Real-time traffic data collection is of fundamental importance for traffic information management, road guidance, and intelligent vehicle highway systems (IVHS). Most techniques addressing this issue use static probes, i.e. fixed sensors and/or cameras. Given the enormous size of a continental roadway system, and the sheer number of roads contained therein, it is impractical not to mention prohibitively expensive to install sensors and/or cameras throughout the network to collect road traffic data for each and every public road on the continent. U.S. Pat. No. 6,401,027 (Xu et al.) entitled “Remote Road Traffic Data Collection and Intelligent Vehicle Highway System” discloses a method for collecting road traffic data by using moving vehicles as probes. As described in this patent, vehicles subscribing to the intelligent navigation service periodically transmit position data to a traffic data center which computes traffic conditions and broadcasts this traffic data back to the vehicles. In-vehicle navigation devices then display or otherwise use the traffic information to enable the vehicle occupants to intelligently navigate the roadways to seek the fastest route to their destination, primarily by avoiding traffic congestion. As taught by this above patent, each vehicle maintains only two digitized road network maps at any time, one being the continental expressway network map and the other being a local regional or metropolitan roadway network map. However, even though the foregoing technology can, in theory, cover the entire territory of a continent, the sheer number of links and nodes needed to represent all the roadways and intersections in a continental roadway system is so enormously large that it is computationally inefficient to do so.

Accordingly, there exists a need for a technology that would enable intelligent vehicle highway systems for the entire expanse of a continental roadway network to thereby provide computationally-efficient and seamless intelligent navigation services to vehicles traveling large distances from one portion of a continental roadway network to another. This invention relates to a continental roadway network partitioning technique for road traffic data collection and intelligent vehicle highway systems. In particular, a system and method is provided for dividing a continental roadway network into a set of smaller, computationally more manageable roadway networks for efficiently collecting real-time traffic data and providing traffic forecasts and travel guidance to drivers of vehicles equipped to interact with the system.

**Sample Forward Citing Companies:** Microsoft, IBM, Samsung, Google, Cisco, Ericsson, and more

**Priority Date:** 7-16-2007

**Representative Claim:** US 7,447,588 – Claim #5

An intelligent vehicle highway system for collecting an providing real-time traffic data from and to vehicles traveling on roadways that are gate of a continental roadway network, the system comprising: a plurality of vehicles each having an onboard vehicle navigation device having a global positioning system (GPS) receiver for generating real-time position data for the vehicle, a wireless transceiver for transmitting the real-time position data and for receiving traffic data, the onboard vehicle navigation device having a processor that executes an application for instantiating one or more traffic managers for each of the digitized roadway subnetworks defined by partitioning
a digitized continental roadway network representative of the roadways of a continent to form a partitioned continental roadway network; and a traffic data center having a wireless transceiver for receiving real-time position data from the plurality of vehicles in the network and for transmitting to the vehicles processed traffic data based on the real-time position data received from the plurality of vehicles in the network wherein the partitioned continental roadway network comprises a plurality of demarcation lines, each demarcation line comprising artificially defined demarcation nodes, the demarcation lines being drawn to partition the network into subnetworks such that no line segment of any demarcation line coincides with any link of the network, and wherein the partitioned continental roadway network comprises an instantiating/terminating threshold (ITT) on each side of the demarcation line, the instantiating/terminating threshold having a plurality of lifeline nodes arranged approximately parallel to the demarcation line whereby arrival of the vehicle at one of the lifeline nodes causes instantiation of a new traffic manager or termination of an existing traffic manager.

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