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REMOTE SENSE AND NAVIGATION DATA ASSIMILATION FOR LOCAL TRAFFIC
CORROBORATIVE MANAGEMENT APPLICATION

Abstract

Right before the 2013 Chinese Spring Festival, the foggy smog over massive area of the Northern and Eastern China attracted intensive public discussion about the problem of air pollution and its leading role-PM2.5. According to research, automobile exhaust accounts for at least 40% of all PM2.5 floating above the cities of China. Not uniquely, a recent publication showed that an average US driver lost 56 hr per year due to traffic jams. In the waiting, more than 21.9 billion liter gas and \$ 2 billion domestic production value are wasted. Therefore, it is definitely necessary to utilize all kinds of means to relieve the local traffic condition in urban areas and ultimately to reduce the burden on surrounding environment for the benefits of mankind. It is proposed in the current paper that both data from remote sense and data from spaced based navigation are compiled into a local traffic database. For the corroborative management purpose, the remote sense data is used for setting up a framework of local traffic background conditions. The traffic framework contains local information of basic traffic characters, such as capacity, traffic flow, main routes, inlet and outlet hotspots, etc. By ways of field investigation and statistical analysis, a local traffic database is prepared and combined with the traffic framework to build up a local traffic model. Then, real traffic data which is supplied by the local traffic administration authority as a data assimilation of the space based navigation and local traffic monitoring is input into the model for computation and assessment. Lastly, the assessment result is feed into the navigation system for a real-time adjustment of the route planning. Ultimately, a corroborative local traffic management is achieved based upon the data assimilation of remote sense and navigation signals. For a startup showcase, the method is applied to a large commercial building complex in Beijing. It is projected that an average driver can save 1 hr per travel, which amounts to a 33% reduction, going to the complex. Real data about the traffic improvement and pollution reduction are pending for scrutiny and verification.