Technologies for Smart Transportation

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A Smart city that include smart living, smart governance, smart environment and smart transportation use technologies to provide intelligent response to the needs of the city (Su et al. 2011). Smart transportation adopts new and emerging technologies to travel around a city in a more convenient, cost effective, and safer manner (Mazur, 2020). With the advent of internet technology and wireless communications, a network of smart objects have been enabled that can communicate with each other to provide services to different domains like health care, home automation, transportation etc. Under transportation, connected vehicles that are capable of connecting over wireless networks to nearby devices such as other connected vehicles or road side units installed on the roads can be used for traffic management. Connected vehicles connect to a network to enable bi-directional communications between vehicles (cars, trucks, buses and trains) and other vehicles, mobile devices and infrastructure for the purpose of triggering important communications and events. In the case of city traffic and intersection safety, for example, those communications can enable vehicles outfitted with connected vehicle technology to continuously communicate their locations and to receive near real-time information that triggers an automated response (Wade, 2020).

The connected vehicles technology as well as other real time traffic management strategies work through the aid of Intelligent Transportation System (ITS) applications. ITS is a worldwide initiative to use information, communication and control technologies to improve the transportation system. The major goal of ITS is to make the transportation system more effective, efficient and safe. The benefits of ITS include improved mobility, increased safety, reduced emissions, informed trip making, better utilization of roadway capacity, economic productivity and sustainability. The vital unit for the functioning of ITS is Traffic Management Centre (TMC), administered by the transportation authority. The data collected through sensors deployed within the vehicle or installed on roads are analysed in real time by the TMC and communicated to the travellers through Variable Message Sign (VMS), internet, SMS or on-board units of vehicle. Examples of sensors include GPS based probe vehicles, inductive loop detectors, video camera etc. which collect data such as traffic count, travel speed, travel time, vehicle location etc. Real time information about travel time, delay, accidents on roads, change in route, work zones, diversions etc. are delivered to the users which improve the efficiency of the transportation network.

The application of ITS is in an infant stage in India. The traffic stream in the western countries are lane based in nature with the major traffic composition including cars and a fewer percentage of trucks, which makes the data collection from the detectors less challenging. However, the Indian traffic being composed of different varieties of vehicles such as two-wheelers, three-wheelers, cars, buses and trucks moving without any lane disciplines makes the data collection a challenging task. Identification of suitable sensors for data collection under Indian traffic conditions by itself is a challenge. Numerous researches are currently being carried out to

analyse the effectiveness of sensors for data collection under Indian traffic conditions such as Bluetooth sensors, Wi-Fi sensors, RFID sensors etc.

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