SYSTEM FOR IMAGE-BASED ACCESS CONTROL

Communication system for access control of a door leading into a restricted area. The system comprises an access terminal (1), including a first control device (6), which is connected with an electronic camera (4) for providing a first picture information, a display device (6) for displaying a second picture information, a manual operating device (3) for providing an activating signal, and a communication device (7; 8; 10) for providing two-way video communication between the first control device (6) and a mobile telephone network (16). The first picture information may be received by the network (16), and the second picture information may be transmitted to the network (16). The communication system is arranged to establish a connection between the access terminal (1) and a predetermined mobile terminal (17; 18) operating in the network (16), depending on the activating signal. In a first embodiment, the system constitutes a self-contained unit (1) which preferably may be located outside the door, the communication device (7; 8; 10) being a mobile communication module included in the access terminal. In a second embodiment, the system is split, the communication unit (7; 8; 10) comprising a module for local communication (8), included in the access terminal, and a separate control terminal (10) to be located within the restricted area.
For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.
System for image-based access control

Technical field

The invention relates to communication systems in general, and more specifically a communication system for access control of a door or a gate leading into a restricted area.

Background to the invention

In many situations there is a need to communicate with a person who wishes to enter a door or gate leading into a restricted area, where this person does not possess a key, access card or the like. A number of previously known solutions exist which address this problem. A well-known example is intercom solutions where one rings up either to a security officer or an occupant of the housing unit from an access terminal outside the front door and talks to this person through a loudspeaker/microphone, and where the officer/occupant talks into a dedicated telephone and can remotely control the opening of the door by means of a control button. Solutions of this kind are usually geared to residents in blocks of flats and other housing units where many residents use the same entrance. Independent housing units, such as detached houses, have less need for an ordinary entry telephone solution, since the resident can normally hear when someone rings the doorbell and see the person concerned through the windows of the house before the door is opened. Regardless of the type of housing, however, there is a need for solutions which enable communication to be achieved with the resident from an entry telephone/access terminal, even when the resident is not at home.

The state of the art

From US 6,049,598 a technique is known where a video camera is connected to an ISDN fixed line for transmitting an image from an access terminal. In this solution an ISDN videophone is employed which is located in the home, and images can be transmitted directly to it by means of a control box which is installed. The system is also coupled to the ISDN network and can if wished transmit images via ISDN to a remotely connected user.

Drawbacks of this solution are that it requires physical connections for installation, and it places special requirements on the terminal equipment the resident uses, particularly that it does not permit dynamic adaptation of form
and content during the communication to the terminal type employed by the resident.

EP 0 789 493 A1 describes an entry telephone solution with a video camera. In this case short-range TV transmitters are installed, thus enabling use to be made of the standard TV sets in the flats in order to establish a video image of the person who wishes to enter the flat. Disadvantages of this technique are that it only imparts information to a resident who is present in the house, and that a TV set has to be switched on and tuned to a specific channel in order for the picture communication to be achieved.

DE 4 127 316 describes a cordless entry telephone solution where an access terminal at the front door is cordlessly connected to a dedicated base station inside the house which establishes a cordless communication channel to a cordless DECT type house telephone. The residents can thereby combine an entry telephone with a cordless telephone. Disadvantages of this technique are that only speech information is transmitted, not picture information; that a special private exchange has to be installed; that the resident has to be present or in the immediate vicinity in order for communication to be achieved; and that the resident has to use a special DECT type terminal.

US 6 072 861 illustrates an entry telephone solution which, if the resident does not answer the call within a given period of time, starts audio and video recordings which are converted to digital data and transmitted to the residents via e-mail for subsequent playback. Disadvantages of this technique are that it requires connection to an existing entry telephone system and that it does not permit picture communication to a remote location in approximate real time.

Summary of the invention

It is an object of the present invention to provide a communication system for access control of a door or an gate leading into a restricted area, particularly a door leading into a private house, which system is not encumbered by the above-mentioned drawbacks.

A second object of the invention is to provide a system as mentioned above, which permits picture communication with a mobile terminal operating in a mobile communication network.
A further object of the invention is to provide a system of this kind which requires no or a minimum of electrical installation or wiring.

A further object of the invention is to provide a system of this kind which utilises existing infrastructure and services in already established communication networks.

Another object of the invention is to provide a system of this kind which is either composed of a single free-standing unit, or of two units which communicate cordlessly with each other.

Additional objects of the invention are to provide a system of the above-mentioned type which can be purchased and produced for a reasonable price, and in addition are practical, simple, easily operated, dependable and reliable to use.

The above-mentioned objects and other advantages are achieved by means of the features which will be apparent from the following patent claims.

The invention relates to a communication system for access control of a door or a gate leading into a restricted area, particularly a door leading into a private house.

The system comprises an access terminal to be installed outside the door. The system comprises a first control device, connected with

- an electronic camera for providing a first picture information,
- a display device for displaying a second picture information,
- a manual operating device for providing an activating signal, and
- a communication device for providing two-way picture communication between the first control device and a network for mobile communication.

The first picture information is received from the network, and the second picture information is transmitted to the network. The communication system is arranged, depending on the activating signal, to establish a connection between the access terminal and a predetermined mobile terminal operating in the network.

In a first embodiment the communication device is a mobile communication module contained in the access terminal. The first control device is further arranged, depending on the activating signal, to establish a connection between the access terminal and the mobile terminal. The system thereby
constitutes a single, free-standing unit which can be mounted outside the
doors without the need for wiring/installation.

In a second embodiment the communication device of a first local
communication module is contained in the access terminal. This embodiment
of the system further comprises a separate control terminal, arranged for
local communication with the first local communication module and for
mobile communication with the network. Thus the system consists of two
free-standing units, where the access terminal can be mounted outside the
doors without the need for wiring/installation, and where the control terminal
can be placed inside the house.

Further objects and advantages of the invention will be apparent from the
following description with drawings.

A brief description of the drawings

The invention will now be described in greater detail in the form of preferred
embodiments with reference to the drawings, in which

fig. 1 illustrates an access terminal, viewed from the front,

fig. 2 is a principle block diagram illustrating a first embodiment of a
communication system for access control,

fig. 3 is a principle block diagram illustrating a second embodiment of a
communication system for access control,

fig. 4 is a simplified logic diagram for the access terminal illustrated in fig. 2
or the access terminal illustrated in fig. 3,

fig. 5 is a simplified logic diagram for the control terminal illustrated in fig.
3, and

fig. 6 is an illustration of a home page for operation and set-up up of the
system.

A detailed description of preferred embodiments

Fig. 1 illustrates an access terminal according to the invention, viewed from
the front.
The access terminal 1 is built into a compact unit which in a typical application is arranged to be attached to an outer wall of a house, in connection with a door leading into the house. From the front can be seen a display 2, an operating device 3, a camera 4 and a preferably infrared light source 25. The camera 4 is arranged for taking still pictures or video images of a person standing in front of the access terminal 1.

Fig. 2 is a principle block diagram illustrating a first embodiment of a communication system for access control according to the invention, and the environment interacting with the system.

In this embodiment the system is composed of an access terminal 1 for installing outside the door leading into a restricted area. The access terminal 1 is arranged to communicate with a network 16 for mobile communication, which further has communication connection with an additional network 19, such as the Internet.

Figure 2 also illustrates mobile terminals 17, 18 which communicate with the system by means of the mobile telephone network 16. The mobile terminal 17 is an ordinary mobile telephone for speech and text communication, while the mobile terminal 18 is a mobile telephone which is also arranged to display picture information on a display 23. The mobile terminal 18 may alternatively be a PC or a PDA (Personal Digital Assistant) equipped for mobile communication. Figure 2 also illustrates a computer 22 and a central storage device 20 which is connected to the Internet and communicates with the system by means of the Internet 19 and the mobile telephone network 16.

The access terminal 1 comprises a control device in the form of a microcontroller 6. The access terminal 1 further comprises a display 2, a manual operating device 3, a video camera 4 and a mobile communication device 7. These components 2, 3, 4, 7 are all connected to the microcontroller 6.

In addition the access terminal 1 preferably also comprises a loudspeaker 5, a microphone 26, a door position detector 21 for detecting whether a door is open or closed, and a light source 25, arranged to illuminate an object which is located in an imaging area in front of the camera 4. These components 5, 21, 25, 26 are also connected to the microcontroller 6.
The display 2 is arranged to display information in the form of text and/or picture, controlled and fed from the microcontroller 6. The display must be suitable for battery-operation, and have a low power consumption. A bit map-LCD display is therefore well suited. The display may be equipped with a lighting means, such as white LED's, which provide the best possible lighting effect with the least possible power consumption.

The manual operating device 3 normally consists of an electric switch, such as a push-button switch. The operating device 3 emits a signal which can be read by the microcontroller 6.

The video camera 4 is arranged to provide first picture data to the microcontroller 6. It may, for example, be a CMOS video detector, equipped with a lens which projects the subject down on to a CMOS chip. The choice of a CMOS video detector is decisive for a low power consumption and low operating voltage. An example of such a CMOS video detector is PB-0101 from Photobit. Any control functions which the camera 4 may have, such as exposure time, picture format and picture transmission rate can also be controlled by output signals from the microcontroller 6.

The mobile communication device 7 is a transceiver circuit for mobile communication, arranged for providing two-way communication in a network 16 for mobile communication, typically a global, cordless network such as a GSM, GPRS or UMTS network. For GSM the transceiver consists of a GSM Voiceband/baseband codec mixed-signal chip such as Analog Devices' AD6521 in combination with a GSM/GPRS controller such as Analog Devices' AD6522. The radio-transceiver can be implemented by means of Analog Devices' Othello™ chip-set and an integrated GSM dual-band antenna.

The mobile network 16 is further connected to an additional data network 19 such as the Internet. This permits communication between the microcontroller 6 and an external computer 22 connected to the Internet 19, thus enabling data relating to control parameters, configuration and program changes to be downloaded from the computer 22 to the microcontroller 6, and similarly to be retrieved from the microcontroller 6 to the computer 22.
The loudspeaker 5 is arranged to acoustically reproduce an analog signal generated by the microcontroller 6. The signal may be amplified or processed in another way by intermediate circuits.

The door position detector 21 is arranged to generate a door position signal expressing whether a door is open or closed, and to transmit this signal to the microcontroller 6. The detector is preferably an infrared or ultrasonic distance detector which senses the door's position by means of reflection. The door position signal can be generated internally in processing circuits in the detector, or in software in the microcontroller 6 on the basis of a transmitted and reflected signal.

Alternatively, the detector 21 is composed of a microphone which picks up vibrations in air and/or door frames resulting from the movement of the door, in co-operation with a processing unit which is preferably implemented as software in the microcontroller 6, and which on the basis of the vibrations determines whether the door is being opened. By comparing sound impulses picked up by a microphone, a frequency-response analysis through a Fast Fourier Transform and a pattern comparison with a previously recorded pattern can determine whether the door is being opened. The comparison of patterns may either be solved analytically or by means of a neural network.

Resources for performing frequency analysis and filterbank-parameter-break-up are incorporated in the functions included in the speech encoder and are reuse of existing resources which are available in the system.

The light source 25 is arranged to illuminate an object located in front of the camera 4, preferably with infrared light. The light source preferably comprises one or more infrared light diodes. The light source is controlled by means of a control signal emitted by the microcontroller 6. Infrared lighting enables the camera 4 in an acceptable manner to photograph a person at a given distance in front of the camera, even though the environment is dark, and without the lighting being visible to the eye.

The microcontroller 6 comprises a processor, a program memory (ROM/flash) for storing the program code and fixed data, a data memory (RAM/flash) for storing transient or temporary data, together with input/output circuits linked to the said elements 2, 3, 4, 5, 21, 25, 26 which are included in the access terminal.
The microcontroller 6 is preferably a standard electronic component, such as a micro RISC processor from Atmel AT90LS8515 which is suitable for operation on battery voltages of 3.3V and has different characteristics such as low power consumption in active and standby mode. The program code contained in the program memory, and thereby the mode of operation for the microcontroller, will be unique to the invention. This will be explained in greater detail with reference to fig. 4.

The various elements in the access terminal 1 are supplied with electrical operating power from a suitable DC voltage delivered by a power supply which in its simplest form comprises an ordinary power transducer 29 which is supplied from the mains. In order to simplify the installation and reduce the use of cables, the power supply advantageously comprises a chargeable battery 27, a solar cell panel 28 and a charging circuit 29.

Fig. 3 is a principle block diagram illustrating a second embodiment of a communication system for access control according to the invention, and the environment interacting with the system.

In this embodiment, the system comprises an access terminal 1 for installation outside the door leading into a restricted area, and a control terminal 10 for installation within the area. The two terminals 1, 10 are communicationally connected by means of a local, cordless, two-way communication connection 9. The control terminal 10 communicates with a network for mobile communication 16, which is connected to an additional network 19 such as the Internet.

The embodiment in fig. 3 can be regarded as a variant of the embodiment illustrated in fig. 2, where the mobile communication device 7 is replaced by the combination of the local communication device 8 and the control terminal 10, which together provide the communication with the mobile network 16. The control terminal 10 also performs additional functions.

The reference numerals in figure 2 agree with the corresponding elements explained in the description of figure 1. We shall now give a more detailed account of only those elements which do not have their direct equivalent in the above description.
Instead of the mobile communication device 7, illustrated by dot-and-dash lines in fig. 2, the access terminal 1 comprises a local communication device 8, composed of an RF transceiver circuit for local communication.

The transceiver circuit 8 is arranged for cordless transmission of data supplied by the microcontroller 6 to a corresponding transceiver circuit 11 in a control terminal 10 located in the transceiver circuit's 8 coverage area. It is further arranged for cordless reception of data transmitted from a corresponding, external transceiver circuit 11 in the control terminal 10, and to deliver these data to the microcontroller 6.

The transceiver circuits 8, 11 must be capable of transferring data sets depending on the capacity of the corresponding transceiver circuit which acts as receiver. If video images have to be transmitted, it must be possible to transmit a minimum of 30,000 bits/second. Conditional on cost, a natural choice will be a Bluetooth transceiver such as ROK 101 007 from Ericsson. Bluetooth transceivers operate in the ISM band on 2.4 - 2.5 GHz and can transmit up to 460,000 bits/second (Bluetooth release 1.0B). Another alternative may be so-called WLAN transceivers which also transmit in the ISM band which employs the standard IEEE 803.11b.

The control terminal 10 is a separate unit for installation within the restricted area, e.g. inside the house. It comprises a control device in the form of a microcontroller 14, which is connected to a local communication device 11 and a mobile communication device 13.

The control terminal 10 preferably also comprises a loudspeaker 12, a data storage device 15 and a movement detector. The component 37 is also connected to the microcontroller 14.

The local communication device 11 is a transceiver circuit for local communication, arranged for cordless transmission of data supplied by the microcontroller 14 to a corresponding transceiver circuit 8 in an access terminal located in the transceiver's 14 coverage area, and for cordless reception of data transmitted from the transceiver circuit 8 and supplying these data to the microcontroller 14. It is preferably of the same type as the transceiver circuit 8 mentioned above.

The mobile communication device 13 is a transceiver circuit for mobile communication, arranged for providing two-way communication in the
mobile telephone network 16, such as a GSM, GPRS or UMTS network, corresponding to the mobile communication device 7 described in connection with the description of fig. 1.

The mobile network 16 is connected to an additional data network 19 such as the Internet. This permits communication between the microcontroller 14 and an external computer 22 connected to the Internet 19, thus enabling data relating to control parameters, configuration and program changes to be downloaded from the computer 22 to the microcontroller 14, and correspondingly to be retrieved from the microcontroller 14 to the computer 22.

In addition, it enables communication to take place between the microcontroller 6 in the access terminal and the external computer 22 via the microcontroller 14 and the transceiver circuits 11, 8.

The loudspeaker 12 is arranged to emit an acoustic signal as a result of a control signal generated by the microcontroller 14, or amplified or processed in another way by intermediate circuits.

The microcontroller 14 is arranged for generating a warning signal in the loudspeaker 12 as a result of an activating signal. It is also arranged to provide a speech signal which is picked up by the microphone 26 and transmitted via the local communication device 9.

The movement detector 37 is arranged to supply to the microcontroller 14 a signal expressing detection of movement in the area in which the control terminal 10 is located, particularly with a view to deciding whether there are persons in the area. An ultrasonic movement detector is preferred which senses movements in the environment by means of ultrasound reflection.

The microcontroller 14 comprises essentially the same structural elements as the microcontroller 6 mentioned in the description of the access terminal 1. The program code contained in the microcontroller's program memory, and thereby the mode of operation of the microcontroller 14, will, however, be unique to the invention. This will be explained in greater detail with reference to fig. 6.

Fig. 4 is a simplified logic diagram for the access terminal 1 illustrated in fig. 2 or fig. 3. The states illustrated, indicated by circles, correspond to
operational states for a program executed by the microcontroller 6. By means of the arrows leading from one state to another or the same state, a transition condition is indicated.

The access terminal 1 operates in a normal state 100 until an activation 102 takes place. This is normally implemented by operation of the push-button 5. The access terminal then goes to a decision state 110.

The transition 102 may alternatively be implemented as a result of a detected movement in the camera's imaging area. In this case the microcontroller 6 is provided with a program part which on execution processes the camera signal, detects changes in the recorded image and generates an activating signal which overrules the signal from the push-button 5.

The transition 102 may alternatively be implemented as a result of the fact that the mobile terminal 17;18 makes an active call to the access terminal. In this case the access terminal acts as a monitoring system or an advanced "babysitter".

In the state 110 it is decided whether a connection should be established from the access terminal 1 to a mobile terminal 17;18 in the network 16. The identity of the mobile terminal is stored in a part of the memory in the control device 6.

In the simplest form of the access terminal 1, the state 110 is a zero state, and the condition is considered always fulfilled. In this case operation of the button 5 will automatically result in implementation of the transition 114 to the state 120, i.e. that the connection is established.

The signal from the door position detector 21, however, will preferably influence the condition for establishing the connection. The transition 114 will typically be implemented if this signal indicates within a given time that the door has not been opened, thereby preventing connection from being established unnecessarily.

If the access terminal 1 is in the form of the first embodiment illustrated in fig. 2, a two-way audio and video connection is established in the state 120 between the mobile communication device 7 and a mobile terminal 17;18 in the network 16.
If the access terminal 1 is in the form of the second embodiment illustrated in fig. 3, in the state 120 a start indicator signal is transmitted to the local communication device 8, which transmits this on to the control terminal 10.

When connection has been established, or when the start indicator signal has been transmitted, the access terminal will continue to provide sound and/or picture until transmission is stopped by the fact that no more sound or movement are detected in the picture on the access terminal within a certain period, or that the connection is broken by the mobile terminal 17;18. When the connection is broken, the access terminal returns to the normal state 100, transition 122.

Fig. 5 illustrates a simplified logic diagram for the control terminal 10 illustrated in fig. 3.

The illustrated states, indicated by circles, correspond to different operating states for a program executed by the microcontroller 14. By means of the arrows leading from one state to another or to the same state, a transition condition is indicated.

The control terminal 10 operates in a normal state 200 until it receives a start indicator from the access terminal 1 via the transceiver 11. The start indicator is received as a result of the fact that the push-button 5 has been operated and the door has not been opened within a period of time, or alternatively that the access terminal 1 has been activated by means of movement detection in the video camera's imaging area or by a mobile terminal making an active call to the control terminal 10 for monitoring purposes.

On receipt 202 of the start indicator the control terminal goes to state 210, where a sound signal is emitted if the start indicator is not due to a call from the mobile terminal, such as a ring signal, in the loudspeaker 12. The control terminal 12 acts in this respect in the same way as an ordinary doorbell, where an acoustic signal is emitted for a period in the house as a result of a bell push being operated outside the door. In this state speech from the access terminal will also be passed to the loudspeaker 12, thus combining a ringing signal and speech.

After a given delay the control terminal goes to the state 220, where the mobile terminal 17;18 is called. The identity of the mobile terminal is stored in a memory in the microcontroller 14. Several such identities can be stored,
and the control device 14 can be arranged in such a manner that another
identity is tried if contact is not obtained with a mobile terminal.

If a call is completed 222 successfully, the control terminal goes to the state
230, where a connection is established between the access terminal 1 and the
mobile terminal 17; 18 via the local communication device 9. The control
terminal is set up in such a manner that any lines to a mobile answering
machine do not result in further calling of other mobile terminals on the list.
If this option is given, it will be possible to leave a message on the resident's
mobile answering machine in the usual manner. The control terminal will
then automatically conclude the conversation after a pre-set maximum time,
thus preventing anyone from leaving unduly long messages. If a call is not
successfully made, the system will record an audio and video message and
return to the starting point through the transition 224. This video message
may then be stored locally and an SMS message will be transmitted to a
mobile terminal that a message has been left. The message may also be sent
as an e-mail with enclosure to a previously provided e-mail address, or it may
be transmitted to a central server which supplies an administration service
where the resident can obtain an overview via the Internet of the latest
movements outside the door, as illustrated in figure 6.

Linked to the identities which are stored for the mobile terminals there are
also pre-stored attribute data indicating whether the mobile terminal
concerned is a text and speech terminal, such as an ordinary mobile
telephone, or whether it also has the ability to receive and display picture
information and/or record and transmit picture information.

Depending on these attributes, the control device 14 establishes either a pure
speech connection or a speech connection combined with either a one-way or
two-way video connection with the mobile terminal concerned 17; 18 in the
network 16.

After the connection has been established, it can be terminated when within a
given period of time no sound or movement are detected in the picture from
the access terminal or the connection is broken by the mobile terminal
breaking the connection. These states give the transition 232 back to the
normal state 200.
Fig. 6 is an illustration of a home page for the resident supplied by a server 20 which is coupled to the Internet 19 and shows how it looks on a terminal coupled to the Internet. The terminal may be a fixed terminal 22 or a mobile terminal 17;18 via WAP, or a mobile video terminal. After logging on with user and password 31, the personal page is shown to the user 30. A log 32 of the latest movements and events for the access terminals linked to the system show whether it is normally activated sequences and the position thereof together with any events which were activated as alarm functions by the detection of movement by the video sensors. By choosing an event in the log, audio/video recording 33 is played back. All set-up is carried out via a set-up menu 34 where it can be determined which mobile terminals have to be called, which access terminals are connected, etc.. The characteristics of each mobile terminal, indication of times for maximum length of message, time which should elapse before the mobile terminal is called, etc.

The invention has been described in the above by means of an example, with the additional mention of individual alternatives.

In the example in fig. 3 it is stated that the system comprises an access terminal 1 and a control terminal 10 which communicate locally. It will be appreciated that a larger number of access terminals, such as 2, 3, 4 or more, may be employed in a system together with one and the same control terminal 10. This is particularly relevant if several doors have to be monitored in connection with one and the same building. In this case different ringing tones and functionality may be used, depending on which access terminal 1 is operated. For a front door, e.g., a monitoring function may only be implemented if movement is detected at night, while any movement at any time may activate a warning and the taking of pictures at a back door.

The control devices 6, 14 are specified as being microcontrollers, but it should be understood that they may equally well consist of functional units where processor, memory and I/O units are connected, but are not necessarily integrated on one and the same chip. It should also be understood that one or more of the units which are stated to be connected to a microcontroller, such as for example a local communication device, may alternatively together with the microcontroller form an integral part of one and the same chip.

In the examples it is stated that an access terminal 1 contains an operating device 3. It will be appreciated that several operating bodies 3 may be
included in the same access terminal, if it is required that such a terminal should be capable of communicating with a larger number of control terminals, such as 2, 3, 4 or more. This is particularly relevant if a unit has to be mounted at a common door used by several persons or residents.

The detector 21 is preferably integrated in the access terminal 1. It lies within the scope of the invention that the detector may be a traditional proximity detector, e.g. a magnetic switch, which is physically located outside the terminal 1, but which is electrically connected with and thereby logically covered by the terminal 1.

The detector 37 is also preferably integrated in the control terminal 10. It lies within the scope of the invention that these may be physically located outside the terminal 10, but still be electrically connected with and thereby logically covered by the terminal 10.

Even though reference is made in the example to access control of a house, it will be obvious that the invention may equally well be employed for access control of different types of buildings, such as offices and shops, or for access control of outdoor areas such as backyards, where the device is installed in connection with a gate, or similarly for access control of parts of buildings, such as an individual room, e.g. a hotel room.

As an alternative application the access terminal 1 may be used as a general, portable monitoring unit for use in the area concerned, e.g. as a "babysitter".

Persons skilled in the art will realise that several possible embodiments and areas of application lie within the scope of the invention, as it is defined by the features indicated in the following claims and by their equivalents.
PATENT CLAIMS

1. A communication system for access control of a door or a gate leading into a restricted area, particularly a door leading into a private house, characterized in that the system comprises
   - an access terminal (1) comprising
     - a first control device (6), connected with
     - an electronic camera (4) for providing a first picture information,
     - a display device (6) for displaying a second picture information,
   - a manual operating device (3) for providing an activating signal, and
   - a communication device (7; 8, 10) for providing two-way video communication between the first control device (6) and a network (16) for mobile communication, the first picture information being received from the network (16), and the second picture information being transmitted to the network (16), and where the communication system is arranged, depending on the activating signal, to establish a connection between the access terminal (1) and a predetermined mobile terminal (17; 18) operating in the network (16).

2. A communication system for access control according to claim 1, where the communication device is composed of a mobile communication module (7) contained in the access terminal, and where the first control device (6) is arranged, depending on the activating signal, to establish the connection between the access terminal (1) and the mobile terminal (17; 18) operating in the network (16).

3. A communication system for access control according to claim 1, where the communication device is composed of a first local communication module (8) contained in the access terminal (1), and a separate control terminal (10) arranged for local communication (9) with the first local communication module (8) and for mobile communication with the network (16).

4. A communication system for access control according to claim 3, where the communication terminal comprises
   - a second control device (14), connected with
- a second local communication module (11), arranged to provide local communication (9) with the first local communication module (8),
- a mobile communication module (13), arranged to provide mobile communication between the second control device (14) and the mobile terminal (17; 18),
where the first control device (6) is arranged to pass on the activating signal to the control terminal (10) via the local communication device (9), and where the second control device (14) is arranged to establish the connection between the communication device (8, 10) and the mobile terminal (17; 18), depending on the activating signal.

5. A communication system for access control according to claim 4, where the second control device (14) is further connected with
- a movement detector (37), arranged for detecting movement in an area which covers or surrounds the control terminal (10), and
- where the second control device (14) is arranged, also depending on the movement detector signal, to establish the connection between the communication device (7; 8, 10) and the mobile telephone terminal (17; 18).

6. A communication system for access control according to one of the claims 4-5, where the second control device (14) is further connected with a loudspeaker (12), and is further arranged for generating an acoustic signal in the loudspeaker (12), depending on the activating signal.

7. A communication system for access control according to one of the claims 1-6, where the first control device (6) is further connected to a loudspeaker in order to impart a speech signal generated by the first control device (6), and a microphone (26) in order to provide the control device with a speech signal, and where the communication device (7; 8, 10) is further arranged to provide two-way speech communication between the access terminal (1) and the network (16).

8. A communication system for access control according to one of the claims 1-7, where the first control device (6) is further connected to a light source, preferably an infrared light source, arranged to illuminate an object in the camera's imaging area, and where the first control device (6) is arranged to influence a control signal supplied to the light source.
9. A communication system for access control according to one of the claims 1-8, where the first control device (6) is further connected to a door position detector (21), arranged for generating a door position signal expressing whether a door or gate is open or closed, and where the first control device (6) is arranged, also depending on the door position signal, to establish the connection between the communication device (7; 8; 10) and the mobile telephone terminal (17; 18).

10. A communication system for access control according to one of the claims 1-9, where the first control device (6) is arranged to detect movement in the camera's (4) imaging area by processing the first picture information, and, also depending on the camera detection signal, to establish the connection between the communication device (7; 8; 10) and the mobile telephone terminal (17; 18).
Fig. 1
Fig. 4
Fig. 5
Name: Endre Røsjø
MoBell #: 192.168.0.100
Password: ********

Playing door 1:

Call log:
Door 1 (London) 14:02 26.02.2001 SMS
Door 2 (Oslo) 14:10 26.02.2001 Video
Door 3 (AAAM!) 23:20 26.02.2001 Picture

MoBell call set-up:
1. 192.168.0.10 3G
2. 915 228993 2G

Fig. 6
INTERNATIONAL SEARCH REPORT

A. CLASSIFICATION OF SUBJECT MATTER

IPC7: H04N 7/14, G08B 13/00
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)

IPC7: H04M, H04N, G08B

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

SE, DK, FI, NO classes as above

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

C. DOCUMENTS CONSIDERED TO BE RELEVANT

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<td>File EPDOC/EPO, TAMURA ELECTRIC WORKS LTD: &quot;TELEPHONE SET&quot; JP, A, 9107409, 1997-04-22</td>
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<tr>
<td>A</td>
<td>EP 0789493 A1 (RODRIGUEZ SANCHEZ FERNANDO), 13 August 1997 (13.08.97), abstract</td>
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<td>A</td>
<td>US 6049598 A (WOLFGANG PETERS ET AL), 11 April 2000 (11.04.00), claims 1,5</td>
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<td>DE 10039263 A1 (GENSWEIN, KLAUS), 21 February 2002 (21.02.02), figure 1, claims 1-10</td>
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Further documents are listed in the continuation of Box C. See patent family annex.

Date of the actual completion of the international search: 9 July 2002

Date of mailing of the international search report: 07-07-2002

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Form PCT/ISA/210 (second sheet) (July 1998)
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<td>DE 20101205 U1 (HWG TELEKOMMUNIKATION SYSTEME GMBH), 20 Sept 2001 (20.09.01), figures 1A, 5, claim 1</td>
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