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(54) **Paid public parking management without parking meters**

(57) The solution to Manage the Paid Public Parking is characterized by identifying every parking place by a unique area code plus a place code, then the user (1) only needs a smartphone or mobile phone (2) to interact with the Management System (4)(5) and register the beginning and the end of the place occupation, so that the

Management System (4)(5) can withdraw the corresponding parking fee from the user account. The fiscal agents (6) job will significantly change and they will have a performance increase from this new method, with the corresponding productiveness increase to the concessionary of the public parking.

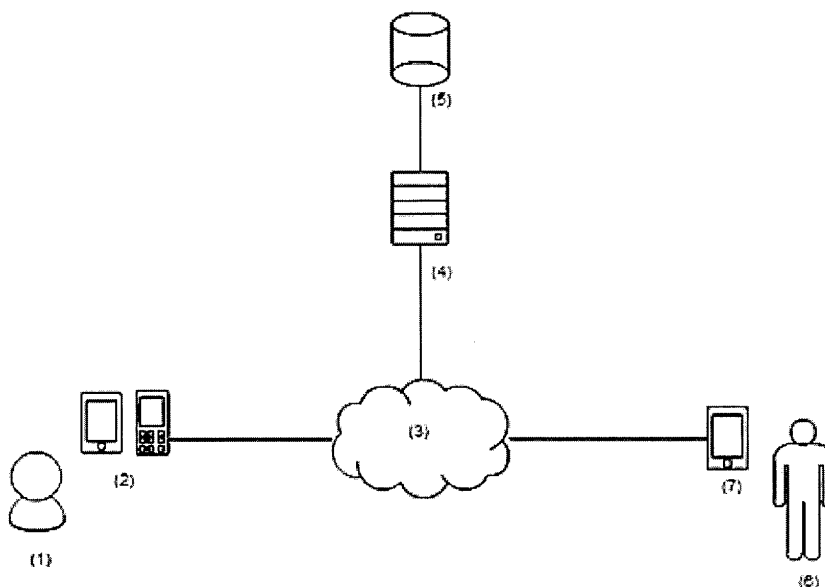


Fig. 1

Description

State of the art

[0001] The public parking solution currently uses a machine, which, according to a table, accepts the user money and produces a ticket with the details of the transaction, that the user then puts on display on his vehicle to prove payment of the parking.

[0002] This solution has many disadvantages to the user. He has to locate the machine, move to it, pay with coins because they do not accept bills, pay in full because they do not provide exchange, sometimes the machines are broken, sometimes their vaults are full or do not have printing paper, so they do not accept payments, thus forcing the user to find another machine, if any. After getting the payment ticket, the user needs to return to his vehicle and leave the ticket visible. Under bad weather, the users dislike even more this moving back and forth.

[0003] When the user makes the payment, he needs to define upfront how long he will need to park, which sometimes is unpredictable; he may think 15 minutes will be enough but an issue or delay may come up and he needs his vehicle parked longer than predicted. This difficulty vehicle parked longer than predicted. This difficulty predicting the time necessary for parking often causes the users to pay for the less, with losses to the concessionary or losses and dissatisfaction for the user if he is fined. On the other hand it happens that, to prevent being fined, the user pays for longer than he really needs, which reveals an unfair situation, because the user should only pay for the time he occupies the parking place.

Technical domain of the innovation

[0004] The Public Parking without parking meters Solution identifies each parking place with a unique code composed by an area code and a number inside that area. The format is <area>-<place>, e.g. <AB5C-23>, where "AB5C" is the area code and "23" is the parking place number. The adjacent parking places will be "AB5C-22" and "AB5C-24". This method allows identification of 99 parking places per area; larger areas can be broken into smaller sub-areas, eg. on a large avenue, each direction can have one different area assigned.

[0005] Each area will have a fee table (parking cost per time unit). Several areas can have similar fee tables.

[0006] The parking solution will be available for users (1) with smartphones or mobile phones (2) with SMS capabilities. Preference will be for smartphones, because the user experience will be simpler and more intuitive, and with lower operating costs both for the user and also for the management system (4)(5), that with SMS's would need to send at least 2 SMS's to the user (1) confirming the transaction. The option to offer the SMS service is important to reach more potential users (1), but it is predictable that in a near future smartphones will become

increasingly common and the SMS solution will be residual.

How does it work with a smartphone?

[0007] The first time the user (1) intends to use the system, he downloads the application to his smartphone (2).

[0008] The user (1) can choose the free version that will not have any parking credit, but will provide an ATM reference to transfer money to his account or integrate different forms of payment, e.g. PayPal. The user (1) will need to transfer some credits to his account using an ATM machine or a home banking application. The ATM reference may be reused and always will match that user account.

[0009] As an alternative, the user (1) may download a paid version of the application, and the value paid will be converted into parking credits for public parking. This way the user may use the system to pay for parking immediately.

[0010] To start paying for a parking place, the user (1) opens the application on his smartphone (2), inserts the area code and place number where he intends to park his vehicle and makes the request to start counting. The application will communicate with the core system using TCP/IP that will record the request to use that particular parking place by that user (1). The user (1) may configure alarms so that his smartphone (2) reminds him about the parking situation; after a configured time e.g. 15 minutes, the application produces a notification to the user and questions if he intends to extend parking, making it harder for him to forget, like it may occur nowadays.

[0011] The user may "STOP" paying the parking place at the time he returns to his vehicle and prepares to abandon parking, and this way he will no longer have to predict for how long he will need to use that parking place beforehand.

[0012] Because the system will have knowledge about the parking occupation, the smartphone application may be integrated with a mapping solution to provide information where it is more likely the user to find a free parking place. The more users use the system, the more accurate it will become. This option adds even more value to the solution and may change public parking as we know it.

How does it work with mobile phones using SMS?

[0013] This option works with SMS commands. The user (1) is identified by his mobile phone (2) number, which is associated to a parking account.

[0014] The user starts by sending a registration SMS. The system receives the SMS, validates that phone number does not have an account associated, creates one, and sends an SMS back to the user with an ATM reference, so that he can acquire parking credits on an ATM machine or his home banking application. It will also

send the user a secret code for him to be able to see his account details and transactions on a website.

[0015] After registration the system will also be based on commands.

[0016] To start occupying a parking place, the user sends an SMS with "<area>-<place>", thus identifying the area and parking place where he intends to park his vehicle. The user phone number from where the SMS was sent identifies the associated account. The application validates the information and returns an SMS to the user with the account balance.

[0017] When the user intends to abandon his parking place, he sends an SMS with a "STOP" command. The system knows the details about the previous parking request from that phone number/user, and returns an SMS with the value paid and the new account balance.

[0018] As an alternative to this Start/Stop method, the user can send an SMS with format "<area>-<place><time>", where <time> is the maximum number of minutes he intends to pay. The user (1) would still have the possibility to interrupt before that time expires by sending a "STOP" SMS, otherwise the total minutes specified in the initial request would be accounted for. In either scenario, the system sends an SMS to the user informing about the end of the parking and the new account balance.

[0019] The user can send another SMS to initiate another parking session if he needs to extend the parking time.

Definition of the information system that enables the solution

[0020] The system is made of a set of application servers (4) that receive the user (1) requests. Those requests are transmitted through a network (3). In the case of smartphones (2) that network is Internet. In the case of SMS's with mobile phones (2), the network (3) will be partially GSM from the user (1) mobile phone provider, and another part Internet with TCP/IP access to an SMS Gateway of any mobile communications provider.

[0021] The application servers (4) will record all payment operations and will register new users (1) on a Database Management System (5). The application servers perform an important role identifying the users (1) and their account/balance. They also control the business rules, including the parking fees associated to each area, receiving the correct amount from the user accounts according to the date/time and occupation time.

What changes, from the point of view of parking management?

[0022] It will change the paradigm. Currently all the occupied places are checked, vehicle by vehicle. With this system the fiscal agents (6) would have real-time information about the occupation and would need only to verify the vacant places, which are minority. The places

would in fact be vacant, would have a vehicle parking, or they could be using the parking meter, because the option to pay with the traditional solution is predictable to continue for at least 10 more years, unless the indicators for this solution prove the parking meters have become obsolete and no longer justify the maintenance costs they require.

[0023] Therefore, on the medium term, the fiscal agents (6) will be much more efficient on their actions because they will only check vacant places, and will be able to increase the number of times they check each area, which in turn will have a significant dissuasive effect against not-complying users.

[0024] The supervisor agents (6) will have access to a list of vacant/not-paid parking places using a supervision application on a smartphone (7), that will show a list of supposedly vacant parking places to be verified on that area.

Advantages for the users and the society?

[0025] The corporate users (1), in particular those with large auto fleets, take advantage of simplified billing, because there will be the possibility to associate several users to a common company account and instead of collecting and accounting for individual parking receipts, the company will receive a document with an integrated position about the parking for all the users, independent of the concessionary.

[0026] Personal users (1) will have better control on what they pay for parking, no longer have to worry about predicting how long it will take to perform many day-to-day activities wondering if their vehicle is safely parked and they pay only for the time they use. With increased usage, there will be better information about parking occupancy, and in the future it will become easier to find a free parking place without having to go back and forth, saving time, money and the environment.

[0027] On rainy days, the user no longer has to search for a functional parking meter. Currently if a parking meter is malfunctioning or in need of assistance, the user is forced to find another one, and he can easily walk over 200m on bad weather to pay the parking. He no longer has to search for coins too.

[0028] The user may use this payment alternative in any city or concessionary that makes it available, because the system will not be exclusive of any particular municipality or concessionary. Urban mobility requires a system that can be shared by all operators, so if a user travels from city A to city B, it is not practical to use two different smartphone (2) applications, with separate accounts; for commodity, the same system/account should be used to the maximum extent.

[0029] The environment also takes advantage, because of the potential fuel savings explained earlier. Nowadays it is also common to find parking tickets abandoned on the public streets; the current solution dematerializes the process so it eliminates these waste from

the public street.

Claims

1. Public Parking Management without Parking Meters, a method comprising by identifying the vehicles in a public street that are paying for that parking place, hence the first step of this method is the user (1) identifying his vehicle by inputting it's vehicle registration plate number, using a mobile communications device (2) smartphone or cellphone capable of sending SMS's, using an application installed on his smartphone or a text message, the user (1) also identifies the generic location of the area where he intends to park his vehicle, that area being assigned a particular fee, important for calculating the parking costs, includes in the message the time he intends to occupy the parking place, the messages reach an information system (4)(5) using an operator independent standard technology, either by an SMS message using the GSM network or by smartphone application that uses TCP/IP, on a later optional stage of this method is to supervise the paid places on the public street, carried out by a fiscal agent (6) that using a mobile communications device (7) will have a list of vehicles, identified by their license plate numbers, that are accounted for, so it is the fiscal agent's (6) task to act upon the vehicles that are not being paid for the parking, on a third stage of this method, when the time paid for the user (1) expires, the information system (4) (5) will withdraw the corresponding amount for the public parking from the user (1) account, all this cycle can repeat while the user (1) has a positive account balance, I propose an alternate method **characterized by** changing on the first stage of the described process, the area identification and the license plate number of the vehicle, by a unique parking place identification, this identifier will have the traditional area code plus a unique number associated, so when the user (1) sends the unique parking place identifier on the SMS message or using a smartphone application, it is identifying the place occupied by his vehicle on the public parking, independently of the vehicle registration plate number he is parking, on the second stage this alternate method, instead of checking the vehicles vehicle registration plates numbers, has the fiscal agents (6) checking the places not being paid for by this method, hence the fiscal agent (6) will need to validate only the supposed free places that have vehicles parked on those places.

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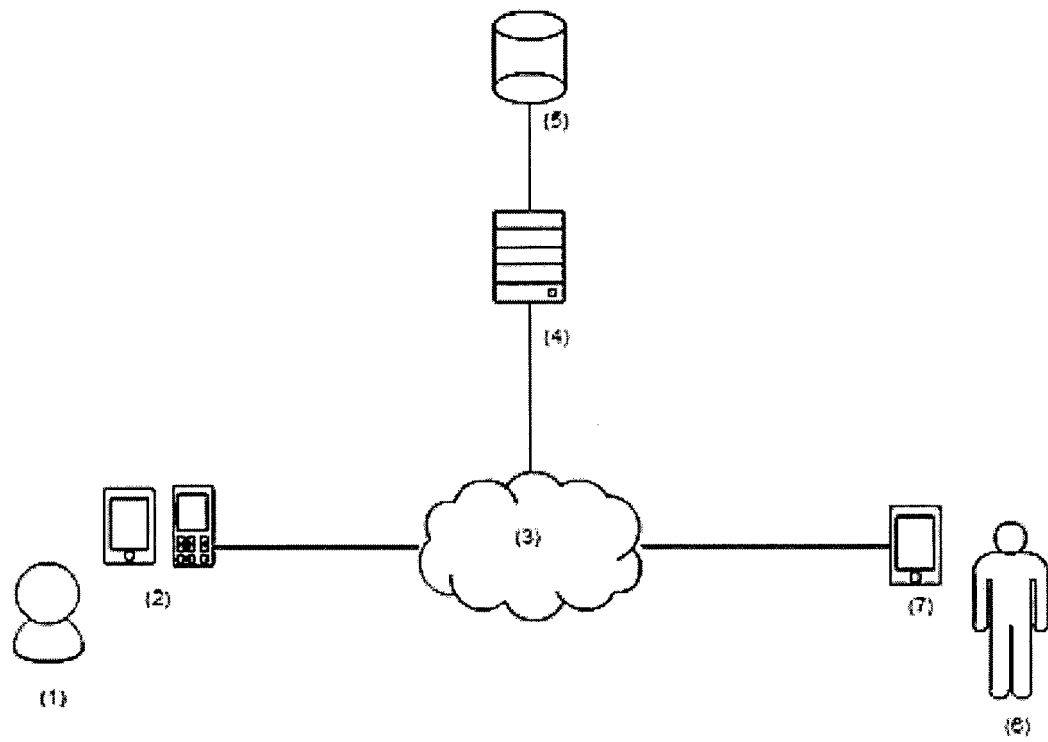


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