

METHOD AND FRAMEWORK USING CELL IDENTIFIER OF MOBILE COMMUNICATION BASE STATION FOR INTELLIGENT TRANSPORTATION MANAGING SYSTEM

BACKGROUND OF THE INVENTION

1. Field of the invention

The present invention is related to a framework and a method using cell identifiers of mobile communication base stations for an intelligent transportation managing system, and more particular to a framework and a method using cell identifiers of mobile communication base stations for an intelligent transportation managing system which can be a basis of the current fix-positioned toll collection system and the future electronic toll collection system of highway according to the mileage.

2. DESCRIPTION OF THE PRIOR ART

Because cars are more and more popular, countries over the world are all suffering traffic problems without exception and all kinds of transportations are still insufficient to deal with the requirement of transportation which is getting more and more. If employing hardware constructions, e.g., road construction, for improving the supplication, a lot of cost must be paid and the speed of supplication always cannot catch up that of the requirement. Therefore, how to enhance the traffic safety and improve the capacity of transportation becomes a great urgency. Because through the development of the intelligent transportation managing system, the traffic problem can be solved and the service for the car user can be improved, it demands immediate attention to this. In all kinds of applications of the intelligent transportation

managing systems, the most beneficial one is the highway automatic toll collection. However, the traditional highway toll collection achieved by manual collection becomes the main factor of the traffic jam and air pollution when the vehicles are increased rapidly now, in particular during the continuous holidays. Therefore, the manager of the highway has no choice but stop the collection for reducing the jam. Thus, how to develop the most efficiency of the roadway makes the ETC (electronic toll collection) a solution for the popular intelligent transportation system (ITS). Applications of infrared rays, microwaves, or VPS (burgeoning vehicle positioning system) for highway electronic toll collection are correspondingly produced. But, presently, there are still some insufficiencies, e.g., the cost for constructing the lane, for reconstructing the lane and for additionally adding a machine to the car, which cause the ETC uneasily to be carried out.

Thus, it can be seen, the prior art described above still has some defects, is not a good design, however, and is urgently to be improved.

Because of the technical defects of described above, the applicant keeps on carving unflaggingly to develop a framework and a method using cell identifiers of mobile communication base stations for an intelligent transportation managing system through wholehearted experience and research.

SUMMARY OF THE INVENTION

An object of the present invention is provide a framework and a method using cell identifiers of mobile communication base stations for an intelligent transportation managing system which can significantly reduce the construction cost of the intelligent transportation system and save the cost of mounting a machine on the vehicle.

Another object of the present invention is to provide a framework and a method using cell identifiers of mobile communication base stations for an intelligent

transportation managing system which can make the vehicle management in highway easier and smother and more efficient so that the whole intelligent transportation system can be more efficiently connected to each other, the car management can also be controlled more efficiently, and the purpose of real intelligent transportation can be achieved.

For achieving the purposes described above, the framework and method using cell identifiers of mobile communication base stations for an intelligent transportation managing system according to the present invention includes a user who upgrades a cell phone thereof to use an ETC application service, mobile communication base stations and an ETC accounting system. When the user enters an entrance gateway of a highway and leaves the highway via an exit gateway, the ETC accounting system will compares records of cell identifiers provided by a telecommunication company with an electronic map for converting the records into a corresponding toll which should be paid by the user and stores the records and payment in a database for facilitating a toll collection through a next month pay bill of the cell phone.

These features and advantages of the present invention will be fully understood and appreciated from the following detailed description of the accompanying Drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

The drawings disclose an illustrative embodiment of the present invention which serves to exemplify the various advantages and objects hereof, and are as follows:

Fig. 1 is a flow chart showing the steps of a method using cell identifiers of mobile communication base stations for an intelligent transportation managing system; and

Fig. 2 is a systematic framework showing the method and framework using cell

identifiers of mobile communication base stations for the intelligent transportation managing system.

【Main representative symbols】

- 1 Gateway
- 2 Gateway
- 10 the user sets the cell phone to use the ETC application service
- 20 after starting the cell phone, the cell identifier of each mobile communication base station is automatically authorized with the cell phone of the user along the way
- 30 the user enters an entrance gateway of a toll lane
- 40 ETC accounting system tracks the cell identifiers passed by the user
- 50 the user leaves an exit gateway of the toll lane
- 60 ETC accounting system records the cell identifiers of the exit gateway, the entrance gateway and passed thereby for being compared with an electronic map of the toll lane
- 70 ETC accounting system converts the records into the toll which should be paid by the user
- 80 list the toll which should be paid by the user in a bill of the cell phone

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Please refer to Figs. 1 showing the framework and method using cell identifiers of mobile communication base stations for an intelligent transportation

managing system according to the present invention. The framework includes a user who upgrades a cell phone thereof to use an ETS application service, mobile communication base stations and an ETC accounting system, wherein each of the mobile communication base stations provides a cell identifier thereof to the ETC accounting system, and the ETC accounting system may integrate the cell identifier of each mobile communication base station at the exit gateway and the entrance gateway of each section of a toll lane, the toll station, the road junction or the route of a road for being compared with an electronic map. The steps thereof comprises:

Step 1: the user sets the cell phone to use the ETC application service 10;

Step 2: after starting the cell phone, the cell identifier of each mobile communication base station is automatically authorized with the cell phone of the user along the way 20;

Step 3: the user enters an entrance gateway of a toll lane 30;

Step 4: the ETC accounting system tracks the cell identifiers passed by the user 40;

Step 5: the user leaves an exit gateway of the toll lane 50;

Step 6: the ETC accounting system records the cell identifiers of the exit gateway, the entrance gateway and passed thereby for being compared with an electronic map of the toll lane 60;

Step 7: the ETC accounting system converts the records into the toll which should be paid by the user 70; and

Step 8: list the toll which should be paid by the user in the bill of the cell phone.

Please refer to Figs. 1 & 2, the present invention provides a framework and a method using cell identifiers of mobile communication base stations for an intelligent transportation managing system. Firstly, a user starts a cell phone thereof which has upgraded to use the ETS application service, and at this time, the cell identifier of each mobile communication base station is automatically authorized with the cell phone

along the way. Then, when the user enters an entrance gateway 1 of a highway, passes through cell identifiers Cell ID 110, 111, 112, 113, 123, 134 and 144 and exits the highway via an exit gateway 2, the ETC accounting system will compare records of Cell ID 110, 111, 112, 113, 123, 134 and 144 provided by the telecommunication company with the electronic map for converting the records into corresponding toll which should be paid by the user and stores the records and payment in a database for facilitating a toll collection through a next month pay bill of the cell phone. Finally, the ETC manager and the telecommunication company share the toll. In addition, the cell identifier employs the Cell ID mobile communication base station to narrow the communicating coverage so that the orientation can be more accurate.

Furthermore, in the present invention, the cell identifier is employed by the mobile communication base station for being authorized with the cell phone so as to prove whether the user accesses the data communication network. Moreover, it also integrates SIM card code and encoding and decoding mechanism for confirming whether the cell phone accesses the authorization and then transmits the data. Therefore, the user who utilizes the ETC application service can be relieved and safely own a personal privacy. Also, the present invention can be applied to a highway, a parking area or a bridge which employs an automatic toll system.

The framework and method using cell identifiers of mobile communication base stations for an intelligent transportation managing system according to the present invention, when being compared with the other prior arts, further includes the advantages as follows:

1. Because the electronic toll system is completely automatic, vehicles do not need to be stopped for toll collection. Therefore, as being compared with the prior art, it can significantly save the driving time and reduce the air pollution and time cost caused by the traffic jam.

2. The present invention utilizes the cell phone which has already owned by the

user so that the user does not need to additionally add the machine which is needed by the conventional intelligent transportation managing system to the vehicle and also causes an additional loading of the user.

3. The present invention utilizes the existing base stations of the telecommunication company so that it can save the fees for building the lane system of a highway and the ETC manager also can significantly reduce the huge expense and time for construction.

4. The present invention utilizes the existing base stations provided by the telecommunication company and the cell phone so that the privacy and safety of the user can be protected well.

5. In addition to being applied to the highway, the present invention can also be conveniently expanded to be used for vehicle managing of the road for achieving the purpose of intelligent transportation managing system.

Many changes and modifications in the above described embodiment of the invention can, of course, be carried out without departing from the scope thereof. Accordingly, to promote the progress in science and the useful arts, the invention is disclosed and is intended to be limited only by the scope of the appended claims.

What is claimed is:

1. A framework using cell identifiers of mobile communication base stations for an intelligent transportation managing system, comprising:

mobile communication base stations, each of which provides a cell identifier thereof to an ETC accounting system;

an ETC accounting system for integrating cell identifiers of each said mobile communication base station at an exit gateway and an entrance gateway of each section of a toll lane, a toll station, a road junction or a route of a road so as to be compared with an electronic map; and

a user who has upgraded a cell phone thereof to use an ETC application service.

2. A method for said framework according to claim 1, comprising steps of:

Step 1: the user sets said cell phone to use said ETC application service;

Step 2: after starting said cell phone, said cell identifier of each said mobile communication base station is automatically authorized with said cell phone of the user along a way;

Step 3: the user enters an entrance gateway of a section of a toll lane;

Step 4: said ETC accounting system tracks said cell identifiers passed by the user;

Step 5: the user leaves an exit gateway of said section of said toll lane;

Step 6: said ETC accounting system records said cell identifiers of said exit gateway, said entrance gateway and passed thereby for being compared with said electronic map of toll lanes;

Step 7: said ETC accounting system converts said records into a toll which should be paid by the user; and

Step 8: list said toll which should be paid by the user in a bill of said cell phone.

3. The method according to claim 2, wherein said cell identifier employs a Cell ID

mobile communication base station for narrowing a coverage so that the user is more accurately orientated.

4. The method according to claims 2 being capable of being applied to a highway, a parking area or a bridge which employs an automatic toll system.