Role of Smart Traffic Management & Intelligent Street Lighting in Smart Cities

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Abstract

Smart services in Smart Cities and communities can be created with the use of Information and data available to us which provides us better living. This paper discusses 3 cases, which impacts us almost daily. Smooth traffic management can be achieved with the Use of technology and real-time analysis. This paper also discusses intelligent street lighting. How it can help to make a city smarter.

Keywords

Smart Traffic Management, Intelligent Street Lighting, Smart Cities

1. Introduction

Because of higher purchasing power a common person can easily own a vehicle. The number of cars being sold in India is increasing at a fast rate. This has led to a comfortable lifestyle, but problems like road congestion and traffic jam is also increasing day by day. So how can we use information technology to deal with this? Let us look at a scenario.

Smooth traffic management is possible only if Traffic Management System is Connected (Traffic signals and Traffic Command centers) with a GIS-enabled digital road map of the city and use the power of analytics software. We can manage traffic flow with the help of data from all sources using real-time analytics. If a driver gets information via SMS about parking slot, less congested roads in the City. A driver can plan the journey accordingly.

Data analytics tools get data from the Traffic Management System, align this in real time with GIS mapping and parking management data and provide information to the driver, thus helps in reducing traffic to pile up. Also, information from these systems is being projected in real time on digital screens installed at City Center entrances, guiding drivers to available parking slots and streets. This not only helps to reduce congestion but also saves a lot on time and fuel, thus making the environment cleaner and better to live. Hence, a smart living experience.

Scenario 1: How Smart Analytics can help to reduce Traffic Congestion on a busy road

- Sensors are connected to each traffic signal. These signals keep sending information about the number of vehicles piling to a central server.

- Sensors, traffic signals within 2km of intended junction & GIS mapping of roads provide real-time data to Analytics platform,

- A message is sent by analytics software to traffic display 1km before the signal when a threshold is reached.

- Motorists driving towards signal can now divert to another road.

- When a number of vehicles at signal decreases below the threshold in that case message is flashed on traffic display not to divert on other routes.

- Signals are congestion free if a similar system is installed across the city.

Scenario 2: How Smart Analytics can be helpful in saving life on the road

- When an Ambulance is driving at full speed towards hospital carrying a critical patient.

- Sensors provide real-time data to Analytics platform. All traffic signals on the way to the hospital and GIS mapping of all roads leading to hospital.

- An ambulance display panel in front of the driver gets a message from Analytics software about which route to take.

- All signals towards hospital are asked to be on a particular color (Red or Green) prompting ambulance to pass through.

- Hospital system also gets a message to be ready, including an auto message to the doctor's phone to rush back if he is not in the hospital.

Scenario 3: How Smart Analytics helps in the prevention of crime and catching criminals.

- A criminal places a suspicious bag near a roadside bus stop.

- Recording of all activities is done with the help of CCTV cameras.

- Analytics platform gets all updated information from CCTV, sensors on the road, criminal database and information from Police command center. Which is used to analyze the information and make decisions

- According to the analytics report, a message is flashed to the police command center. People are informed through display boards or announcements to remain away from the site.

- Bag contents are checked by Police squad at the site. After that necessary actions can be taken.

- Command center sends Video of the person placing bag to all the police stations.

2. Intelligent street lighting

Intelligent street lighting refers to street lighting that adapts itself according to the movement by pedestrians, cyclists and cars. Intelligent Street lighting is also referred to as adaptive street lighting. Intelligent street lighting dims when no activity is detected but brightens when movement is detected. Traditional lighting has stationary illumination. Traditional lighting dims at pre-determined times. Intelligent Street lights use cameras or other sensors. With the help of them, movements can be easily detected. Additional technology enables the street lights to communicate with one another. Different companies have different variations to this technology. When a passer-by is detected by a camera or sensor, it will communicate this to neighboring street lights, which will brighten so that people are always surrounded by a safe circle of light.

Street lights collect and transmit information with the help of Digital networks and embedded sensors. Which helps to monitor and respond to any circumstances. Traffic controlling, air quality controlling, crowd controlling and noise controlling can be done with intelligent street lighting. Intelligent street lighting can detect traffic congestion, deadlock, and available parking spaces. Digital networks help to turn on and off, flash, dim LED lights from a distant place. With street lights creating a network coverage, those networks of data can be used by more than just lighting departments, empowering even schools and businesses via a lighting infrastructure that brightens the future of the digital city.

Smart lighting helps cities save energy, lower costs, reduce maintenance—all while better serving citizens and reducing energy use and CO2 emissions. Automation and networked control can further increase energy savings and reduce maintenance cost. Networked street lighting can reduce crime up to 10% and make roadways safer through improved visibility.

The first large scale implementation of intelligent street lighting network took place in Oslo (Norway) and it was expected to reduce energy usage by 50 percent, improve roadway safety, and minimize maintenance cost.

E-Street initiative was inspired by Oslo project to reduce energy usage in outdoor lighting systems in the European Union (EU). The E-Street group strongly influenced EU standards and legislation for intelligent outdoor lighting systems.

3. Why Intelligent Lighting?

Intelligent lighting offers many benefits to a city which includes environmental, financial, safety and security:

Energy Efficiency: Energy efficient LED lighting reduces carbon footprint and long term operating costs.

Operations Centre Integration: Real-time data is seeded directly into Centre which allows brightening of lighting manually when required.

Noise Detection: With real-time CCTV, Street disturbances can be monitored using noise detection. Community safety can also be provided.

Movement Detection: Movement sensors allows to monitor traffic flow – which helps in city planning.

Air Pollution Detection: Monitoring of Air pollution can be integrated into the street lighting network. Up-to-date and accurate data is collected which is used for planning and pollution reduction.

Wi-Fi Service: Wi-Fi service can also be provided with an intelligent street lighting network. Wi-Fi can be used by citizens and vital city services.

Conclusion:

Thus we can conclude that Traffic management gets better with the use of technology. Data from different sources in real-time plays an important role. Processing of data is done to take immediate decisions. Because of all this, we are able to implement traffic management successfully in our cities. An enormous amount of data is around us it depends on us how we create a more meaningful and smooth living for us with this enormous amount of data. On the other hand, intelligent street light is also helpful in traffic monitoring, energy saving. Both intelligent street light and Smart Traffic Management are good options for smart cities and good for earth's environment.

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