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Commentary

# Intelligent Transportation System: An Overview

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## COMMENTARY

Intelligent transportation system (ITS) is a sophisticated application that strives to provide novel services related to various modes of transportation and traffic management, allowing users to be better informed and make safer, more coordinated, and 'smarter' use of transportation networks. Some of these technologies include emergency call-outs in the event of an accident, the use of cameras to police traffic laws, and signs that indicate speed limit changes based on conditions. Although ITS can refer to any mode of transportation, the European Union's directive 2010/40/EU, which took effect on July 7, 2010, defined it as "systems in which information and communication technologies are applied in the field of road transport, including infrastructure, vehicles, and users, as well as traffic management and mobility management, as well as interfaces with other modes of transportation."

In a variety of settings, such as road transport, traffic management, mobility, and so on, ITS may increase the efficiency and safety of transportation. ITS technology is being used all over the world to boost road capacity and cut travel times. Governmental activity in the field of information technology (IT) is being fueled even more by a growing focus on homeland security. Many of the proposed ITS systems include traffic monitoring, which is a high priority for national security. Many systems are funded either directly or with the agreement of homeland security organizations. Furthermore, ITS can aid in the speedy mass evacuation of individuals from metropolitan areas following large-scale casualty events such as natural disasters or threats. Many of the infrastructure and planning requirements for ITS are similar to those for homeland security systems. The transition from rural to urban environments has taken a diverse path across the developing countries. Many emerging countries have urbanized without considerable motorization or the development of suburbs. Automobiles are only affordable to a small percentage of the population, but they significantly aggravate congestion in these multimodal transportation systems. They also contribute to massive air pollution, offer a serious safety risk, and increase societal inequity. Predictive approaches are also being developed to enable for advanced modelling and comparisons with previous data. The following sections go over some of these technologies. Wireless communications technology in many kinds has been proposed for intelligent transportation systems. Within ITS, radio modem transmission on UHF and VHF frequencies is commonly utilized for short and long distance communication. IEEE 802.11 protocols, notably WAVE or the dedicated short range communications (DSRC) standard promoted by the Intelligent Transportation Society of America and the United States Department of Transportation can be used for short-range communications of 350 metres. The range of these protocols can theoretically be expanded by deploying mobile ad hoc networks or mesh networking. Infrastructure networks, such as 5G, are used for longer-range communications. These technologies are well-established for long-range communications, but unlike short-range protocols, they necessitate considerable and expensive infrastructure development. Recent advancements in automotive electronics have resulted in vehicles having fewer, more capable computer processors. In the early 2000s, a typical vehicle would have anywhere from 20 to 100 networked microcontroller/programmable logic controller modules with non-real-time operating systems. Fewer, more expensive microprocessor modules with hardware memory management and real-time operating systems are the current trend. More advanced software applications, such as model-based process control, artificial intelligence, and ubiquitous computing, can now be implemented on the new embedded system platforms.

Artificial intelligence is perhaps the most significant of them for intelligent transportation systems. Method of triangulation A large percentage of autos in wealthy countries have one or more mobile phones. Even when no voice connection is established, the phones send their presence information to the mobile phone network on a regular basis. Attempts were made in the mid-2000s to use mobile phones as anonymous traffic probes. When a car is moving, the signal from any mobile phones within the vehicle moves with it. This technology has the advantage of requiring no infrastructure along the road; all that is required is the use of the mobile phone network. However, in practice, the triangulation method can be difficult, particularly in areas where the same mobile phone towers serve two or more parallel routes (such as a freeway with a frontage road, a freeway and a commuter rail line, two or more parallel streets, or a street that also serves as a bus line). The popularity of the triangulation method was waning by the early 2010s.

Vehicle re-identification procedures necessitate the installation of detectors along the road. A unique serial number for a car gadget is recognized at one spot and then detected (re-identified) farther down the road using this technique. The time it takes for two sensors to identify a specific device is used to compute travel times and speed.

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