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The Meaning and Value of ITS in Our Community

-Things changing ITS, and things ITS changes-

Intelligent Transportation System (ITS) has been introduced decades ago to overcome limits of existing transport infrastructures and improve efficiency and safety by adapting state-of-the-art technologies such as electronic, information, communication, and etc. Today, ITS is not a new paradigm any more, and is closely interweaved with our daily life already. In U.S. and other advanced countries, many remarkable developments have been achieved throughout almost all of services and systems (e.g. Real-time Traffic Information, Automated Fare(Toll) Collection, V2V communication, Dynamic Signal Controls, and so on).

The boundaries between services and systems are crumbling down due to the advancements in communication and information technology which are the smartphone revolution. The advancements of technology have enriched value of ITS much more: Intelligent vehicle-highway connection service including smart vehicle, V2V/V2I communication, service fusion with green environment such as green car (EV, PHEV), safety service for drivers and pedestrians, and other application services using smartphone. By this technological shifts and rapidly changing circumstances, the goal and value of ITS should be explored again.

First, as its original purposes, ITS will take roles of mitigating most of conventional transportation problems efficiently. Instead of constructing new roads which take tremendous expenses, ITS provides much more efficient ways to increase road capacity

and reduce traffic congestion. This includes traffic light control and coordination, real-time traffic information, real-time route optimization, and etc. New technologies make ITS even more efficient than ever before. Using image processing algorithms, existing CCTVs may also be used to count traffic volume and speed, and GPS technology enabled systems to collect locations and times of individuals. Additionally, increased speed of computers and communication technologies facilitated use of complex algorithms and large amount of data to predict traffic flows more realistically.

Second, by growing concerns and needs of environmental improvement, ITS will be key tools to provide green transportation. Green car (low-carbon vehicles) is one of common components discussed today to achieve green transportation. As the country struggles to reduce greenhouse gas emissions in the face of climate change, people have high expectations that the auto industry will do more to help reduce CO₂ emissions. For instance, the Honda Accord and Civic GX, the Nissan Sentra CA, and the Toyota Prius are Super-Ultra-Low-Emission Vehicle (SULEV)¹. In California, the California Air Resources Board released the draft proposal which guides development and implementation of California's greenhouse gas emission reduction programs. Among the actions proposed or considered in the transportation sector include aggressive implementation of regulations of vehicle emission standard (i.e. GHG reductions of about 5% per year). However, green car is not the only way to reduce GHG emission in ITS. Reducing travel time, delay, stops can be achieved by traffic signal control, real-time traffic information including incident detection, forcing drivers behave in a certain way by changing speed limit and charging congestion fee. Thus, not only vehicle efficiency, but also achievements of other areas of ITS may bring environmental impacts which must be counted.

Third, ITS will also provide a new framework of transportation planning and policy. ITS has been mainly focused on operation so far. However, ITS should also be able to provide advancements of transportation planning and policy with the rapidly changing

¹ According to the category of California Air Resources Board, passenger car emissions reductions of HC, CO, NO_x for Super-Ultra-Low-Emission Vehicle (SULEV) are 96%, 70%, 95% respectively.

environments such as global warming, population growth, abnormal climate, and etc. Even though many studies have been conducted to find trends and solutions of the environmental changes, what we really confront always and will have to consider much seriously and considerably is the uncertainty. Due to the increase of this uncertainty, conventional methodologies of transportation planning today may not work anymore in several years or less. Thus, the procedure of planning and making policy needs to be built up more interactively. By using real-time information, the planners and policy decision makers will be able to see and evaluate impacts of a new policy they implement. Furthermore, the development of communications technology will enable users be informed about the changed new policies and provide feedbacks to the planners and decision makers interactively.

Lastly, with the smartphone revolution and many other technology developments, various added services will be implemented through ITS. No one can afford to ignore the smartphone revolution. The juggernaut growth of smartphones marks a major opportunity for businesses to capitalize on changing consumer habits, and ITS is also one of big beneficiaries. Smartphone allow people to access services and connect with anyone from anywhere at any time. With connection to mobile communication, passengers can get real-time information such as searching optimal route and estimated travel time. Furthermore, by allowing their information accessible to vendors (information providers), massive amount of data can be collected which also be used to provide information to others. There will be various location-based added services (e.g. providing advertisements depending on their routes or locations), too. In-vehicle technologies using smartphone have become one of top priorities for car manufacturers and customers. This in-vehicle technologies provides not just driving tools, but also information and entertainments (infotainment system). Now, using any device that supports Bluetooth technology, you can listen to music stored on your phone, stream live podcasts via the Internet, navigate, and even use smartphone apps with the in-car infotainment system.

There are many other values and applications not mentioned in this article. Those other possible ITS technologies and services may also change our life dramatically. For

instance, if driverless cars are adopted on highways in future, people may spend their in-vehicle time for other productive activities that means the value of in-vehicle travel time is not just cost anymore. Furthermore, ITS is not just simply adapting new technologies, it's more about how intelligently we use them. Self-learning and machine-learning could be one of examples we can make ITS more intelligent. Data quality and reliability for big data are also one of key issues. Today, another growing concern we confront is how efficiently the appropriate information will be provided to the prime consumer of that information. This is the time to remind ourselves why we put the term "intelligent" for ITS.