

TITLE

A METHOD AND RELATED GRAPHIC USER INTERFACE (GUI) DESIGN FOR PRESENTING CARPARK INFORMATION

5 FIELD OF THE INVENTION

The present invention relates to a new method and related GUI design for presenting carpark information, such as carpark location, tariff and lots available that are linked to vehicle types, in real time on display screens.

10 BACKGROUND OF THE INNOVATION

One of the main functions of a carparking related mobile application is to provide carpark information to users for choosing a carpark that better fit their parking needs.

In order to choose a carpark for parking the vehicle used, users normally consider the following aspects of carpark information:

- 15 1) The location of the car park - it shall be a carpark that is located as near as it is acceptable to the destination of the traveller (the location where the user intends to go);
- 2) The carpark must have available parking lots/spaces for the vehicle used;
- 3) The parking charges for the vehicle used and in the targeted parking time
- 20 period shall be as cheap as it is acceptable, normally cheaper is better for most users).

The carpark chosen finally by a user is dependant on the information the user can get about the car parks near to the user's travel destination and also on the balancing importance of the aspects 1) and 3) above to the user.

- 25 The location of a car park can be presented by its address or by its geographic coordinates (longitude, latitude).

The data of available parking lots/spaces are related to vehicle types. A carpark may have different numbers of parking lots/spaces available for different vehicle types, such as

car/van, motorcycle, lorry/heavy vehicle, containers, handicapped, electric car/van, and etc.

Parking charges are dependant on the vehicle type as well as on the parked time period and the time zone(s). [For example, the parking charges may be different for 2 vehicles of the same vehicle type (e.g. car), parked in a same car park with the same parked time period (e.g. 30 minutes), but parked in different time zones (e.g. one in day time, another in night time)].

How to present so many and complicated carpark information?

Some mobile apps use a list of the name and address of the car parks near to the travel destination, then user can click on the name of a carpark to see related information of lots available and of parking charge tariff. In this way, user can only see the information for one carpark at a time, it is not easy to do comparison among different car parks to choose a carpark that better fit the user's needs.

Another way of presentation of carpark information used by some mobile apps is to display carpark icons together with the car lots available, and user can click on a carpark icon to see the parking charge tariff. However, same as the way of using a carpark list, user can only see the information of one carpark at a time.

OBJECT OF THE INVENTION

The objective of this innovation is to provide a method and related display design to present together the necessary information of the car parks, such as carpark location, tariff and lots available, in real time on a mobile phone screen in a manner for easy reading, understanding and comparing, so that it allows users to quickly make a decision for choosing a carpark that better fit their parking needs.

SUMMARY OF THE INVENTION

In accordance with one aspect of the present invention, the information of car parks is presented on a main graphic user interface (GUI) screen comprising at least

one vehicle type icon that indicates a selected vehicle type that all the information of the car parks presented on the GUI are linked with the selected vehicle type, a carpark icon together with the following available information of the car parks around it:

- 5 - the name/short name of the carpark/building;
- the location of the carpark on the geographic map of a mobile app;
- the current lots available level for the selected vehicle type in the carpark;
- the current parking charging rate and the end time of the charging rate for the selected vehicle type in the carpark;
- 10 - the cheapest carpark(s).

Preferably the vehicle type icon is of a round shape with a vehicle type identification symbol inside. The vehicle type icon could also be of other shapes. A vehicle type may be one of the followings: car, motorcycle, lorry, container, electric vehicle, handicap, and etc.

- 15 Preferably, the carpark icon is of the shape with a round shape at the upper portion and a cone at lower portion, it could also be of other shapes. The location of a carpark icon on the map of a mobile screen is determined by the geographic coordinates (longitude, latitude) of the carpark.

- Preferably, a lots available level of a carpark corresponding to a selected vehicle type is
- 20 defined by a range of the percentage of the number of lots available over the total number of the lots for the selected vehicle type in the car park. For example, three lots available levels can be defined as (a) Low Level, if the percentage is lower than a% (e.g. a%=10%); (b) Mid Level, if the percentage is bigger than a% and lower than b% (e.g. b%=50%); (c) High Level, if the percentage is higher than b%. Preferably, the value of a% and of b%
 - 25 can be determined by the management of the car park.

Preferably the lots available levels are displayed by using different colors to fill the upper portion (the round shape) of the carpark location icon. For example, Red color for Low Level, Orange color for Mid Level, and Green color for High Level.

Preferably, a different color (e.g. Blue color) is used to indicate that there are some lots available for the selected vehicle type in the carpark but there is no percentage data available.

5 Preferably, another different color (e.g. Black color) is used to indicate the fact that the lots of available data of a car park is not available.

Preferably, the current parking charging rate with the end time of the charging rate for the selected vehicle type in a car park is displayed in text format in the position between the car park name/short name and the car park location icon.

10 Preferably, a cheapest carpark symbol is displayed above the carpark name/short name of the car park(s) that is (are) the cheapest carpark(s) among the carparks displayed on the GUI screen. Preferably the cheapest carpark can be defined as the carpark of the lowest parking charge for a certain parking time period (e.g. 1 hour) starting from the current time.

15 In accordance with another aspect of the present invention, the more completed information of a selected carpark are presented on another GUI (figure 2) comprising

- the carpark address;
 - the vehicle type icon(s) for all the types of vehicles allowed to park in the carpark;
 - the number of the current available lots and of the total lots for the different vehicle types in the carpark;
 - the completed parking charging tariff for different vehicle types, on different days and in different time zones.
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BRIEF DESCRIPTION OF THE GUI FOR AN EMBODIMENT

25 The present invention will now be described, by way of example only, with reference to the accompanying figures, in which:

Figure 1 is the main GUI screen of an embodiment (a car parking related mobile application), it shows the information of carpark to help users to make a quick decision for choosing a carpark that better fit their parking requirement;

Figure 2 is another GUI screen that shows a more complete information of a selected carpark.

Description of an Embodiment of the invention

The information of carpark shown on the main GUI screen of the mobile phone in figure 1, where

- (i) the icon (1) is the vehicle type icon, all information of the carpark displayed on the GUI are related to the selected vehicle type. The default selected vehicle type icon is a car icon. When a user clicks on the displayed vehicle type icon, the icon will switch to another vehicle type icon, and the information of the carpark will be changed correspondingly.
- (ii) the pin icon (2) is a carpark icon that is used to mark the carpark's location on the map and as well as to indicate the lots available level (LAL) for the selected vehicle type in the carpark by the color of the pin head (Red color indicates Low Level of the lots available ($LAL \leq 10\%$); Orange color means Mid Level of availability ($10\% < LAL \leq 60\%$); Green color shows the High availability $LAL > 60\%$). Blue color is used to indicate that there are lots available but no lots available level is defined. Black color means that the lots data is not available.
- (iii) the text (3) is the building/carpark name/short name that is displayed near to and above the carpark icon.
- (iv) the current parking charging rate (4) and the end time of the charging rate (5) are displayed below the carpark name and above the carpark icon.
- (v) the symbol (6) is used to mark the cheapest carpark(s) among the carpark shown on the map. The cheapest is defined as the lowest parking fee for the first 1 hour of parked time period, starting from the current time.

With the information displayed on the main GUI, users are normally able to quickly choose quickly a carpark that better fit their parking needs.

In case that a user would like to get a more complete information of a selected carpark, the user can click on the carpark icon, the Figure 2 GUI will appear, where

- 5 (i) the carpark name,
- (ii) the address of the carpark,
- (iii) the icons of the vehicle types allowed to park in the carpark (the icon marked with black color is the selected vehicle type), user can change the selected vehicle type by clicking on the desired vehicle type icon,
- 10 (iv) the name of the selected vehicle type,
- (v) the current lots available level presented in color, the number of the lots available and the total lots for the selected vehicle type,
- (vi) the parking charging tariff for the selected vehicle type,
- (vi) the navigation icon.

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Basic Operation Flow

The table below shows the basic operation flow of choosing a carpark based on the information of carpark provided by the mobile application.

Step	User	Mobile App Display
1	Input travel destination	
1.1	Input the travel destination in the main GUI in the search	List of matched or partial matched carpark(s)
1.2	Click on the carpark matched or most matched to your travel destination	With the carpark as the screen, the main GUI will display the near carpark within 1 km with the necessary information (1) to (6) in figure 1

2	Choose a carpark that fits user's parking needs	
2.1	User can enlarge (or reduce) the displayed area on the map	The number of carpark displayed on the screen will be increased (or decreased) accordingly
2.2	User can change vehicle type	The information of carpark displayed will be changed accordingly
2.2	Click on the carpark chosen based on the consideration of location, lots available, and parking charges.	The more complete information of the carpark will be displayed as Figure 2.
3	Switch to navigation maps for showing driving way to the chosen carpark	
3.1	Click (7) to switch to navigation map to get the directions to the chosen carpark	Switches to navigation map to get the directions to the chosen carpark

Claims

The claims defining the invention are as follows

1. A method and mobile app GUI using one of the vehicle type icons to indicate that the information of car parks (such as lots available and parking charging rate and etc.)
5 presented are all linked to the vehicle type.
2. A method and GUI using colors to present different parking lots available levels for the indicated vehicle type in a carpark.
3. A method and GUI to present parking charging information by displaying th the current parking charging rate and the end time of the charging rate.
- 10 4. A method and GUI to indecate the cheapest carpark by using a cheapest carpark icon.
5. A method and GUI according to claim 1, wherein the vehicle type icon may be one or more of the following: car, van, lorry, container, motorcycle, handicap used, electric vehicle, reserved, and etc.
- 15 6. A method and GUI according to claim 2, wherein the the lots available level is defined by ranges of the percentage of the number of the current lot available over the total number of the lots for the indicated vehicle type in a carpark.
7. A method and GUI according to claim 1, wherein the colors is marked on the carpark icon of car parks, and the colors may include red for low availability, orange or yellow for mid availability, green for high availability, blue for no definition of lots available
20 levels, and black for no lots data available.
8. A method and GUI according to any one of the preceding claims, further comprising a GUI displaying more complete information of a selected car park. The information includes lots available levels and numbers, parking charging tariff for all days, time-zones and vehicle types.

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