

Smart Traffic Management

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Abstract: *Physical infrastructure extension is an available solution for traffic management in many regions of the world. But the task is time consuming, costly, complex, and disturbing work. Employing technology as a key monitoring and management tool to overcome obstacles is a vice decision over physical infrastructure destruction. The smart traffic management system can provide intelligent insights and solutions for current problems through few modifications and tech integrations. AI is evolving as a prominent tool in every sector. And the future traffic management systems for the smart community would be an intelligent traffic management system. If you resonate with our article, please share your thoughts with us.*

Keywords: *Traffic Management, Integration tool, Infrastructure Destruction*

Introduction:

Smart Traffic Management Systems are technology solutions that municipalities can integrate into their traffic cabinets and intersections today for fast, cost-effective improvements in safety and traffic flow on their city streets. What's more, deploying

these systems today, or upgrading your city's existing Intelligent Transportation Systems (ITS) infrastructure can create huge efficiencies and cost savings, while massively improving system reliability, all of which have excellent ROI. These systems utilize sensors, cameras, cellular routers and automation to monitor and automatically direct traffic and reduce congestion. The right technology solution can be scaled to any size and painlessly upgraded at any time. Simultaneously, these technology solutions prepare Smart Cities for coming technology evolutions, including Connected Vehicle and the full deployment of 5G networks.

Why Evaluate Smart Traffic Technology?

Budgets for public infrastructure are always tight, and constructing roads and bridges is always expensive. Smart Traffic Management Systems help municipal and regional transportation departments to cope with the situation — quickly and cost-effectively. Integrating smart traffic technology helps them affordably get better performance from their existing infrastructure. Let's explore how augmenting and retrofitting infrastructure can dramatically improve the efficiency and safety of existing traffic networks. Smart Traffic Management: Smart Cities Do More with

Less: The problems plaguing our streets and highways are well known. Traffic slow-downs can cause debilitating congestion and add to urban air pollution. Businesses suffer from delivery delays and lost productivity. Emergency vehicles are slowed down by bottlenecks, potentially putting lives at risk. And all of it diminishes the city's overall quality of life. Meanwhile, cities and regional governments continually ask their traffic management teams, civil engineers and highway maintenance crews to do more with less. In the face of these challenges, innovative cities — "Smart Cities" — are using a coordinated array of hardware, software and cloud solutions to increase traffic flow and improve safety. Smart Traffic Management Systems, which are included in the umbrella of "intelligent transportation systems" and sometimes called "intelligent traffic management," are automated systems that incorporate the latest advances in Internet of Things (IoT) technology.

These systems can optimize traffic flow and enhance safety by using sensors, cameras, routers and cellular technology to dynamically adjust control mechanisms such as traffic lights, freeway on-ramp meters, bus rapid transit lanes, highway message boards and even speed limits.

Today, Smart Traffic Management Systems make it possible to increase the capacity of city streets without actually adding new roads. With the advent of connected vehicle technology, these systems will also be able to directly control vehicles when needed — breaking them in intersections, for example,

to prevent accidents with pedestrians or other vehicles. Smart Cities are deploying these systems now to be prepared when the vehicle technology is fully tested and deployed.

Smart traffic management system goals

- Prioritize moderate traffic conditions by analyzing real-time traffic situations.
- Providing congestion-free traffic.
- Improving traditional ticketing with an automated E-bill payment system.
- Speed sensors to warn commuters over speed violations.
- Provide a smart lighting system that reserves renewable energy sources.
- Offer safe and punctual public transportation.
- Eradicate pollution.
- Advanced traffic monitoring systems at intersections and narrow road ends to provide the right traffic guidance through GPS and GIS.
- Optimizing road networking systems, through building IoT, enabled quick and better communication systems.

AI & Big Data components enhancing smart traffic management: Smart traffic control system (IoT integrated AI System)

The drawback of having a predefined time-based signaling system in many cities is that the traffic management system functions irrespective of traffic flow. And the responsive smart traffic control systems act according to the real-time traffic conditions. Below mentioned are the components of the smart

traffic control system.

1. **A central control system:** The central control system acts as a base of a traffic control system. This system is integrated with traffic lights, signals, cameras, and queue detectors. The AI-based system can analyze real-time data by collecting information from the computer vision-enabled 3d AI cameras and queue detectors. The AI system helps in passing on an optimized information to control the functioning of the traffic lights and signals for the free flow of traffic.
2. **Smart signal lights:** Smart traffic lights and signals reduce the inefficiencies in traffic congestion and idle time at intersections. The intelligent lights can manage the queue and clear the traffic irrespective of the predefined timing system.
3. **Intelligent cameras and queue systems:** The cameras and queue system updates information to the
4. control system about the real-time traffic condition. And the control system enacts this real-time information to clear the overcrowding traffic and helps in reducing pollution.

Smart traffic monitoring system

1. AI integrated big data tools and IoT enabled intelligent communication systems are integral parts of smart traffic monitoring systems. And the tech components that define the smart traffic monitoring system are

traffic lights, smart roads, public transportation, smart parking, and geospatial traffic guidance system. These systems replace traditional ticketing systems with automation by providing advanced assistance through IoT enabled communications. Services by integrating sensors, vehicle-mounted information systems, and private individual vehicle tracking devices for tracing commuter location.

2. Smart roads and smart highways are developing tech applications of AI. The roads and highways are equipped with sensors that monitor vehicle speed and inform the vehicle owners through vehicle-mounted information systems regarding speed over limit, penalties, and information regarding overhead traffic. Smart parking enables access to information through an app or mobile application regarding vacant parking lots at a particular location for better assistance.
3. Geospatial traffic guidance system is an integration of GIS, GPS, and radiofrequency devices. It provides
4. 3d visualization of real-time geographical data based on the position of a physical object. GPS is currently used to detect the best routes to reach particular destinations within less time based on the traffic in all possible pathways. The

geospatial technology can advance this system by providing guidance, possible upcoming obstacles, and traffic inflows from various routes and their respective queue length.

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