

Parking Payment System

159159

000000



000000

Field of invention

- 5 The present invention relates to a payment method for using a vehicle parking space.

Background of invention

- Typically, time-based payment for use of a parking space relies on parking systems
10 which use meters, coupons or gantries etc. to monitor the period of time the parking
space is used. Such methods are not the most desirable for various reasons.

- For example, a coupon or meter based system rely on pre-charged time in blocks. If the
vehicle owner uses the parking space for only a small part of a block of time, he has
15 nonetheless been charged in advance for the entire block.

- A gantry system provides the opportunity of monitoring the usage period to greater
accuracy. However, a gantry system requires an area to be cordoned off so that entering
into and leaving from the parking area is controlled. It is not uncommon to see vehicles
20 having to queue to exit through a gantry as the gantry needs time to open and close
successively for each vehicle.

Furthermore, infrastructure costs to maintain a secure gantry system are substantial and
ongoing.

A recent method to pay for parking charges uses mobile phones to log the time of use. Subsequently, payment is made through monthly billing or is taken from a pre-paid account. Although it seems that paying for use of a parking space would be more
5 convenient in using the mobile phone payment system to replace the gantry, meter or coupon systems, it has in fact become more difficult. For example, the vehicle owner will have to spend time to compose an SMS and to call in to a payment server. However, not everyone is familiar with SMS technology, especially elderly people.

10 Therefore it is desirable to provide a system for time-based payment for the use of a parking space, which does not inconvenience the getting into and out of the car park and is without the hassle of the multiple options and selections in the mobile phone-based method.

15 Summary of the invention

In a first aspect, the invention provides a system for timing the use of a parking space comprising a database, a remote device suitable for installation into a vehicle, the remote device having a messaging system means and a trigger; the trigger being capable
20 of triggering the messaging system means to compose and send messages to the remote database server; wherein the remote database server is capable of recording a period of time which is the difference between the time an earlier message is sent to the remote database server and the time a later message is sent to the remote database server.

In a second aspect the invention provides a remote device comprising a housing, the housing containing a telecommunication means the housing having a button wherein the button capable of composing a first message and sending the first message to a
5 predetermined number by the telecommunication means.

Brief description of the drawings

It will be convenient to further describe the present invention with respect to the
10 accompanying figures which illustrate possible arrangements of the invention. Other arrangements of the invention are possible, and consequently the particularity of the accompanying figures is not to be understood as superseding the generality of the preceding description of the invention.

15 Figure 1 illustrates a system according to an embodiment of the invention;
Figure 2 further illustrates a remote device shown in the embodiment of figure 1;
Figure 2a illustrates another version of the remote device of Figure 2;
Figure 3 shows an example of a graphically generated display which is may be used in the embodiments illustrated in Figure 1;
20 Figure 4 is a flowchart showing how the embodiment of Figure 1 is used;
Figure 5 illustrates a system according to a further embodiment of the invention;
Figure 6 illustrates a flowchart showing how the a remote device as shown the embodiment of figure 2 or 2a is activated;
Figure 7 illustrates a flowchart showing how the a remote device as shown the

embodiment of figure 2 or 2a is deactivated;

Figure 8 illustrates a third embodiment of the invention; and

Figure 9 illustrates a further embodiment of the invention.

5 Detailed description of the preferred embodiments

Figure 1 illustrates a vehicle park system using an embodiment of the present invention.

A vehicle 0100 is shown installed with an apparatus known as a Press-And-Park (PAP
10 0200) 0200 in this embodiment.

When the vehicle owner parks the vehicle into a parking space, the vehicle owner manually triggers, i.e. activates, the PAP 0200 to communicate wirelessly to a remote database server 0400 the time and the PAP 0200's identity. Thus, a record of the point
15 in time in which the vehicle was parked is provided to the remote database server 0400. Conversely, when the vehicle owner wants to drive the vehicle away from the parking space, the vehicle owner also manually triggers, i.e. deactivates, the PAP 0200 to communicate the time and the PAP 0200's identity to the remote database server 0400. Thus, the remote database server 0400 may also have record of the end time of the
20 parking. The duration of use of the parking space is then computed as the difference between the start time and end time, such that a time-based fee may be charged to the owner of the vehicle for using the parking space.

In this description, 'parking space' refers to the actual plot drawn on the ground of a parking area, into which only one vehicle may be station, as is typically in most countries.

- 5 It is thus possible in this embodiment to charge for the use of the parking space to the precise second, minutes or block of minutes.

In Figure 2, the PAP 0200 is shown comprising a housing 0201, a display screen 0202, one or more buttons 0203 for operation of the PAP 0200 and a wireless means 0204 of
10 communication with the remote database server 0400. The display screen 0202 may be, for example, an LCD (liquid crystal diode) screen 0202 having a size of 4.5 inch. Preferably, the PAP 0200 device is E911 compliant.

The PAP 0200 also comprises an integrated, or embedded, SIM card (or an equivalent
15 technology, depending on the technology of the day), which is not visible in Figure 2.

The SIM card is used to communicate with the remote database server 0400 by text messaging e.g. Short Message System technology. Therefore, the PAP 0200 may but, in this embodiment, does not have speaker and audio receiver features. Typically, a third
20 party service provider may provide the text messaging service.

Furthermore, the remote database server 0400 has capabilities to parse the text message that is sent by the PAP 0200 to the remote database server 0400.

The SIM card is encoded with the number to call in to the remote database server 0400 400. Thus, the PAP 0200 need not have a telephone keypad to dial the number for sending the text message to the remote database server 0400, as the number is pre-determined. Furthermore, the PAP 0200 comprises means for automatically composing
5 the text message to be sent to the remote database server 0400 when activated. For example, pressing on the activation button 0203 causes the PAP 0200 to both automatically compose a text message and send the text message to the remote database server 0400. Thus, there is no need for the user to painfully type the text and then select the number to call in to the remote database server 0400. This is particularly useful to
10 the elderly or people who are not keen to navigate through the many options typically available in a mobile phone.

In this embodiment, the SIM card is integrated into the PAP 0200 and is not removable from the PAP 0200. Thus, the SIM card is useable to identify the PAP 0200; each
15 vehicle installed with the PAP 0200 has one SIM card for the vehicle's identification. In turn, the PAP 0200 is permanently installed in the vehicle and can be used to identify the vehicle. Typically, the SIM card's identity is the International Mobile Subscriber Identity (IMSI). The IMSI is known in the art and is unique for the purpose of identifying the SIM and the service provider to which the SIM card is subscribed.
20 Alternatively, as one mobile phone number is uniquely linked to one SIM card in a country, it can be said that the vehicle may be identified by the phone number linked to the SIM card.

5
10

15

20

The text message is then sent to the remote database server 0400, which parses the message for the start time.

Alternatively, the text message may not include the time stamp as the server operating the remote database server 0400 has its own clock and is able to obtain and enter the time into the remote database server 0400 the moment it receives the text message. In
5 this alternative, there is greater accuracy in time-based charging as the clock is in the database, and not in the vehicle owner's PAP 0200, which has a risk of being tempered with.

Although the IMSI is not shown in the text message, the IMSI is encoded during text
10 transmission and the mobile phone service provider is nonetheless able to detect the IMSI. The IMSI is passed to the remote database server 0400 by the mobile phone service provider to query, match and find the identity of the vehicle owner in the remote database server 0400 records. In this way, the vehicle's identity number, the vehicle's owner and the vehicle owner's billing information such as his bank account may be
15 queried using the IMSI.

When the vehicle owner is about to drive away from the parking space, he deactivates the PAP 0200 by triggering the composition and sending off of a second text to the remote database server 0400, i.e. a deactivating text message. For example, the text
20 message may be

"1230 end"
↑
End time

Optionally, the button 0203 to compose and send the deactivating text message that is a different one from the button 0203 used to compose and send the activating text message, i.e. there are two buttons on the PAP 0200. Alternatively, they may be one same button 0203 which is toggled to alternatively activate and deactivate the PAP 0200 in
5 consecutive operations.

Typically, the deactivating text message also contains the time in which the message is composed. Being the second text message in pursuance of the activating text message, the time in the deactivating text message is taken to be the end time of the parking.
10

Similar to the alternative described before, in a variation of the embodiment, the deactivating text message need not contain the time if the remote database server 0400, on receiving the second text message, is able to take the time from the clock in the server running the remote database server 0400.

15 The remote database server 0400 also contains information on the charge rate for using the parking space. Thus, as soon as the start time and end time have been received by the remote database server 0400 to compute the duration of the use of the parking space, the charge rate is used to calculate the total chargeable amount for use of the parking
20 space. Optionally, the chargeable amount may be re-calculated in regular intervals in the database before the deactivating text message is sent, while the parking time is still being monitored, so that the charging record in the remote database server 0400 is updated regularly.

The display screen 0202 on the PAP 0200 is used to display a visual indication that the activating text message has been sent and that use of the parking space is thereby being timed or monitored for fee charging. The message may be as simple as a digital display of the word "Charging". Optionally, the PAP 0200 may continually update the display to show the time lapsed since the start time. Optionally, the remote database server 0400 regularly calculates the charge amount incurred and updates the PAP 0200 by text messaging, such that the PAP 0200 display may be regularly updated to show the current incurred charges. Optionally, even more information may be shown in the display such as a transaction reference number, the start time, the vehicle number etc, which may be extracted from the remote database server 0400 and sent to the PAP 0200.

The PAP 0200 may be positioned in the vehicle such that the screen 0202 is visible from outside the vehicle, for example, on the vehicle's dashboard. In this way, a parking attendant may be able to check the display to confirm that use of the parking space is being monitored using the PAP 0200. Alternatively, the PAP 0200 may have more than one display means. For example, the PAP 0200 may be connected to a screen 0202 installed at the dashboard of the vehicle for the parking attendant to see, and to another screen 0202 positioned inside the vehicle for the vehicle owner to read.

20

The display on the screen 0202 may be a conventional digital or LED display. Preferably, however, the screen 0202 displays information in graphically generated images. A message in a graphically generated image is not presented in typical font types and the PAP 0200 cannot therefore be easily hacked into and made to display

information to fool the parking attendant that the PAP 0200 has been activated and payment is being charged. Figure 3 shows an example of a graphical image of a word 'lumper', which is not presented in characters in typical fonts. Preferably, the graphical image displayed is a distorted text so that there may be further prevention against
5 forging of the parking message on the PAP 0200 display.

Since the LCD displays a parking status, it would be good to use graphical representations instead of text representation (it is possible to forge a display of parking status via text, i.e. affixing another alien LCD display into the PAP, which can be
10 controlled and displayed by driver's mobile phone, which also means that vehicles can park for free).

Since the graphics is under secure key encryption that changes on a daily basis, it is stored in the server as a parking logo of the day for a said payment type. Thus, copying
15 of the graphics into another device becomes impossible as the former mechanism disallow the loophole of parking forgery, in addition, despite the fact that the driver may get a replica PAP which allows him to forge a text display, he will not be able to forge a graphical display.

20 In yet a further variation of the embodiment, the PAP 0200 is connected to an electronic cash card reader from which payment is extracted instantaneously, instead of being charged to a bank account.

In yet a further variation of the embodiment, the PAP 0200 is connected to a credit card reader from which payment on credit is taken by the operator of the parking space the moment the PAP 0200 is used to indicate that the parking is completed.

- 5 In yet a further variation of the embodiment, the PAP 0200 further comprises a blinker which indicates that an activation text message has been sent to monitor the parking, and which may be easily noted by the parking attendant at night or in a dark environment. The blinker feature serves as a visible cue for the parking inspector for doing inspection at night. A blinking light in the vehicle would show that the driver has
10 parked the vehicle, on the other hand, vehicles that has no blinking light in the PnP clearly shows a violation and prompts the inspector for a priority scan.

The beep tone alerts the driver that the parking process has started, it also serves as a reminder to the driver to stop parking prior to starting the vehicle.

15

- In yet a further variation of the embodiments, the number to call the remote database server 0400 has to be keyed in or dialled using a keypad attached to the PAP 0200, or selected from a list of numbers from a dropdown list or combo box displayed in the screen of the PAP 0200. This may provide the advantage of flexibility in allowing
20 several databases operated by different service provider to be selected for payment. Selection of the list of numbers may be effected by selection and navigation buttons 0203 provided on the PAP 0200, or the screen 0202 may be touch-sensitive.

In yet a further variation of the embodiments, the PAP 0200 may have an identity which is not the IMSI, and which may be nonetheless sent by text messaging to the remote database server 0400 for identifying the PAP 0200. For example, instead of the IMSI, the PAP 0200 may use an International Mobile Equipment Identity (IMEI) to identify
5 itself. The IMEI identifies the PAP 0200 as an equipment, unlike the IMSI which identifies the embedded SIM card. The IMEI is presently used in all mobile phones to identify the phones regardless of the SIM cards in the phones.

In yet a further variation of the embodiments, different charge rates may be applied
10 according to the time of the day. For example, peak hour charge, such in a work week day, may be more expensive compared to non-peak hour charge, such as in a work week night. Furthermore, different charge rates may be applied according to the day. For example, if the parking space is in a business district, the time-based charges for using the parking space in the weekend may be cheaper than in a weekday. In this case, the
15 text message may either include the date and/or the time, or the remote database server 0400 may automatically detect the date or time for computation of the charges when the text message is received.

In a variation of the embodiment, information such as the identity of the vehicle owner,
20 the vehicle registration number or the like and also the billing account may be sent anew to the remote database server 0400 from the PAP 0200 every time the text message is sent. This will allow the information to be changed easily, providing the possibility to update change of owner and billing account in the remote database server 0400. As a

non-limitative example, the new information may be pre-entered into the PAP 0200 by a keypad.

In yet a further variation of the embodiment, the PAP 0200 may be activated or
5 deactivated on biometrics authentication of the vehicle owner. This provides better security if the remote database server 0400 has direct access to the bank account of the vehicle owner to take payment.

In yet a further variation of the embodiments, Enhanced Messaging Service (EMS),
10 MMS or other mobile phone messaging systems may be used instead of text messaging i.e. SMS.

Figure 2a illustrates a PAP 0200 having some of the discussed features, for example, a keypad for entering further information and a Start and a Stop button 0203 for,
15 respectively, sending activating and deactivating text message to the remote database server 0400. Also illustrated is a blinker 0206 for night parking.

As a non-limitative example, the PAP 0200 device may be a cellular mobile device solely customised for car parking purpose, with 4.5 inch LCD screen that is able to
20 display graphical text.

As mobile phone communication technology is used, even though a mobile phone is not used, the advantage and speed in network and communications such as CSM, CDMA, WiFi and 3G network may be exploited. Typically, the processing time using a CSM

network is 20 seconds while the processing time using a 3G network is about 6 seconds. Alternatively, other forms of wireless technology or telecommunication technology may be used, especially those that may span across an entire city, such as Wimax coupled with WiFi technology that is able to offer a coverage of 200 miles apart. Furthermore, 5 semi-wireless technology may also be used such as Internet-telephony in conjunction with text messaging technology such as Voice over IP protocol etc.

Figure 4 is another flowchart depicting how the owner of the vehicle uses the embodiment. In step 400, the vehicle owner drives the vehicle into a parking space 10 which is payable using the present embodiment. In step 405, the vehicle owner activates the PAP 0200, such as by pressing a button 0203 on the PAP 0200, to start timing his use of the parking space. When so activated, the PAP 0200 sends the remote database server 0400 a text message to record the start time, at step 410, and to identify the PAP 0200.

15 Optionally, the screen 0202 of the PAP 0200 displays information indicating to the vehicle owner that his use of the vehicle park is being timed for charges, at step 415. The display may show the time lapsed, the amount incurred or just an indication such a word “Charging”, “Monitoring” or even “On”.

20 When the vehicle owner wishes to drive the vehicle away from the parking space, he uses the PAP 0200 such as by pressing on a button 0203 on the PAP 0200, to send an text to the remote database server 0400, at step 420. The text message preferably contains indication that the use of the parking space has come to an end. Alternatively,

however, the text message may just contain an indication of the identity of the PAP 0200 and the end time. Being a second received a text message, the remote database server 0400 is thereby notified that the text message indicates that the parking period has ended.

5

The remote database server 0400, at step 425, takes the difference between the start time and end time to compute the parking duration. The remote database server 0400 then multiplies the time-based charge rate with the duration of parking space use to compute the total amount payable by the vehicle owner, at step 430.

10

Optionally, at step 435, the remote database server 0400 sends a text message to the PAP 0200, which causes the PAP 0200 to display the total chargeable amount.

Optionally, at step 440, the vehicle owner has to press a button 0203 on the PAP 0200

15 to acknowledge payment.

Although it is not shown in the flow chart Figure 4, the remote database server 0400 may subsequently send a bill to the vehicle owner for the amount incurred for use of the parking space. Alternatively, the remote database server 0400 may be linked to the
20 vehicle owner's account in a bank and may thus directly take payment from the vehicle owner's bank account.

Using Cash Card

The PAPD, after receiving the appropriate fees deductible, sends a RF signal to deduct the amount in a smart card reader with frequency (B). The end-of-parking message sent time (T) is recorded also in the server.

- 5 In an event where the cash card is not inserted or contains insufficient cash value to pay the said parking fee, the I.U. will emit a negative signal (-) to the PAPD and cause it to send a failure message to the server to continue the parking charges, which includes the difference between the failure message received time (F) and end-of-parking message sent time (T). The PAPD sounds an alarm and displays an internal generated message:

10

“Parking still charging, please insert cash card and press again ”

An additional \$0.10 can be imposed for each unsuccessful deduction together with the parking charges until the driver inserts a valid cash card with a successful deduction.

15

Similarly, if the user ignores the message and drives off without performing the above, the parking charges will persist until the end operational hours of the parking lot. An additional administration fee plus the total parking fee will be imposed.

- 20 On the other hand, if the deduction process is successful, the I.U. will emit a positive signal (+) to the PAPD and cause it to send a successful deduction message back to the server to end the entire parking process. Thereafter, the PAPD will display a delayed message to the respective PAPD indicating the deducted parking fees. For example:

25

“Parking Fee: \$1.55, Thank You ”

The PAPD may use a credit top up system, which requires the user to credit sufficient value into the PAPD before the latter can be used, via a smart/cash card debit device or a mobile phone that has an in-built RFID reader that allows bill payment. The user
30 would have to top up i.e. min \$20.00 each time and the PAPD will alarm the user when

a minimum value of say \$2.00 is reach to prevent the PAPD from usage. Each transaction is sent to the server for record keeping via wireless means i.e. GPRS, WiFi etc. for claims, accounting and auditing by the parking operator.

- 5 The PAPD can also write the parking status (for the particular parking type) into a detachable active RFID tag (powered by coin like lithium batteries for high temperature applications). The latter is configured and to be used in one PAPD only. This enables the driver to display the tag on the dashboard/windscreen for parking inspection. The parking ends with the driver pressing the PAPD after the RFID card is inserted. This
- 10 mechanism allows the driver to store the PAPD in other parts of the vehicle rather than constant exposure to the sunlight, and allows the integration of the PAPD on the vehicle's control dash board.

15

- In a further embodiment, different parking spaces may have different charge rates. For example, parking spaces in an area may be classified according to their Charging Type for example, "A" for car parks operating from 8:30am to 5:30pm, \$0.50 for half hourly parking, "B" for car parks operating from 8:30am to 10:00pm, \$0.50 for half hourly
- 20 parking and "C", "D" etc representing different charging patterns and different car parks has means to allow the vehicle owner to identify the zone of the parking space in which he parked his car. In this way, the remote database server 0400 may be informed of the charge type and selects a suitable charge rate for calculation.

In this further embodiment, the PAP 0200 may comprise further buttons 0203 for pressing the charging type buttons. For example, the vehicle owner may be able to press a button 0203 from a row of charging type buttons 0203 on the PAP 0200 to select the charging type, and then press the activating button 0203 to compose and send the activating text message. The text message thus composed will include an identification of the charge type, which the remote database server 0400 may use to query for the charge rate of that zone. Alternatively, the buttons 0203 for selecting the charging type may all be capable on being pressed to both compose an activating text message which include the zone identification and to send off the text message to the remote database server 0400.

Alternatively, instead of physical buttons 0203, a touch-sensitive user interactive screen 0202 with a graphical user interface showing digital buttons 0203 may be used. Optionally, the PAP 0200 may further comprise a keypad or keyboard by which the zone is keyed-in.

The text message generated to include information on the zone may look like this:>>

20 “0930 charge D Start”
 ↑ ↑
 Start time The charge type alphabet, which the vehicle is parked.

Typically, but not necessarily, the different charge rates of different zones are pre-determined and are recorded in the remote database server 0400. Therefore, the

particular charge rate for the zone in which the vehicle is parked may be queried from the database using the zone identification, which is then used to calculate the charge for the parking duration.

- 5 The owner may be made aware of the zone to which the parking space belongs, preferably, by means of signboards near the parking space.

In this embodiment, the screen 0202 of the PAP 0200 may also display the zone which the vehicle owner has selected when activating the PAP 0200. For example, the word
10 'lumper' in Figure 3 may well be the name of the zone in which the vehicle is parked, so that the parking attendant knows that the correct zone has been selected and indicated in the activating text.

Figure 6 is a flowchart showing how the PAP 0200 may be activated in this
15 embodiment.

First, the vehicle owner parks his vehicle into the parking space and, at step 0710, presses a button 0203 to select the zone to which the parking space belongs. After that, the vehicle owner presses a 'Start' button 0203 on the PAP 0200 to compose and send
20 the text message to the remote database server 0400, the text message indicating the zone to the remote database server 0400.

In Step 0720, the database queries its record by the IMSI of the text message for the identity of the vehicle and the owner, and adds the vehicle number to a record of

vehicles being charged for using parking spaces. In step 0730, the database time stamp into the vehicle's record the start time. As mentioned, the time may be sent by the PAP 0200 or may be obtained from the clock of the server running the database.

- 5 The remote database server 0400 then replies, at step 0740, to the PAP 0200 with a text message which is displayed in the screen 0202 of the PAP 0200. For example, the remote database server 0400's message may include the vehicle number, the zone identification, the start time and a reference number for tracing the transaction.
- 10 The vehicle is then being timed for using the parking space at step 0750.

Optionally, at step 0715 (wherein the dotted lines represents the feature as optional to the embodiment), where there are different charge rates for different zones, the charge rate for the zone in which the vehicle was parked may be queried from the database.

15

- Figure 7 shows the corresponding deactivation flowchart for ending the parking. In step 0810, the PAP 0200 is deactivated by pressing a button. On receiving the deactivating text message, at step 0820, the car number is removed from the list in the records of the database of vehicles being charged for use of parking spaces. Subsequently, in step
- 20 0830, the end time is entered into the record for the vehicle. A text message is then generated by the database and sent to the PAP 0200 indicating that the charging has been deactivated. Preferably, the text message, at step 0840, shows the vehicle number, the zone identification, the end time and the reference number for tracing the

transaction, the total amount of charges incurred. The parking thus ends, shown as step 0850.

Optionally, the charging of the use of the parking spaces may be based on credit points, 5 for which the vehicle owner may pay before in advance or after use. In this case, the text message sent to the PAP 0200 on deactivation, at step 0840, may indicate the credit points spent or, alternatively, credit points remaining.

In a variation of the embodiment, there may be a further button 0203 on the PAP 0200 10 which is useable to poll the remote database server 0400 for the charge rate of the parking spaces in the area PAP 0200 is in, without triggering the logging of the start time and incurring charges for the vehicle owner. This would allow the vehicle owner access to payment information before committing himself to parking in a specific area.

15 In a third embodiment, instead of using buttons 0203 to select the zone which the parking space belongs to, the PAP 0200 is also able to determine wirelessly the location of the PAP 0200, and thus the parking space or zone 0500, 0500a in which the vehicle is parked. This is achievable by various positioning systems such as the Global Positioning System (GPS), however, the latter is vulnerable to and completely 20 dysfunctional in sheltered car parks and dense urban environment where visibility of satellites are poor. As most parking activities are conducted in urban areas, a more accurate and robust system are preferred as follows:

1. Differential Global Positioning System (DGPS) or Inverted DGPS (iDGPS) combined with active RFID tagging of car parks with poor satellites visibility.
2. WiFi Positioning System (WPS), or other wireless based location services, which performs robustly in urban and sheltered conditions. Combined with active RFID tagging of car parks with special requirement that is not within the accuracy tolerance of WPS.

Figure 5 illustrates the embodiment showing how vehicles parked in parking spaces in different zones 0500, 0500a may be detected by GPS.

10

In a nutshell, GPS is a NASA-run satellite system 0300a in which an object having a GPS receiver is able to receive signals from the satellites as references to obtain its position on earth. DGPS uses two or more known point signal receivers, which are stationary and provides a point(s) of reference to make corrected positional measurements. In iDGPS, the GPS coordinates are corrected by a reference GPS coordinates sent to a remote computer to make the corrections for errors.

15

In wireless positioning, the location of the vehicle is found by using a wireless chip, for example Wi-Fi chip, that is able to tell which wireless hotspots(s) or access point(s) the car is nearest to, which thus allows the system to use the relevant hotspots(s) or access point(s) locations to perform a multi point interpolation of the vehicle's exact location, more routers in sight, more accuracy can be achieved. Wireless positioning has robust performance in dense urban conditions.

20

In GPS positioning, the parking spaces, or the zones 0500, 0500a which the parking spaces are in, may be pre-identified by their GPS coordinates (Geofencing technology), which are stored in the remote database server 0400. In order to know which parking space is the PAP 0200 in, the remote database server 0400 correlates the GPS coordinates of the PAP 0200 to the GPS coordinates of the parking spaces. The parking space with the nearest GPS coordinates to those of the PAP 0200 is assumed to be the one the vehicle is parked into. In practice, there is no need to identify the specific parking space, as an identification of the zone 0500, 0500a to which the parking space belongs is sufficient to determine the charge rate of the parking space. Therefore error tolerance of up to a pre-determined several metres may be allowed. In general, the lower the required accuracy, the easier and faster it is to compute the zone 0500, 0500a of the parking space.

Similarly, the server can also store all known location of the wireless access points or hotspots so as to determine which hotspot(s) is used to transmit the car's Location, which allows the triangulation of the exact location of the vehicle. As for parking lots with very close proximity and different car park types, and cannot be resolved by any means of wireless positioning technology, an RFID tagging is inevitable to indicate the exact car park type.

20

Figure 8 shows an example of how iDGPS may be used in this embodiment. The PAP 0200 in the vehicle 0900 (or 0100) further comprises a GPS receiver. Using the GPS receiver, the PAP 0200 may receive the GPS coordinates of the location of the vehicle 0900 from the NASA satellites 0940. When the PAP 0200 is activated for parking

charges, the PAP 0200 composes and sends the activating text message along with the GPS coordinates detected by the PAP 0200 to the remote database server 0910 (or 0400), at 0901. The remote database server 0910 (or 0400) receives the text message and parses the text message for the GPS coordinates. As is known in the art, GPS
5 signals from the NASA satellites 0940 usually have a small level of error. Thus, the remote database server 9010 (or 0400) subsequently may use DGPS technology, e.g. the remote database server 9010 may be linked to a DGPS receiver 0920, to obtain correction information from a reference GPS receiver 0930 to correct the GPS coordinates sent by the PAP 0200.

10

In areas where satellite visibility is poor, i.e. sheltered car park or dense urban conditions with small sky view. RFID technology can be used to tag a type to a car park alongside the implementation of wireless positioning means. The battery or electrically powered RFID tag is an active tag, which only emits radio waves (usually with a range
15 of more than 10 meters) when it is a probe with a passive RFID reader installed in the PAPD. Upon entering the tagged car park, the identity of the car park is read by the PAPD and stored in a ROM chip, which erases any GPS coordinates that was last read. It is erased at the same time when the parking commences or when the vehicle leaves the said car park, which unlocks the PAPD for further reading of satellite signals when
20 the car is on the move.

A reference receiver 0930 is installed in a known position on earth and thus has known GPS coordinates. When the reference GPS receiver 0930 checks its coordinates from the satellites 0940, any discrepancy between the coordinates sent out by the NASA

satellites 0940 and the known coordinates of the reference receiver(s) 0930 may be calculated. Within a certain distance of the reference receiver 0930, this discrepancy may be applied to correct coordinates read by reference receivers in the area. The corrected coordinates through I-DGPS may then be used to determine the zone and
5 location of the vehicle 0900 (or 0100) relatively accurately, for calculating parking charges.

Thus, depending on where the vehicle 0900 (or 0100) is, the GPS signals received by the PAP 0200's 0200 GPS coordinates may be corrected by referencing a suitable
10 reference GPS receiver 0930.

In an alternative embodiment, the PAP 0200 itself is installed with a DGPS receiver 0920 and is by itself capable of communicating with the known reference DGPS stations(s) 0930 to calculate and correct the erroneous coordinate the PAP 0200
15 received from the NASA satellites. Thus, the correction of the erroneous coordinates received from the satellites 0940 is performed in the PAP 0200 instead of the remote server 0910, i.e. without burdening the processing capacity of the remote server 0910. The corrected coordinate by the PAP 0200 may then be quickly matched to a list of coordinates of car park zones pre-stored in a memory in the PAP 0200, without
20 requiring any processing in the remote server 0910.

In this way, the PAP 0200 may also be able to regularly determine the corrected GPS coordinates of the vehicle's position, even when the vehicle is on the move. Thus, the PAP 0200 may already know the zone of a parking premises the moment the vehicle

0900 (or 0100) enters the parking premises and may, without requiring much processing time, merely need to indicate the zone thus determined to the remote server 0400 when activated.

- 5 Optionally, the zone list in the memory of the PAP 0200 may be updated on a regular basis through wireless means and preferably during off peak hours to avoid jamming the system.

Such wireless technologies are known in the art and will not be described in further
10 detail. It is sufficient to note that these wireless positioning technologies are capable of locating the PAP 0200 to sufficient accuracy to identify a parking space or a zone in which the parking space is.

Therefore, in this embodiment, the different parking rates may be applied according to
15 the auto-detected position of the PAP 0200. For example, if the parking space is in a business district, the time-based charges for using the parking space may be more expensive than a parking space in a suburb.

In a variation of this embodiment, if the PAP 0200 is very sensitive and precise about
20 the location of the parking space, the PAP 0200 may also be used to charge a different parking rate for a specific parking space among many parking spaces in the same parking premises. This provides the advantage to help deter non-permitted use of designated parking spaces for handicapped people. For example, if the vehicle owner is recorded in the remote database server 0400 as a handi

capped person, his use of a parking space meant for a handicapped person may be subsidised or discounted by the remote database server 0400 automatically. However, if an able-bodied person, who is not recorded in the remote database server 0400 as a handicapped person, uses the parking space designated for a handicapped person, extra charges may be imposed on him. This may serve as a deterrent to abuse parking spaces designated for handicapped drivers.

In a further variation of the embodiment, the keypad as shown in Figure 2a may be used in conjunction with the GPS feature to ensure robustness in the embodiment. For example, the vehicle owner may have to key in the zone, of any other identity of the parking space, into the PAP 0200. In the activating text message, the GPS information detected by the PAP 0200 may then be concatenated to the zone identification which the vehicle owner keyed in. If the remote database determines that the GPS coordinates do not match the zone identified by the vehicle owner, the remote database will be alerted that the vehicle owner may have made a mistake in the zone identification or may be attempting to cheat by keying in a wrong zone (such as one with a cheaper charge rate). The remote server may then respond with a text message to the PAP 0200 to inform the vehicle owner that the zone he keyed in is wrong.

Figure 9 shows a further variation of the embodiment, wherein a country 0900 may be divided by Geofencing technique into 'areas' 0901. When the vehicle is on the move, the PAP 0200 is constantly determining the area 0901a the vehicle is in, using GPS coordinates. When the vehicle is parked in a parking space 0500 and the PAP 0200 activated, the remote sever may quickly match the parking space's 0500 GPS coordinates against a pre-determined list of parking spaces 0500, 0500a which are

classified as being in the specific area 0901a. This saves time in querying for the exact parking space 0500 and charge rate, as the list of parking spaces 0500, 0500a in the area 0901 is pre-determined in advance. This embodiment may allow a quick identification of the parking spaces 0500, 0500a in an entire country 0900. For the same purpose, the parking spaces 0500, 0500a in a country 0900 may be further classified under sub-areas and sub-sub areas. This embodiment is similar to the earlier one described as parking space being classified into zones. However, where zones are classified under charge rate category, the areas are classified by Geofencing, as within GPS defined physical demarcations.

10

In yet a further variation of the embodiments, the PAP 0200 has Bluetooth-GPS wireless communication. For example, inside the vehicle there is a GPS receiver which is physically removed from the PAP 0200. The GPS receiver is able to receive GPS coordinates from the NASA satellites and communicates the coordinates to the PAP 0200 via Bluetooth.

15

In yet a further variation of the embodiments, the PAP 0200 may use other wireless technologies such as RFID to determine the zone to which a parking space belong. For example, the PAP 0200 further comprises an RFID transmitter. The RFID transmitter may be used to detect a transponder installed in or near the parking space. It is well known in the art that an RFID transponder is able to respond to challenging RF signals with a unique transponder identity. The transponder identity can therefore be included by the PAP 0200 into the activating text message. The remote database server is consequently able to use the transponder identity to query the zone of the parking space,

20

and thus the charge rate of the parking space. In other words, in this variation of the embodiment, each zone (or even the specific parking space) is identifiable by a pre-installed RFID transponder having a unique identity. The frequency of the RFID may be high frequency or low frequency and the type of RFID used may be active or passive

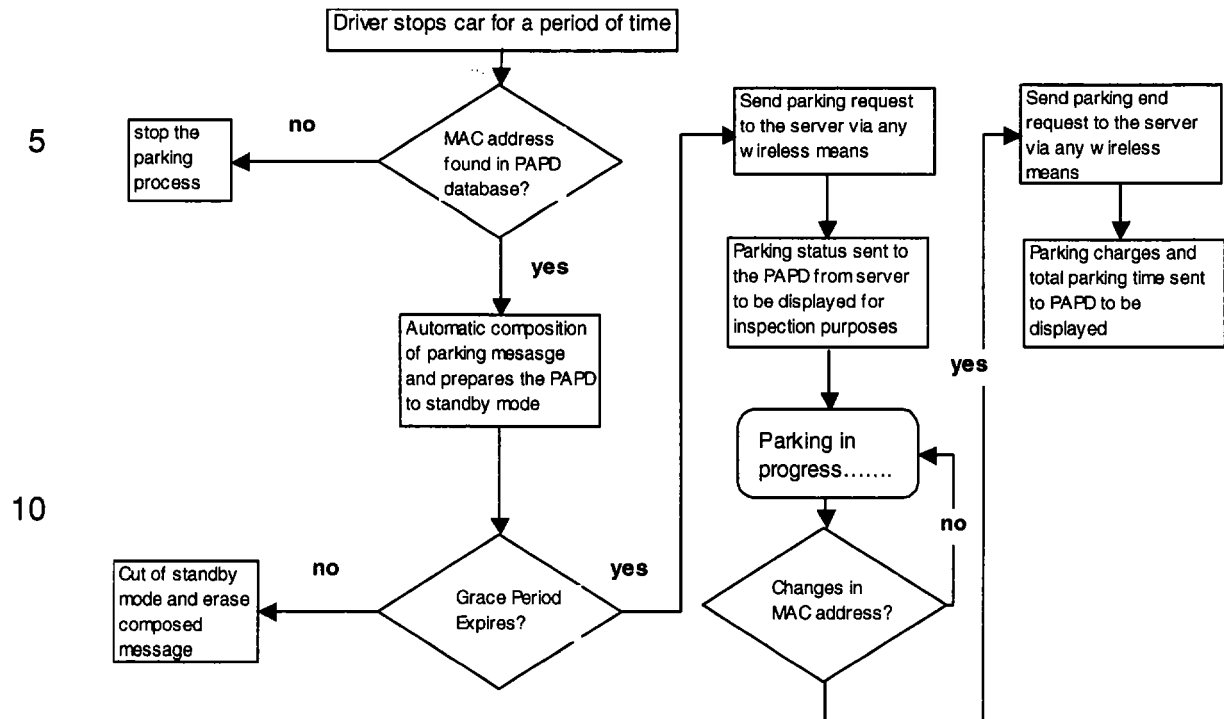
5 RFID technology.

RFID technology is known in the art and therefore the workings of the RFID feature will not be described in further detail.

10 In yet a further variation of the embodiments, the PAP 0200 may continually send an updating text to the remote database server 0400 even when the vehicle is parked. Thus, if the vehicle is driven off and the owner of the vehicle has forgotten to 'deactivate' the PAP 0200 to inform the remote database server 0400 that the parking has ended, the change in GPS location detected by the PAP 0200 may alert the remote database server

15 0400 to record an end time and stop charging for the parking.

Fully Autonomous Parking with Wi-Fi Positioning System.



This requires careful calibration of different wireless access points (WAP), which correlates to various car parks charge type in the PAPD device. The list of WAP(s) and their respective charging type database is stored in the PAPD under a compressed mode. The PAPD internal car park database is updated frequently and wirelessly alongside with every parking transaction should there be any addition(s) or removal(s) of car parks locations.

20

When the vehicle enters the relevant car park, and when the said vehicle is stationery for a period of time, (the detected MAC address of the WAP remains unchanged for a period of time e.g. 5 minutes) the PAPD will automatically start a search process to query the internal database of the detected MAC address. If found, the PAPD prepares

itself to a standby mode and will automatically compose a parking request to the server after a grace period expires. The server is able to identify the charge type of the particular car park based on the received MAC address(es) which includes the similar vehicle parking parameters.

5

If the detected WAP(s) is not found in the PAPD's internal database, i.e. out of Wi-Fi range of 30 meters of car parks calibrated hotspot(s), the PAPD will remain dormant and no parking signals will be sent. Similarly, if the driver possesses a relevant season parking ticket for the car park, the MAC address will be omitted and not stored in the
10 PAPD internal database, which would result as a "missing" car park and would not constitute to a parking request.

When the vehicle starts to move away from the said car park, any change in the previously registered MAC address will be evident, the change signifies that the vehicle
15 has moved out of range of 30m from the last registered MAC address and the parking process automatically ends. The driver will receive the parking charges on the PAPD display of the latest parking transaction.

Similar mechanism can also be applied if every car park is provided with RFID
20 identification as mentioned previously. The PAPD will send a parking request to the server as soon as an identity of a car park is read in the PAPD i.e. after the expiry of a grace period.

In a further embodiment, the PAP 0200 device may employ a two-way handshaking mechanism to verify each user. A ROM (read only memory) chip in the PAP 0200 stores a unique ID for a PAP 0200 device. The unique ID is concatenated with the SIM card number and communicated to the server operating the database whenever the
5 device is switched on. The server, upon receiving the concatenated string, will search the database for record of the PAP 0200. If the record is found, the network service support for the PAP 0200 device is enabled. If the record is not found, the network service support for the PAP 0200 device is disabled.

10 In a further embodiment, the SIM card to operate the PAP 0200 may be unremovably secured to the vehicle. However, the SIM card may be removably 'installed' in the PAP 0200 via a communication wire. For example, the SIM card is not inserted into the PAP 0200 but is in the vehicle and a communication wire is used to integrate the functions of the PAP 0200 and the SIM card together. In this way, a security system may be
15 provided wherein the PAP 0200 has to be disconnected from the SIM card in order for it to be removed from the vehicle. Without the SIM card, the PAP 0200 cannot be used to identify the vehicle even if it is installed with another person's SIM card. Preferably, the SIM card is mounted permanently on the windscreen for connection to the PAP 0200 device through a communicative wire.

20

In yet a further variation of the embodiments, further security of the PAP 0200 may be provided by an engraving of the vehicle registration number on the PAP 0200. The engraving may be made in such a way that it is visible to and useable by the car park inspector to validate the PAP 0200 against the vehicle number.

In yet a further variation of the embodiment, the PAP 0200 is authenticated when the vehicle engine is ignited or when the PAP 0200 is powered on. As mentioned, there may be a biometric identification of the vehicle owner.

5

RFID technology may also be used in ensuring the robustness of the embodiments, instead of just identifying parking zones as mentioned afore. For example, there is an RFID transponder with a unique identity embedded, adhered or fixed inside the vehicle for vehicle authentication purpose, it should be a temper evident type, which is
10 destroyed once the PAPD is removed from its original fixation/position in the vehicle. When the PAP 0200 is switched on, or when the vehicle engine is ignited, the PAP 0200 sends an RF challenging signal to search for the transponder. The transponder then responds with an identity of itself to the PAP 0200 and the identity of the transponder is concatenated with the identity of the PAP 0200 in a text message. The text message is
15 then sent to the remote database as an initialisation procedure. The remote server has record of the PAP 0200 identity (as mentioned before, which could be IMSI, IMEI or any other identity) as well as the transponder identity. If the transponder identity and the PAP 0200 identity are both recorded in the remote database as belonging to the same vehicle owner, the remote server will recognise the PAP 0200 as being used validly. If
20 the transponder identity and the PAP 0200 identity are not recorded as both belonging to the same vehicle owner, then it implies that the PAP 0200 is being used with another vehicle, which does not have the correct transponder. This will prevent theft and use of the PAP 0200 by an un-authorised person who might want to use someone else's PAP 0200 for his own parking fees.

The PAPD can also be installed with a power off alarm, which is able to send an alarm of the vehicle's identity to the server should the power of the PAPD be severed by any means, i.e. by cutting, pulling or disconnection. Such an alarm will disable the network
5 service support for the PAPD once it is powered up again, and requires the authentication of the driver himself via his mobile phone.

Since each PnP device represents one vehicle, it would be useful to have such a feature in an event of a parking violation. The parking inspector with his RFID parking device
10 may not be able to detect the parking status if the PnP is removed from the vehicle, which is similar to an "invisible" vehicle, which means that vehicles can park for free.

Such irremovable feature would deter drivers from removing their device from their vehicle in order to evade detection from the inspector's RFID reader. The authorities
15 may also make it a mandatory inspection of the identity and presence PnP device in each car inspection, i.e. before the driver renews the road tax, any prior removal or alien PnP can be detected by the concatenation of the PnP's and temper evident RFID tag ID, which correlates to the vehicle's registration number.

20 An example of a text message containing the RFID identity of a vehicle is "+677654+6553323", where "+6776543" is the identity of the PAP 0200 and "+6553323" is the RFID transponder identity unique to the vehicle.

The vehicle's embedded RFID transponder may also be used to identify the vehicle to a parking attendant. For example, in the event that the vehicle's registration or license number (which is conventionally displayed) may be false, the RFID transponder identity of the vehicle may be read by a parking attendant using a portable RFID reader (having
5 a reading range of, e.g. 1 - 1.5m). The parking attendant may then compare the RFID identity with a list of RFID identities of cars recorded by the remote database as being parked in the area or parking zone. The list may also show the licence plate number of each car along with the car's RFID identity. Optionally, the list is sent to the parking attendant and updated periodically through wireless means (such as blackberry push
10 mail). Thus, a parking summon may be issued by the parking attendant if the vehicle's licence plate number is missing from the list of licence plate numbers.

Alternatively, the transponder may be tagged physically to a cash card reader inside the vehicle, instead of to the vehicle.

15

Alternatively, there is a transponder fixed into the vehicle to identify the vehicle and also a transponder fixed to the cash card reader to identify the cash card reader. Both RFID identities may be used to provide further security that the correct vehicle owner is charged by the correct PAP 0200 using the correct cash card reader.

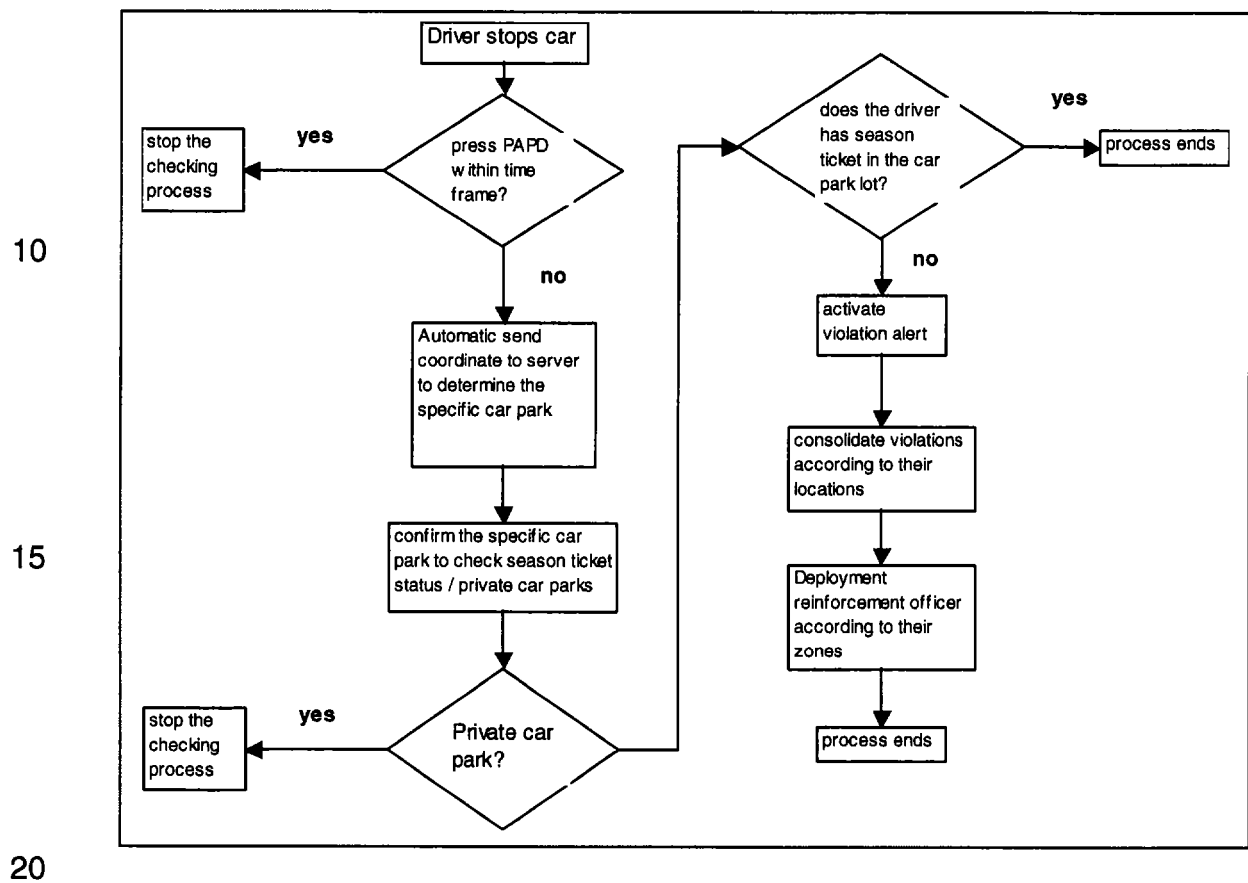
20

In a further embodiment, the PAP 0200 is integrated with a cash card reader as singular device. In this embodiment, the display of the cash card reader may be useable to show the amount of parking fees deductible for a parking session.

In the above embodiment, the text messages which the PAP 0200 may send to the remote server may be payable separately from the parking fees. For example, the telecommunication service provider providing the text service may provide a quota of text messages for a sum of money, payable when the PAP 0200 is registered with the remote database. As the PAP 0200 is used for parking session after parking session, the quota of the text messages used by the PAP 0200 is slowly depleted until the vehicle owner tops up the quota. Typically, the number of text message used in a single parking session is more than one. For example, a first text message is sent to initiate parking, a second text message is used when the remote server acknowledges the first message . Furthermore, the information sent to the vehicle owner such as the parking charge rate, the total amount of charges incurred and so on may require more than one message. Furthermore, the deactivating text message and an acknowledgement to the deactivating text message may also further deplete the text quota. Thus, a single parking session may require more than just one or two text and it is thus more cost effective to purchase text messages in quota for use of the PAP 0200.

In a further embodiment, the parking status can also be written in to the PAPD's internal RFID tag in the form of zeros and ones, which can only be read and interpreted by the parking inspector's RFID reader. The status is sent through the wireless network and stored in the PAPD when the parking starts and has a different configuration daily. The parking inspector would probe the reader firstly, to detect the presence of a PAPD, and the parking status thereafter. The inspection may summon the driver if any of the two former conditions is missing.

In a further embodiment, the PAPD parking system is so able to incorporate auto reinforcement of parking. If the driver fails to press the PAPD after parking, the PAPD will send the location of the car to the server e.g. after 5 minutes and check if the driver has violated the parking rules, if yes, the system will alert the nearest parking inspector to summon the driver. The flow of auto parking inspection is attached below:



In a further embodiment, another communication method or protocol may be used to communicate with the remote sever. For example, in the case of any wireless technology e.g, Wimax and Wifi, communication between the vehicle, telecommunication server and the remote database may be much faster than technologies presently known, and need not rely on mobile phone technology. In this further embodiment, the activation button will compile information on the vehicle's

identity, and perhaps also the location of the vehicle, and communicate the information to the remote server to time the parking duration and compute the charges.

In a further embodiment, the PAP 0200 does not have an LCD display. Instead, when
5 the PAP 0200 is activated, the remote database sends the parking status to the vehicle owner's mobile phone, informing the vehicle owner that his/her parking has been registered.

Therefore, the embodiments described provide the possibility of using mobile phone
10 technology, which is cheap and reliable, for paying parking charges. As the PAP 0200 is not a mobile phone, the functions and the features in the PAP 0200 is simpler to manufacture use than a mobile phone. For example and as mentioned, it is possible that the PAP 0200 is operated by a one-button 0203 operation to activate or to deactivate parking. In this way, the embodiments allow payment for a parking space to be charged
15 at a pre-determined rate without using a gantry to control payment for the parking. Furthermore, there is no more need to buy parking coupons and pay for blocks of time in advance. The TEXT capability of the PAP 0200 allows the remote database server 0400 to time and charge specifically for use of the parking space down to the very minute, or even seconds. Furthermore, different charge rates for different parking spaces
20 may be applied by means of the positioning technology such as I-DGPS. Furthermore, the charge rate for using the parking space, or parking space in an area, may be priced automatically at a different rate depending on the time.

It should be understood that the embodiments described herein are but embodiments of underlying concepts of the invention. Alternatives to the embodiments, though not described, are intended to be within the scope of this invention as claimed.

Claims

1. A system for timing the use of a parking space comprising:
 - a database;
 - 5 a remote device suitable for installation into a vehicle, the remote device having
 - a messaging system means; and
 - a trigger; the trigger being capable of triggering the messaging system means to compose and send messages to the remote database server;
 - wherein
 - 10 the remote database server is capable of recording a period of time which is the difference between the time an earlier message is sent to the remote database server and the time a later message is sent to the remote database server.
2. A system for timing the use of a parking space as claimed in claim 1 wherein the
 - 15 trigger is a button.
3. A system for timing the use of a parking space as claimed in any one of the preceding claims wherein
 - the period of time is the period in which the vehicle is parked in the parking
 - 20 space.
4. A system for timing the use of a parking space as claimed in any one of the preceding claims wherein
 - the remote device further comprises a display;

said display is capable of showing an indication that the first message has been sent.

- 5 5. A system for timing the use of a parking space as claimed in claim 4 wherein
the display of the remote device is a graphically rendered display.
6. A system for timing the use of a parking space as claimed in any one of the
preceding claims wherein the remote device further comprises means for indicating
to the remote database the chargeable rate for the position the remote device is in.
- 10 7. A system for timing the use of a parking space as claimed in claim 6 wherein the
means for indicating the chargeable rate is a button for indicating to the remote
database the zone which the remote device is in.
- 15 8. A system for timing the use of a parking space as claimed in any one of the
preceding claims wherein
the remote device further comprises wireless positioning means; and
the messages comprises information on the position of the remote device
obtained from the wireless positioning means.
- 20 9. A system for timing the use of a parking space as claimed in claim 8 wherein the
wireless positioning means includes any one or a combination of GPS, DGPS,
iDGPS, Bluetooth, RFID or WiFi.

10. A system for timing the use of a parking space as claimed in any one of the preceding claims wherein remote database is linked to a payment account of the user.
- 5 11. A system for timing the use of a parking space as claimed in any one of claims 1 to 10 wherein the remote device is linked to a cashcard or a credit card reader.
12. A system for timing the use of a parking space as claimed in any one of the preceding claims wherein the remote device is installed in a vehicle.
- 10 13. A system for timing the use of a parking space as claimed in any one of the preceding claims wherein the messages are SMS messages, MMS messages or EMS messages.
- 15 14. A system for timing the use of a parking space as claimed in any one of the preceding claims wherein
- the remote device comprises a removable SIM card; and
- the SIM card is connected to the vehicle; such that the remote device may be removed from the vehicle only when the SIM card is removed from the remote device.
- 20 15. A system for timing the use of a parking space as claimed in any one of claims 1 to 13 claims wherein
- the remote device comprises a non-removable SIM card.

16. A remote device comprising
- a housing;
- the housing containing a telecommunication means the housing having a button;
- wherein
- 5 the button capable of composing a first message and sending the first message to a predetermined number by the telecommunication means.
17. A remote device as claimed in claim 15 wherein the first message is sent to log a first time in a remote server.
- 10
18. A remote device as claimed in any one of claims 16 to 17 wherein the remote device is installed into a vehicle.
19. A remote device as claimed in any one of claims 16 to 18 wherein the device further
- 15 comprises a screen, whereby the screen displays information on the operations of the remote device.
20. A remote device as claimed in any one of claims 16 to 19 wherein the device further
- 20 comprises a blinker wherein the blinker blinks when the first message has been sent to the remote server and the blinker stops blinking when the second message has been sent to the remote server.

21. A remote device as claimed in any one of claims 16 to 10 wherein the device further comprises a further one or more button, wherein the area which the remote is in can be selected and be included in the first message by the further one or more buttons.
- 5 22. A remote device as claimed in any one of claims 16 to 21 wherein the device further comprises wireless positioning means, wherein the first message contains positional information of the remote device obtained from the wireless positioning means.
- 10 23. A remote device as claimed in any one of claims 16 to 22 wherein a second message pursuant to the first message is sent to log a second time in a remote server; wherein the difference between the first and second time define a period of time.
- 15 24. A remote device as claimed in any one of claims 16 to 23 wherein the device is connected to a cash card reader having a cash card, wherein an amount determined according to the period is deducted from the cash card.
- 20 25. A remote device as claimed in any one of claims 16 to 24 wherein the device is connected to a credit card reader having a credit card, wherein an amount determined according to the period is deducted from the credit card.
26. A remote device as claimed in any one of claims 16 to 25 wherein the period is indicative of the time the remote device is stationed in a parking space for a vehicle.

27. A remote device as claimed in any one of claims 16 to 26 wherein the first message is an SMS message, MMS message or EMS message.
28. A remote device as claimed in any one of claims 23 to 27 wherein the
5 telecommunication means is a SIM card.
29. A remote device as claimed in any one of claims 23 to 28 wherein the first and second messages are SMS messages, MMS messages or EMS messages.
- 10 30. A remote device as claimed in claims 16 to 29 further comprising a blinker capable of indicating a parking status.
31. A remote device as claimed in claims 16 to 30 further comprising
means of communicating with an RFID tag;
15 the RFID tag capable of displaying information from the PAP;
whereby the information from the PAP is displayed by the RFID tag.
32. A remote device as claimed in claim 31 wherein the RFID tag is positioned to display information from the remote device remotely.
- 20 33. A remote device as claimed in claims 16 to 32 wherein the remote device is installable onto a vehicle using temper-evident means capable of indicating that an attempt to remote the device has been made.

34. A remote device as claimed in claims 16 to 33 further comprising an alarm;
wherein the alarm is triggered when power supply to the remote device is disrupted.
- 5 35. A system for timing the use of a parking space as claimed in claim 1 wherein the
triggering is automatic on wireless detection of the remote device in a specific
location and/or a specific time.
36. A system for timing the use of a parking space as claimed in claim 35 wherein the
10 wireless detection is by GPS, DGPS, iDGPS, Bluetooth, RFID or WiFi.
37. A system for timing the use of a parking space as claimed in claim 1 wherein
the remote device has means for indicating to the remote database server that the
remote device is in a specific location;
- 15 the remote device further has means for indicating to the remote database server
that the trigger has not been triggered after a pre-determined period of time.