Title: SYSTEM FOR LOCATING OF FREE PARKING PLACES BY MEANS OF MOBILE COMMUNICATION DEVICES

(57) Abstract: System for locating of free parking spaces by means of mobile communication devices solves the great problem of locating of parking places, especially in cities and towns. The system comprises the following components: camera (1a) that records status of a number of parking places; sensors (1b) for each parking place; indicators (2) with red lamp, indicating that the parking place is occupied or booked, and green lamp, indicating that the parking place is free; data collecting and processing device (3) that collects data on parking places status and forwards them to the central data base (4); and the application server (5) that, at the driver's request, sends these information to his mobile communication device (6). This way, each driver may, at any time and quickly, obtain information on where there are free parking places. The system may incorporate all sorts of parking facilities: street, fenced, closed, garages, etc. The system spares time and fuel (whereby decreasing environment pollution), enables better utilisation of parking facilities and decreases traffic jams.
SYSTEM FOR LOCATING OF FREE PARKING PLACES  
BY MEANS OF MOBILE COMMUNICATION DEVICES

INVENTION DESCRIPTION

1. FIELD OF APPLICATION

The invention relates to the system for locating of free parking spaces, both in 
outdoor and indoor parking facilities. 
In the International Patent Classification, it is classified as Field H - Electricity, 
Class H 04 - Electric communication technique, Subclass H 04 M - Telephonic 
communications.

2. TECHNICAL PROBLEM

Locating of free parking places makes a major problem in cities and towns. In 
larger cities this may take half an hour or even more. Therefore, there should 
be instituted a system assisting drivers in locating of free parking places, in his 
closer of farther surrounding, in outdoor or indoor parking facilities. 
Benefits from such a system are fuel and time saving, lesser traffic jams and 
lesser pollution.

3. STATE OF THE ART

Presently, there are electronic devices warning car drivers whether or not 
there are free parking places in a closed or indoor parking facility, however, 
they do not advise where exactly a free parking place is located.
4. DISCLOSURE OF THE INVENTION

The essence of the invention is the system that locates free parking places by means of mobile communication devices. For this purpose, all parking places are equipped with sensors or with cameras covering several of them, detecting whether a parking place is vacant. All places are also visibly numbered and provided with indicators, with a green and a red lamp, indicating whether a place is booked, occupied or free. This information is sent to the central database. A car driver may obtain information on free parking places from the central database and book one by his mobile communication device, by SMS or Internet.

5. ILLUSTRATION DESCRIPTIONS

Figure 1 shows block diagram of the system with its basic components. Figure 2 shows an example of parking place marks. Figure 3 shows an example of information on the nearest favourite or any other parking facility occupancy, displayed on the mobile communication device display.

6. DETAILED DESCRIPTION OF AN INVENTION EMBODIMENT

The invention describes the system for locating of free parking places by means of mobile communication devices. The system may be included all types of parkings: street, fenced, closed, garages, etc.

The system for locating of free parking spaces by means of mobile communication devices comprises the following components:

1a - camera
1b - sensor
2 - indicator
3  - data receipt and processing device
4  - central data base
5  - application server (web server)
6  - mobile communication devices

In the Figures 1 and 2, mark P denotes a parking place, number 8 a side-walk, and number 9 a driveway.

**Detailed description of particular components, as shown in Figure 1:**

**Camera 1a, that records several parking places**, is placed above the parking facility, to record several parking places simultaneously. If a single camera cannot cover the entire parking facility, several cameras are fitted. The camera takes pictures of the parking facility in regular and programmable intervals (e.g., every 30 seconds). Such pictures are sent, by wire or wireless, to the device 3 that receives and processes them and forwards them to the central data base 4. The device 3 may be situated in the existing parking toll collection facility.

**Sensors 1b, detecting the parking place status** (free/occupied) are located at each parking place. They too, in regular intervals, detect the parking-place status (free/occupied), and sends these information, by wire or wireless, to the device 3 which, after processing them, forwards them to the central data base 4.

**Parking-place status indicator** (occupied/booked/free) 2, provided with red and green lamps (diodes), is located at each parking place. One lamp is always lit. The green lamp is lit when the parking place is free, and the red one when it is occupied or booked. The information receiving and processing device 3 controls which lamp is lit.
Data receiving and processing device 3 receives and processes the data generated by the sensors 1b and the cameras 1a. Each parking facility has at least one data receiving and processing device. The said device 3 is a small computer able, besides collecting and processing of information, also to receive and send data by Internet from and to the central data base. The device 3 also receives information from the central data base 4 when a driver books a parking place. In that case, the device 3 will turn the indicator green lamp off and will turn the red lamp on. If the driver cancels the booking, the device 3 will turn the indicator green lamp on again. If a driver parks at a parking place where the red lamp is on, the system will ask him whether he booked the place. If the driver responds affirmatively, the red lamp remains lit.

Central data base 4 stores information on statuses of parking places at all parking facilities, information on parking facilities geographic coordinates, and information on which parking facilities each driver searched and booked, in order to offer to him a list of his favourite facilities.

Application server 5 processes the data received from the central data base 4, and communicates with drivers and answers their questions, that is, provides them with information on the parking places available. Here is the complete system logics. The system also tells parking places allocated to disabled persons. The system remembers which parking facilities a driver most often used, that is, his favourite parking facilities, and offers him such information to help him make his decision.

Mobile communication devices 6 may be mobile telephones, personal digital assistants (PDAs), etc. With a mobile telephone, the driver may request from the application server 5 information on occupancy of his nearest or favourite parking facilities, or of any other parking facility incorporated into the system, and may obtain information by selecting the place and/or
neighbourhood of which he wants to learn the parking information, as shown in the Figure 3. The driver may see details on a selected parking facility and book a parking place there.

**Communication between the components:**
The camera 1a or the sensor 1b send, by wire or wirelessly, information to the data collecting and processing device 3. The device 3 is able to send data by Internet (GPRS protocol). In regular intervals, the device sends data to the central data base 4 by connecting to the adequate application server 5. The application server utilises data from the central data base to provide a driver with the information he requires. The driver may send and receive data by SMS or Internet (WAP or GPRS protocols).

Figure 3 shows a detailed example of searching and displaying on the mobile communication device of information on parking places available at the nearest, favourite or any other parking facility, as well as the number of the parking place booked the charge of which starts right away.

7. INVENTION APPLICATION

As evident from the invention description, the system applies to all sorts and forms of parking facilities, outdoor or indoor. All system components are available in the market. Construction of the system is quick and simple.
PATENT CLAIMS

1. System for locating of free parking spaces by means of mobile communication devices, \textit{wherein} it comprises the following components:
   - camera (1a), fitted above the parking facility, recording status of a number of parking places simultaneously (free/occupied) and sending this information (by wire or wirelessly) to the data collecting and procession device (3);
   - sensor (1b), fitted at each parking place, detecting status of the parking place (free/occupied) and sending this information (by wire or wirelessly) to the data collecting and procession device (3);
   - indicator (2), set at each parking place and connected to the device (3), having a red lamp indicating the parking place is occupied or booked and a green lamp indicating the parking place is free;
   - data collecting and processing device (3), connected to the camera (1a), the sensors (1b) and the central data base (4);
   - central data base (4), connected to the device (3) and the application server (5), where all the data on status of the parking places incorporated into the system are being collected;
   - application server (5), sending all data from the central data base (4) to the drivers' mobile communication devices (6); and
   - mobile communication devices (6), used by the drivers to send SMS inquiries and receive messages (wirelessly) on parking places search (free/occupied/booked).

2. System as claimed in Claim 1, \textit{wherein} it provides drivers with the information on which parking places are allocated to disabled persons.

3. System as claimed in Claims 1 and 2, \textit{wherein} it provides drivers with the information on the parking facilities and places he uses most often.
Fig. 1.  

Fig. 2.
Fig. 3.
**INTERNATIONAL SEARCH REPORT**

**A. CLASSIFICATION OF SUBJECT MATTER**

INV. 60861/14

According to International Patent Classification (IPC) or to both national classification and IPC

**B. FIELDS SEARCHED**

Minimum documentation searched (classification system followed by classification symbols)

6086

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

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- Further documents are listed in the continuation of Box C.

- See patent family annex.

- Special categories of cited documents:
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  - "E" earlier document but published on or after the international filing date
  - "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
  - "O" document referring to an oral disclosure, use, exhibition or otherwise
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  - "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
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