Chapter 1
The Current Status and Scope of Smart Highways in India

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ABSTRACT

Due to the advancement in technology, electronic technologies are being implemented on roads as well as on highways. This helps in the improvement of traffic engineering and transportation facility. In this chapter, smart highway will be explained and how they are important in the present scenario. A number of research and scientific publications will be covered to find out the gaps in the current research in regard to the topic. Some smart highway projects in the country India will be covered along with smart highway's present status in the country. Some advantages and challenges will be talked about in this chapter. Then, data from different sources will be collected to perform graphical analyses in order to understand the future of smart highways in the country.

INTRODUCTION

Smart Highways as well as Smart Roads are different from normal highways as well as roads, as electronic technologies could be implemented on them, making them suitable to the changing times. Now, the question comes in the mind that how the system of Smart Highways work? It can be said that such a system is a kind of transport infrastructure which utilizes data analytics in addition to sensors, in order to enhance safety as well as optimize traffic. In the year 1997, it was the first time such a system was executed in the world, which was the country Netherlands, which

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further laid the foundation for more than one thousand systems which are presently active globally. They are utilized to enhance the operations of traffic lights, vehicles which are autonomous as well as connected ones, speed of automobiles, monitoring the road's condition, traffic levels in addition to street lighting. In other words, Smart Highways or Smart Roads have used information as well as communication technologies in order to build a present-day Internet of Things infrastructure, which not only gathers real time traffic but also analyses it. So, utilizing this data, analysts design systems in addition to algorithms in order to improve daily traffic conditions. This helps in understanding the weather conditions, condition of the road surface, and traffic patterns in real time, and accordingly appropriate adjustments are done as needed. Then, Smart Highway infrastructure could also be developed in a way to implement intelligent lighting systems which enables it to adjust the level of brightness automatically according to the time of the day and intensity of the sunlight available. Of course, Smart Highways could also support the novel renewable energy production as well as electric vehicle charging stations. If the system of Smart Highways looked into carefully, then usually it comprises of 3 constituents, which are a data collector, in addition to an info provider, as well as a controller. The info provider is the one accountable for not only managing but also creating the necessary data feeds which are further utilized not only by data collector but also by controller. The traffic data is gathered by the data collector with the assistance of sensors which are present throughout the highway network, whereas the controller utilizes this data to produce prediction in regard to traffic flow pattern as well as traffic congestion.

Figure 1. Smart highway signs at Washington (Wikimedia)

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