

METHOD AND SYSTEM FOR DETERMINING ROUTE VALUE

TECHNICAL FIELD

5 This invention relates generally to a method and system for determining vehicular route value.

Background

10 A typical approach to determining value of a route travelled by a vehicle is usually determined using a fare meter installed with the vehicle. The fare meter tracks distance travelled by the vehicle and applies a standard or tiered fare schedule that cumulates after the fare meter distance is reset and fare calculation using the fixed or tied schedule is initiated. Duration during idle, for example when the vehicle is stuck in traffic or when waiting at a particular location at the request of a passenger, is also tracked and added to a fare amount. Other charges for peak hour travel or restricted zone levies are added to the fare amount only at the end of the trip. The fare meter is not able to discriminate between geographical locations which makes location based levying of fares unheard of which consequently limits the use of fare meters for applications other than for fare metering for transportation purposes. Therefore, there exists a need for a route value method for addressing the foregoing problems.

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Summary

25 In accordance with a first aspect of the invention, there is disclosed a method for determining route value for a vehicle. The method comprises determining a travel route of a vehicle from a reference geo-location and subsequent geo-locations of the vehicle during travel thereof with the travel route entering into at least one of a plurality of geographical zones and the plurality of geographical zones being predefined. The method further comprises tracking distance travelled in each of the at least one of the plurality of geographical zones entered into with each of the plurality of geographical zones having an assigned rate, and determining zone value from at least one of the tracked distance travelled in and the assigned rate of each of the at least one of the plurality of geographical zones

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entered into by the travel route. The zone value of the tracked distance of each of the at least one of the plurality of geographical zones entered into by the travel route being displayable on a user interface UI module.

- 5 In accordance with a second aspect of the invention, there is disclosed a system for determining route value for a vehicle. The system comprise a geo-location module and a processing module. The geo-location module is for determining a travel route of a vehicle from a reference geo-location and subsequent geo-locations of the vehicle during travel thereof with the travel route entering into at least one of a plurality of geographical zones and the plurality of geographical zones being predefined. The processing module is for tracking distance travelled in each of the at least one of the plurality of geographical zones entered into, each of the plurality of geographical zones having an assigned rate, and determining zone value from at least one of the tracked distance travelled in and the assigned rate of each of the at least one of the plurality of geographical zones entered into by the travel route. The zone value of the tracked distance of each of the at least one of the plurality of geographical zones entered into by the travel route being displayable on a user interface UI module.

- 20 In accordance with a third aspect of the invention, there is disclosed a machine-readable medium having stored therein a plurality of programming instructions, which when executed, the instructions cause the machine to determine a travel route of a vehicle from a reference geo-location and subsequent geo-locations of the vehicle during travel thereof with the travel route entering into at least one of a plurality of geographical zones and the plurality of geographical zones being predefined. The instructions further causes the machine to track distance travelled in each of the at least one of the plurality of geographical zones entered into with each of the plurality of geographical zones having an assigned rate, and determine zone value from at least one of the tracked distance travelled in and the assigned rate of each of the at least one of the plurality of geographical zones entered into by the travel route. The zone value of the tracked distance of each of the at least one of the

plurality of geographical zones entered into by the travel route being displayable on a user interface UI module.

5 **Brief Description of the Drawings**

FIG. 1 shows a system diagram of a route value system according to an aspect of the invention;

FIG. 2 shows a data flow diagram of the route value system of FIG. 1;

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FIG. 3 shows a process flow diagram of a route value method according to an aspect of the invention and implementable by the route value system of FIG. 1; and

FIG. 4 shows a data flow diagram of data flow between a platform and each of a vehicle, an
15 advertiser and a vehicle owners according to an implementation of the route value system of FIG. 1 utilising the route value method of FIG. 3.

Detailed Description

An exemplary embodiment of the present invention, a route value system 20, also referred to hereinafter as a method for determining route value for a vehicle, utilising a route value method 100, also referred to hereinafter as a system for determining route value for a vehicle, is described hereinafter with reference to FIG. 1 to FIG. 4. The route value system 20 preferably comprises a user interface (UI) module 22, a processing module 24 and a geo-location module 26. It is preferred that the processing module 24 is in signal and data communication with the UI module 22 and the geo-location module 26. The UI module 22 and the processing module 24 can be combined to form a structurally intercoupled unitary system, for example an in-vehicle dashboard unit, functioning independently or in cooperation with other unitary systems. Communication between the UI module 22 and the processing module 24 can occur through wired or wireless means. When employed as a unitary system, it is preferred that communication between the UI module 22 and the processing module occur through wired means. In configurations where the processing module 24 and the UI module 22 is structurally decoupled, the processing module 24 is preferably also in signal and data communication with the UI module 22 over a network 28. In such a configuration, the processing module 24 may further reside on a cloud platform.

The processing module 24 can represent various forms of server systems including, but not limited to a web server, an application server, a proxy server, a network server, or a server farm. In some implementations, the route value system 20 may communicate wirelessly through a communication interface (not shown), which may include digital signal processing circuitry where necessary. The communication interface may provide for communications under various modes or protocols. In addition, short-range communication may occur, such as using a Bluetooth, WiFi, iBeacons or other such transceiver.

The network 26 can be a large computer network, such as a local area network (LAN), wide area network (WAN), the Internet, a cellular network, or a combination thereof connecting any number of mobile clients, fixed clients, and/or servers. In some implementations, each client (e.g., the UI module 22) can communicate with one or more of the control computer

systems 28 via a virtual private network (VPN), Secure Shell (SSH) tunnel, or other secure network connection. In some implementations, the network 26 can include the Internet and a wireless service network. In other implementations, the network 26 may include a corporate network (e.g., an intranet) and one or more wireless access points.

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In an implementation of the route value system 20, the route value method 100 initiates with determining a travel route 30 of a vehicle 32 from a reference geo-location 34 and subsequent geo-locations 36 of the vehicle 32 by the geo-location module 26 during travel thereof in a step 110. The geo-location module 34 uses one of a combination of a GPS module, an A-GPS module, Bluetooth beacon module and a WiFi module for determining the reference geo-location 34 and the subsequent geo-locations 36 of the vehicle 32. However, it is apparent that other protocols and approaches of determining or estimating geo-location of the vehicle 32 may be adopted. A plurality of geographical zones 38 are predefined with the travel route 30 entering into, or passing through, at least one thereof.

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Next in a step 112, distance 40 travelled by the vehicle 32 in each of the at least one of the plurality of geographical zones 38 entered into is tracked by the processing module 24. The processing module 24 is one of disposed within the vehicle 32 and disposed away from the vehicle 32. When disposed within the vehicle 32, the processing module 24 may be in further communication with a central server 42 through the network 28. This will enable centralized communication with and centralized control over multiple units of the processing module 24, UI module 22 and geo-location module 26 residing in each of multiple units of the vehicle 32 implementing the route value method 100 and the route value system 20.

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Each of the plurality of geographical zones 38 having an assigned zone rate 44. In a step 114, the processing module 24 further determines zone value 46 from at least one of the tracked distance 40 travelled in and the assigned rate 42 of each of the at least one of the plurality of geographical zones 38 entered into by the travel route 30. The zone value 46 of the tracked distance 40 of each of the at least one of the plurality of geographical zones 38

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entered into by the travel route 30 is then displayable on the UI module 22 in a step 116. The assigned zone rate 44 is with respect to distance travelled. However, in addition to the tracked distance 40, the zone value can be further determined from duration 48 spent in each of the at least one of the plurality of geographical zones 38 entered into by the travel route 30. A time-based rate 50 is assigned to each of the plurality of geographical zones 38 for using duration 48 as one of the contributing factors to determine the zone value 46. In each of the plurality of geographical zones, either the tracked distance 40, duration 48 or a combination of both either in tandem or in sequential fashion can be used to determine the zone value 46.

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It is preferred that the main contributing factor to the zone value 46 be the tracked distance 40 in each of the plurality of geographical zones 38. The tracked distance 40 will include multiple exits and re-entry into each of the plurality of geographical zones 38 by the travel route 30 of the vehicle 32. A combination of both tracked distance 40 and the duration 48 for prime or relatively higher value at least one of the plurality of geographical zones 38 and/or travel of the vehicle 32 during specific at least one time periods in a day. In addition, a mutually exclusive use of either the tracked distance 40 or the duration 48 may be employed especially when the vehicle 32 is stationary in traffic in a prime or relatively higher value at least one of the plurality of geographical zones 38. Whether to use either the tracked distance 40, duration 48 or a combination of both either in tandem or in sequential fashion can be used to determine the zone value 46 will be determined by the processing module 24 or the central server 42.

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In the step 116, a total route value 52 accumulated from the zone value 46 of the tracked distance 40 of each of the at least one of the plurality of geographical zones 38 entered into by the travel route 30 is also displayable on the UI module 22. Preferably, the total route value 52 and the zone value 46 of the tracked distance 40 of each of the at least one of the plurality of geographical zones 38 entered into by the travel route 30 is generated and updated on the UI module 22 in real time or with little time delay. Preferably, the UI

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module 22 is disposed in the vehicle 32. Alternatively, the UI module 22 is a mobile computing device, for example, a smart device, a smart phone or a communications device.

5 In a step 120, the UI module 22 generates at least one of a visible alert and an audible alert when the travel route 30 transits or is about to transit from one to another of the plurality of geographical zones 38.

10 In a step 122, the total route value 52 accumulated from the zone value 46 of the tracked distance 40 of each of the at least one of the plurality of geographical zones 38 entered into by the travel route 30 is deducted from a reference value 54 to obtain a remaining value 56 therefrom. The reference value is pre-determined. Preferably, the reference value 54 is specific to at least one of the vehicle 32, a user account and a job/task account.

15 Both the reference value 54 and the remaining value 56 are also displayable on the UI module 22. An alert limit 58 can be set and processed by at least one of the UI module 22 and the processing module 24 to enable at least one of a visual alert and an audible alert to be generated by the UI module 22 once the remaining value 56 reaches or goes below the alert limit 58 in a step 124.

20 In an implementation of the route value system 20 employing the route value method 100, an advertising and promotions business provides a platform 60 for advertisers 62 to request for, pay for and book an advertisement campaign. For each advertisement campaign, the advertiser 62 can specify campaign parameters 64. The campaign parameters 64 can comprise requirement for one or more vehicles and the type of vehicles to be in the
25 advertisement campaign. Further, the advertiser 62 may specify or select from a list of one or more pre-specified options a preferred at least one of the plurality of geographical zones 38 and zone rates 44 for the selected geographical zone 38.

30 The platform 60 is preferably embodied by the central server 42 and will allow the advertiser to further specify campaign parameters 64 such as a maximum distance a

maximum duration, for example an campaign expiry date and time, and a minimum required distance for each of the selected geographical zone 38, maximum of the zone value 46 for each of the selected geographical zones 38 and the maximum amount of total route value 52, for example the reference value 54, for the advertisement campaign. The advertiser 62 may
 5 further specify as campaign parameters 64 the willingness to factor the time duration 48 spent in specific one or more of the selected geographical zones 38 when the vehicle 32, even when the vehicle 32 remains stationery, alternative or in addition to the distance 40 travelled therein. Additional campaign parameters 64 may include geographical zones to avoid and effective advertising time periods for each day or dates.

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In addition to advertisers 62, the platform 60 also enables registration by vehicle owners 66 for advertisement campaigns. Each vehicle owner 66 can specify vehicle owner parameters 68 which comprise make, model and colour of the vehicle 32, modifications impacting visual outlook of the vehicle, vehicle's registration details, driver's details and affiliation of
 15 the vehicle owners 66 with associate and partner platforms or platforms where fees may be earned in the utilization of the vehicle 32 being registered. The vehicle owner parameters 68 may further comprise a selection of preferred one or more of the geographical zones 38, preferred duration of the advertisement campaign and typical duration and time of use of the vehicle 32 each day or for specific days.

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Once the campaign parameters 64 and the vehicle owner parameters 68 have been captured by the platform 60, an association between an advertisement project and the vehicle owner 66 may be achieved by automatic and/or optimized matching of the campaign parameters 64 with the vehicle owner parameters 68, selection or offer to undertake the advertisement
 25 campaign by the vehicle owner 66 via and subjected to approval by the platform 60 and/or the associated advertiser 62 or selection or offer to award of the vehicle owners 66 or vehicle 32 for the advertisement campaign subject to approval by the platform and/or the vehicle owner 66.

The vehicle owner 66 registered with the platform must already have the UI module 22 and/or the processing module 24. The UI module 22 may be integrated with the processing module 24 and installed as an in-vehicle device in the vehicle 32 prior to registration with the platform 60 or prior to selecting or being awarded with the advertisement campaign. In addition or alternative to the in-vehicle device, the UI module 22 can be embodied in a mobile computing device, for an example a smart phone or a smart tab which has an app associated with the platform 60 installed to work in tandem with or independent of the in-vehicle unit.

Once the advertisement campaign has been associated with the vehicle owner 66, the vehicle owner will interact with the UI module 22 to initiate the route value system 20 and to perform the route value method 100. Prior to initiating the step 110 of the route value method 100, the route value system 20 will detect if a proximity/identity authentication module, for example an iBeacon module, has been installed in the vehicle 32, specifically constituting a sub-module of the geo-location module 34. If presence of the proximity/identity authentication module is detected, an identifier (ID) of the proximity-identity authentication module, for example an iBeacon module ID, and the ID of the vehicle owner 66 are captured by the processing module 24 and/or the UI module 22 and sent to the central server 42. If the proximity/identity authentication module is detected to be absent, the ID of the vehicle owner 66 is still captured by the processing module 24 and/or the UI module 22 and sent to the central server 42. However, an additional step of requiring an image of the odometer, or the like device in the vehicle 32, to be captured using the UI module 22 functioning as a mobile computing device or a standalone image capture device in data communication with the UI module 22 will be required and prompted via the UI module 22 before or at the start of each journey or campaign and at the end of each journey of the advertisement campaign.

Capturing of images of the odometer of the vehicle 32, specifically the display thereof, may be required or may mark the start and end of the travel route 30 and are sent by the processing module 24 and/or the UI module 22 to the central server 42 for immediate or

future verification or evidencing purposes. The ID of the vehicle owner 66 may be captured through prompts during interaction of the vehicle owner 66 with the UI module 22. Alternatively or in addition, the ID of the vehicle owner 66 may be automatically read from a transponder tag, for example an NFC device or an RFID tag carried on or by the vehicle owner 66, by the UI module. The platform 60 also serves to keep a historical record of details of past and ongoing advertisement campaigns participated by each of the vehicle owners.

During progress of the advertisement campaign, the route value system 20 will track and register the reference geo-location (i.e. a start location for the advertisement campaign and consequently for the travel route 30) and the subsequent geo-locations 36 for the course of the advertisement campaign. The UI module 22 will update the vehicle owner 66, who is assumed to be the driver of the vehicle 32, on the distance 40 travelled by the vehicle 32 in and the zone value 46 of each of the at least one of the plurality of geographical zones 38 entered into by the vehicle 32 during travel of the vehicle 32 along the travel route 30. The total route value 52, the reference value 54 and the remaining value 56 is preferably also displayed on the UI module 22. The total route value 52, the reference value 54 and the remaining value 56 may be displayed as credits, codes, weighted averages or currency denomination on the UI module 22 which may receive input from the vehicle owner 66 via interaction therewith for display options or for communicating with the processing module 24 and central server 42. Once the reference value 54 has been exhausted or at the expiry of the advertisement campaign, the central server 42 will be alerted by at least one of the UI module 22 and the processing module 24 automatically or in response to initiation by the vehicle owner 66 via the UI module 22. The platform 60 will then proceed with effecting payment based on the total route value 52 on terms specified or arranged at point of registration of the vehicle 32 or the vehicle owner 66 with the platform.

Similarly, the route value method 100 may be implemented through use of a machine-readable medium having stored therein a plurality of programming instructions, which when executed, the instructions cause the machine to determine a travel route of a vehicle from a

reference geo-location and subsequent geo-locations of the vehicle during travel thereof with the travel route entering into at least one of a plurality of geographical zones and the plurality of geographical zones being predefined. The instructions further causes the machine to track distance travelled in each of the at least one of the plurality of geographical zones entered into with each of the plurality of geographical zones having an assigned rate, and determine zone value from at least one of the tracked distance travelled in and the assigned rate of each of the at least one of the plurality of geographical zones entered into by the travel route. The zone value of the tracked distance of each of the at least one of the plurality of geographical zones entered into by the travel route being displayable on the UI module.

Aspects of particular embodiments of the present disclosure address at least one aspect, problem, limitation, and/or disadvantage associated with existing route value determination methods and systems. While features, aspects, and/or advantages associated with certain embodiments have been described in the disclosure, other embodiments may also exhibit such features, aspects, and/or advantages, and not all embodiments need necessarily exhibit such features, aspects, and/or advantages to fall within the scope of the disclosure. It will be appreciated by a visitor of ordinary skill in the art that several of the above-disclosed structures, components, or alternatives thereof, can be desirably combined into alternative structures, components, and/or applications. In addition, various modifications, alterations, and/or improvements may be made to various embodiments that are disclosed by a visitor of ordinary skill in the art within the scope of the present disclosure, which is limited only by the following claims.

Claims

1. A method for determining route value for a vehicle, the method comprising:

determining a travel route of a vehicle from a reference geo-location and subsequent geo-locations of the vehicle during travel thereof, the travel route entering into at least one of a plurality of geographical zones, the plurality of geographical zones being predefined;

tracking distance travelled in each of the at least one of the plurality of geographical zones entered into, each of the plurality of geographical zones having an assigned rate; and

determining zone value from at least one of the tracked distance travelled in and the assigned rate of each of the at least one of the plurality of geographical zones entered into by the travel route,

wherein the zone value of the tracked distance of each of the at least one of the plurality of geographical zones entered into by the travel route being displayable on a user interface (UI) module.

2. The method as in claim 1, further comprising:

displaying at least one of total route value accumulated from and the zone value of the tracked distance of each of the at least one of the plurality of geographical zones entered into by the travel route being displayable on the UI module

3. The method as in claim 2, the UI module being one of disposed in the vehicle and being a mobile computing device.

4. The method as in claim 1, the zone value of the tracked distance of each of the at least one of the plurality of geographical zones entered into by the travel route being further determined from duration spent in each thereof.

5. The method as in claim 1, further comprising:
providing an alert to the UI module when the travel route transits from one to another of the plurality of geographical zones.
- 5 6. The method as in claim 1, further comprising:
deducting from a reference value the total route value accumulated from the zone value of the tracked distance of each of the at least one of the plurality of geographical zones entered into by the travel route to obtain a remaining value therefrom, the reference value being predetermined.
- 10 7. The method as in claim 6, further comprising:
providing an alert to the UI module when the remaining value reaches below an alert limit.
- 15 8. The method as in claim 6, further comprising:
displaying at least one of the reference value and the remaining value on the UI module.
- 20 9. The method as in claim 1, wherein the geo-location of the vehicle is determined by a geo-location module, the geo-location module being at least one of a GPS module, an A-GPS module, Bluetooth beacon module and a WiFi module.

10. The method as in claim 9, each of the geo-location module and the UI module being in data communication with a processing module, the processing module for at least one of determining the travel route of the vehicle, tracking distance travelled in each of the at least one of a plurality of geographical zones entered into, and determining zone value from at least one of the tracked distance travelled in and the assigned rate of each of the at least one of the plurality of geographical zones entered into by the travel route,

5 wherein the processing module being one of disposed within the vehicle and disposed away from the vehicle.

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11. A system for determining route value for a vehicle, the system comprising:

a geo-location module for determining a travel route of a vehicle from a reference geo-location and subsequent geo-locations of the vehicle during travel thereof, the travel route entering into at least one of a plurality of geographical zones, the plurality of geographical zones being predefined; and

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a processing module for tracking distance travelled in each of the at least one of the plurality of geographical zones entered into, each of the plurality of geographical zones having an assigned rate, and determining zone value from at least one of the tracked distance travelled in and the assigned rate of each of the at least one of the plurality of geographical zones entered into by the travel route,

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wherein the zone value of the tracked distance of each of the at least one of the plurality of geographical zones entered into by the travel route being displayable on a user interface UI module.

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12. The system as in claim 11, the UI module further for displaying at least one of total route value accumulated from and the zone value of the tracked distance of each of the at least one of the plurality of geographical zones entered into by the travel route being displayable on the UI module.
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13. The system as in claim 12, the UI module being one of disposed in the vehicle and being a mobile computing device.
14. The system as in claim 11, the zone value of the tracked distance of each of the at least one of the plurality of geographical zones entered into by the travel route being further determined from duration spent in each thereof.
15. The system as in claim 11, wherein an alert is provided to the UI module when the travel route transits from one to another of the plurality of geographical zones.
16. The system as in claim 11, wherein the total route value accumulated from the zone value of the tracked distance of each of the at least one of the plurality of geographical zones entered into by the travel route is deducted from a reference value to obtain a remaining value therefrom, the reference value being predetermined.
17. The system as in claim 16, wherein an alert is provided to the UI module when the remaining value reaches below an alert limit.
18. The system as in claim 16, wherein at least one of the reference value and the remaining value is displayed on the UI module.
19. The system as in claim 1, wherein the geo-location module is at least one of a GPS module, an A-GPS module, Bluetooth beacon module and a WiFi module.

20. The system as in claim 19, each of the geo-location module and the UI module being in data communication with a processing module, the processing module for at least one of determining the travel route of the vehicle, tracking distance travelled in each of the at least one of a plurality of geographical zones entered into, and determining zone value from at least one of the tracked distance travelled in and the assigned rate of each of the at least one of the plurality of geographical zones entered into by the travel route,

5 wherein the processing module being one of disposed within the vehicle and disposed away from the vehicle.

21. A machine-readable medium having stored therein a plurality of programming instructions, which when executed, the instructions cause the machine to:

15 determine a travel route of a vehicle from a reference geo-location and subsequent geo-locations of the vehicle during travel thereof, the travel route entering into at least one of a plurality of geographical zones, the plurality of geographical zones being predefined;

20 track distance travelled in each of the at least one of the plurality of geographical zones entered into, each of the plurality of geographical zones having an assigned rate; and

determine zone value from at least one of the tracked distance travelled in and the assigned rate of each of the at least one of the plurality of geographical zones entered into by the travel route,

25 wherein the zone value of the tracked distance of each of the at least one of the plurality of geographical zones entered into by the travel route being displayable on a user interface UI module.