic jams, including vehicle parking problems inside and outside communities, parking and traffic infrastructures around hospitals, and traffic facilitation inside and outside schools during peak hours. Whenever participants find problems, by recording and uploading videos, pictures, and text through simple human–computer interactions, AIGC could help generate video clips of problems, solutions, and application deductions for management reference.

#### *Participatory Traffic Safety Publicity*

Based on simple interactions, AIGC can help management units and participants generate short videos of traffic safety through the automatic analysis of causes, generation of scripts, and synthesis of speech and then broadcast those videos via virtual people so as to improve everyone’s awareness of traffic safety.

#### *Anticipatory Emergency Response*

Whenever traffic incidents occur, based on traffic videos uploaded by participants, AIGC can quickly generate plans for reference by analyzing inputs and synthesizing outputs automatically. Promisingly, with the preceding plans or solutions, participants can solve most incidents right after they occur, without waiting for police, especially when accidents endanger the safety of people and property.

Therefore, AIGC can not only lower thresholds for participants to get involved in transportation but also release professionals’ imagination by freeing them from tedious modeling, calculating, drawing, and other tasks. In forms of decentralized autonomous organization-based learning communities, participants and professionals and

virtual agents could work together to create and design more effective city planning and transportation models. “Masters in civil, experts in folk”—only by mobilizing the wisdom of all people can we truly alleviate or even solve chronic problems of transportation.

Of course, AIGC, as a Doraemon-like transformative content generation technology, cannot solve all problems in transportation. At present, the essential problem of transportation is the contradiction between growing traffic demands and unbalanced insufficient development of transportation supplies. AIGC can only somehow improve the efficiency of alleviating this contradiction. In addition, the controllability, credibility, security, copyright, and ethics of AIGC will always draw our attention. Most importantly, the application of AIGC in transportation will inevitably bring many problems, including data security, privacy security, urban security, and even national security, which will exist for a long time with the development of AIGC.

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