

# Chapter 12

## Exploring IoT–Enabled Smart Transportation System

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### ABSTRACT

*Internet of Things (IoT) is a platform that makes a device smart such that every day communication becomes more informative. A Smart Transportation system basically consists of three components which include smart roads, smart vehicles and a smart parking system. Smart roads are used to describe roads that use sensors and IoT technology which makes driving safer and greener. Smart parking system involves an automated system model that can assist the drivers in selecting the suitable parking spot for them. The data that the system collects will be sent for some analysis. It provides real time information to drivers about various aspects of transportation like weather conditions, traffic scenario, road safety, parking space, and many other things. A well-built Smart Transportation system reduces the risk of accidents, improves safety, increases capacity, reduces fuel consumption, and enhances overall comfort and performance for drivers. Our chapter deals with the in-depth discussion of these various aspects of a smart transportation system enabled with IoT technology.*

## **INTRODUCTION**

Internet of Things (IoT) provides an interface for a device to be informative of its surroundings so that data processing and analysis becomes smart. IoT is a recent buzzword that keeps on growing throughout the world. Regularly several platforms and models are being developed in order to benefit mankind. IoT acts as an agent that interconnects things of virtual world to things in reality. It enables anywhere and anytime connectivity of any object with an ON and OFF switch. It consists of an environment where physical things along with living beings with the help of virtual data interact with each other. Massive quantity of data is generated in regular basis since huge number of objects is connected to Internet. Hence these massive data is required to be coordinated and managed to provide relevant knowledge that may be useful in building intelligent automated systems. Applications of IoT range from several domain areas like education, industries, transportation, healthcare and many such sectors. Here our main focus is the application of IOT in transportation zone. IOT can be efficiently deployed to develop intelligent transportation models. These smart transportation systems can be utilized as a supportive framework for smart city architecture. Thus, it may be enabled to employ powerful and modern communication methodologies for effective monitoring of the citizens in a city. A smart transportation system enables futuristic roads and highways in managing congestion of traffic in a better manner than today's scenario. With IoT in center stage, it is estimated that in an interval of around 25 years the present traffic management system will be enhanced to such an extent that vehicles will be able to communicate with each other without any interaction of human beings. In this way, the travelling can be made more secure, simpler and smoother. Vehicles can be embedded with sensors to monitor the present traffic condition of roads and highways. This information can be compiled and collected to a central base station. Based on the status of traffic scenario, essential feedback data can be sent to the vehicles on road. In case of estimated heavy traffic conditions, vehicles can be notified to take alternative traveling route for safety purpose or to restrict their speed limit. Additionally, a parking system can also be enhanced by incorporation of smart intelligent transportation model. Parking becomes a huge headache in urban areas. This can be reduced if the driver can be informed at prior regarding the availability of free parking spaces. In addition to this, the drivers can be made aware of the shortest and feasible route available to reach the destination to control the carbon dioxide emission. It is estimated that by implementing IoT based smart transportation system, the revenue spent on traffic control can be significantly reduced by around 15%. The benefits of IoT is currently being used in all industries and transportation is certainly not an exception. Smart Transportation is the buzzword used to refer the use of IoT technology in transportation domain. By 2025, the smart transportation market is likely to grow to an approximate \$130 billion. Some general challenges faced by the use of IoT in transportation sector in modern times are as follows.

- Savings in annual expenditure.
- Enhanced customer service.
- Improved safety of drivers.
- Ensure job satisfaction of drivers.
- Real-time location of vehicles data.
- Vehicle-to-Vehicle (V2V) service.
- Preventive and predictive maintenance.
- Security and safety compliance.

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