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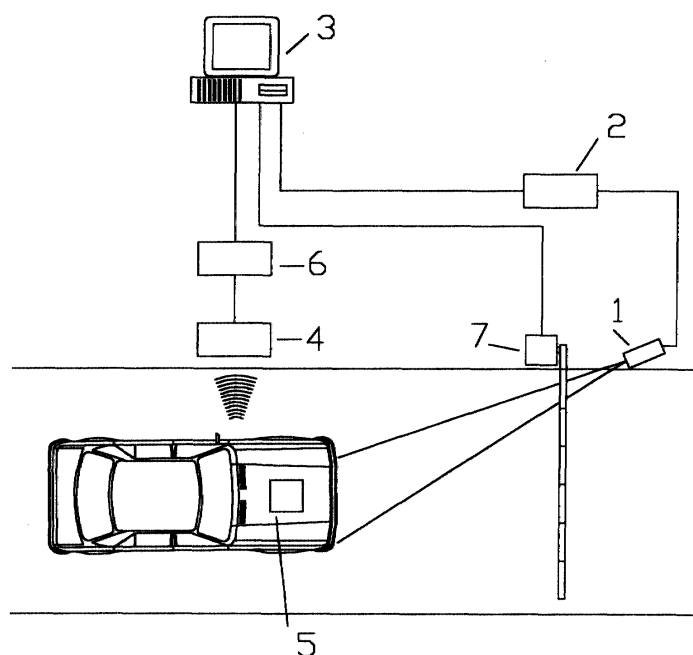
(54) **System to control and supervise vehicle transit in restricted access areas**

(57) A SYSTEM FOR THE CONTROL AND SUPERVISION OF VEHICLE TRANSIT IN RESTRICTED ACCESS AREAS, incorporating software and hardware which permits to verify that the vehicle plate number (by means of automatic or manual captation) and the code

of a radio-frequency identification device fitted on a vehicle, corresponds to those in a database.

This permits to detect the exchange of plate numbers or radio-frequency identification devices thanks to the database which compares plate numbers and codes of radio-frequency identification devices.

FIGURE 1



Description

[0001] The present invention refers to a system intending to fulfil the supervision requirements of vehicles arriving at a restricted access area, and which circulate within the area or leave the area having the following main objects:

- To increase the security level of the area.
- To verify that the vehicle intending to enter or leave the area has a plate number which is associated to a code of a radio-frequency identification device, or to verify that the vehicle intending to enter or leave the area or zone has a code of a radio-frequency identification device associated to a plate number.
- To create vehicle entrance, permanence and departure information, recording the vehicle plate number as well as the code of a radio-frequency identification device.

[0002] Among others, an advantage of the invention is that it permits to adapt the system object of the invention to any restricted access area which entrance and exit supervision is carried out by means of any access control conventional device, being possible to use many of the installed devices such as gates, traffic lights, etc.

STATE OF THE ART

[0003] Conventional systems used to manage restricted access areas, base the opening of the barrier or gate on the use of magnetic band or approach cards, coded keys, or on reading a code of a radio-frequency identification device, or on reading the plate number, or manually by using surveillance personnel. In no case the previous verification of the association of the vehicle plate number and the code of the radio-frequency identification device is considered as a necessary requirement to authorise vehicle transit.

[0004] These conventional systems perform control tasks and efficient management but would not detect the exchange of plate numbers or radio-frequency identification devices.

[0005] The joint association of the plate number and the code of the radio-frequency identification device as the vehicle identification keys permits to detect exchanges of plate numbers or radio-frequency identification devices between users, independently that the code authorising or not the transit is the plate number or the code of the radio-frequency identification device.

[0006] Currently, different plate number readers and a plurality of radio-frequency vehicle identification devices are marketed; some do not require physical fixing to the vehicle, others are designed such that once installed, on trying to remove them, they break becoming useless and in some cases may even be fixed by the vehicle manufacturer. Some are commonly known by the TAG initials.

INVENTIVE STEP

[0007] Prior installation of the hardware and software components, the invention permits that the previously mentioned purposes are achieved through the utilities and functions allowing:

- To detect vehicle presence.
- To read its plate number (the vehicle having stopped or in movement) and the code of a radio-frequency identification device.
- To process the contents of said plate number and the code transmitted by a radio-frequency identification device, comparing them in real time with a previously established database.
- To take a course of action in real time, automatically or according to the security guard's criterion according to the information provided by the system.
- To supply and generate information (vehicle identification and its authorisations).

DESCRIPTION OF THE INVENTION

[0008] The invention consists of the incorporation of a system based on checking the association between the plate number and the code of a radio-frequency identification device located in the vehicle that intends to enter or leave the area by comparing them with the information previously introduced into a database. It is configured for restricted access areas, the latter being understood as those where the vehicles having access belong to one of the following groups:

- Authorised:
 - Employees
 - Clients/Suppliers
 - Occasional, etc.
- Fleets
- Visitors
- Service companies
- Special vehicles (police, ambulances, fire brigade, etc.)

[0009] In these areas parking is free although it is necessary to control that those having access are authorised to do so, being possible to check maximum times inside and to check that the access is carried out on the authorised days and time-tables or other ones.

[0010] The system of the invention provides the necessary real time information to the security guard in order to allow a fast and effective access control. Moreover, it automatically generates necessary information for security supervisors and on many occasions is very useful for other departments like internal logistics, human resources or others. All the latter permits access control at the level of current demands in security matters.

[0011] The security guard interacts with the system through a graphic monitor where the information is displayed and from a standard keyboard from which he/she operates.

[0012] If a vehicle is about to enter or leave the area and if for any reason the plate number and the code of the radio-frequency identification device do not match in the database, the system will notify such an anomaly, being it possible to request the intervention of the security staff.

[0013] The system of the invention works in real time, associating the plate number and the code of a radio-frequency identification device to the vehicle, to the image/s of the same and optionally to the driver's image captured when the vehicle enters/leaves.

PROBLEMS SOLVED BY THE SYSTEM

[0014] The problems solved by the system of the invention are as follows:

- Detection of undesired vehicle transit: It permits the option of warning the security guard when a vehicle belonging to a black list database intends to enter or leave the car parking.
- Exchange of a plate number by another or a code of a radio-frequency identification device by another, since the plate number would not coincide with the code of the radio-frequency identification device associated to the vehicle in the database. The detection of this circumstance may be carried out both at the entry and at the exit from the area.
- It allows both rapid transit and a high security level.

[0015] The association of the incidences with the images permits a fast and comfortable supervision thereof.

[0016] The system allows one to know the number of vehicles that are inside at every turn, which ones and how long they remain inside the area.

[0017] All the vehicles inside the area are arranged according to the entrance order. On shifting upwards or downwards over the list, the associated images are displayed.

[0018] They may be directly searched by means of a code of a radio-frequency identification device, their plate number or other data related to the vehicle. The plate number may be manually incorporated to the system (through the keyboard) or automatically by means of an automatic plate number reader.

[0019] Moreover and as a complement, additional cameras may be installed to capture the different sides of the vehicle. Also as complements, vehicle type classifiers may be added like photocell curtains, volumetric detectors, wheel meters, height detectors or others.

[0020] The basic information related to transit (entry or exit) being executed or intended to, basically consists of the following fields:

- Date and time.
- Vehicle plate number.
- Code of a radio-frequency identification device associated to the vehicle in the database.
- Code of a radio-frequency identification device read from the vehicle in that moment.

[0021] Moreover, the following information may be available:

- Vehicle model.
- Vehicle colour literal.
- Box with the vehicle colour.
- Surnames of the related driver.
- Name of the related driver.
- National identity card of the related driver.
- Group to which the related driver belongs.
- User number of the related driver.
- Authorisation type literal of the related driver.
- Authorisation parameters (time-tables, dates, etc.)
- Photograph of the related driver.

[0022] All or part of this information will be recorded in the historic transit files.

[0023] The system may use different controls for a specific user like: another code, initial and final dates for the authorisation validity, days of the week, time-table type, start and end of the time-table, number of vehicles inside, gathering the maximum number of vehicles the user may have simultaneously inside the area.

[0024] The system of the invention consists of cameras and vehicle front or rear image capture devices, hardware and software for automatic plate number reading and radio-frequency identification device code reading, database associating plate numbers and codes of radio-frequency identification device and the hardware and software necessary to perform the individual follow-up of each vehicle by a data processing application for area control.

[0025] A wider idea of the features of the invention is made below:

IN THE DRAWINGS:

[0026] Figure 1 is a schematic view of a possible preferred embodiment of the invention.

DRAWING DESCRIPTION

PREFERRED EMBODIMENT OF THE INVENTION

[0027] The drawing shows a video camera (1) focussed on the part of the vehicle bearing the plate number. An automatic plate number reader (2) is connected to said camera. The plate number reader extracts the characters of the plate number, transmitting them to the control computer (3). On the other hand, an antenna (4) is incorporated. The antenna captures the

signal from the radio-frequency code identification device (5) located in the vehicle and transmits it to the radio-frequency reader (6) that extracts the code and sends it to the control computer (3). On approach of the vehicle to the barrier (7), when the control computer (3) has received the plate number and the code or the radio-frequency device, it compares them with the data stored in the database, checking if both are associated or not. In the affirmative case and in the absence of other additional conditioners, the control computer (3) automatically orders the barrier (7) to be opened.

[0028] The case may also exist of connecting the radio-frequency reader (6) to the plate number reader (2) and that one of them contains the database and makes the contrast, without the intervention of the control computer (3), performing, besides the database comparison, the order to open the barrier (7), it even being possible to suppress the control computer. Another possibility is to integrate, for example, the plate number reader and the control application in a same computer.

[0029] Once the nature of the invention has been conveniently described, this is recorded for the relevant purposes, etc.

Claims

1. A SYSTEM FOR THE CONTROL AND SUPERVISION OF VEHICLE TRANSIT IN RESTRICTED ACCESS AREAS, detecting the change of plate numbers or radio-frequency identification devices, combining transit speed with high security level, it always being possible to consult all the available information in the database on each one of the vehicles, **CHARACTERISED in that** it incorporates software and hardware permitting to verify that the vehicle plate number and the identification device code (5) of a vehicle based on a radio-frequency may be associated in a database (3).
2. A SYSTEM FOR THE CONTROL AND SUPERVISION OF VEHICLE TRANSIT IN RESTRICTED ACCESS AREAS according to claim 1, **CHARACTERISED in that** it comprises video cameras (1) and an automatic plate number reader (2) and an arrangement of radio-frequency vehicle identification devices (4-5-6) at the area entrance or exit. Once the digits comprising the plate number are extracted and the code of the radio-frequency identification device is obtained (5), both are compared in a computer (3) managing entrance or exit authorisations.
3. A SYSTEM FOR THE CONTROL AND SUPERVISION OF VEHICLE TRANSIT IN RESTRICTED ACCESS AREAS according to claims 1 and 2, as a complement to the automatic capture of the contents of the plate numbers by cameras and readers,

CHARACTERISED in that it is provided with the utility of introducing alphanumeric characters by means of the computer keyboard (3), where the computerised application for area management resides.

4. A SYSTEM FOR THE CONTROL AND SUPERVISION OF VEHICLE TRANSIT IN RESTRICTED ACCESS AREAS, according to claims 1 to 3, **CHARACTERISED in that** the verification of the association of the plate number and the identification code transmitted by a radio-frequency device (5) with the established database (3), permits the automatic authorisation of area entrance/exit, supplying and generating real time information. If the plate number and identification code of the radio-frequency device (5) located in the vehicle are not associated in the database (3) the system will activate an alarm.

FIGURE 1

