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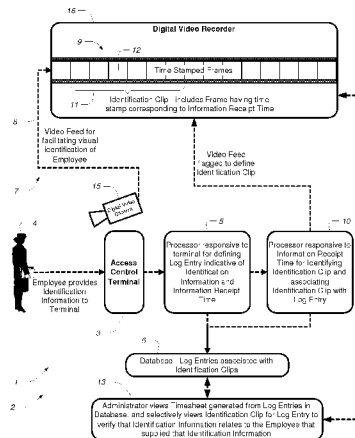
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functions as a Timing and Attendance (T & A) system 1 for a workplace (2). The system 1 includes an access control terminal (3) for receiving identification information from a user, for example an employee (4). The receipt of identification information by terminal (3) defines an information receipt time. In overview, employee 4 provides the identification to terminal (3) to mark the commencement or completion of a period of work at workplace (2). Following the provision of the identification information, a first processor 5 is responsive to terminal (3) for defining event data, in the form of a timesheet log entry. This log entry is indicative of the identification information and the information receipt time. The log entry is routed to a database (6). This log entry, and other similar log entries in database 6, are used to create an electronic timesheet indicative of employee work periods. Terminal (3) is an access control system allowing employee (4) to swipe an ID card having a magnetic strip through a reader channel defined on terminal (3). The magnetic strip contains identification information identifying employee 4. In an identity theft scenario, employee (4) could fraudulently or inadvertently provide an ID card that identifies another employee. The system (1) is implemented to provide a deterrent to identity theft and otherwise provide means for an administrator to manage difficulties associated with identity theft. A video capture system (7) includes a digital video camera (15) coupled to a digital video recorder (16). This system (7) captures image data, in the form of a video feed (8). This video feed is used to facilitate

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visual identification of user (4), as discussed further below. Feed (8) is defined by a plurality of sequentially time-stamped image frames (9). A second processor (10) is, for a given log entry, responsive to the receipt time of that log entry for associating a portion of the image data, in the form of a video clip (11), with that log entry. The video clip (11) is a time-limited segment of feed (8), or a limited number of frames from feed (8). The video clip (11) for association with a log entry includes a frame (12) that is time stamped with a time corresponding to the information receipt time for that log entry. An interface, provided by a software application running on a PC (13), is responsive to a query for a log entry for obtaining the associated video clip (11). Hence, the administrator is able to view on PC (13) the relevant associated video clip for the log entry in question, and as such make a visual identification of the employee that effected by use of terminal (3) the definition of the relevant log entry.

AN IDENTIFICATION SYSTEM

FIELD OF THE INVENTION

The present invention relates to identification systems, and particularly to information systems for hindering identify theft.

5 The invention has been primarily developed for managing and supervising employee attendance, and will be described herein with particular reference to that application. However, it will be appreciated that the invention is not limited to such a field of use, and is generally applicable to in a broader context.

BACKGROUND TO THE INVENTION

10 Any discussion of the prior art throughout the specification should in no way be considered as an admission that such prior art is widely known or forms part of common general knowledge in the field.

It is common for an employer to maintain a timesheet of employee attendance. Often a timing and attendance (T&A) system is implemented to facilitate electronic
15 generation of such a timesheet. In a typical example, an employee provides identification at the commencement and completion of a period of work to mark those events. As a result, the electronic timesheet is updated with information detailing when the employee commenced and completed work. The timesheet is often later used for the purpose of payroll calculations and the like.

20 In some circumstances a first employee may provide identification information that in fact relates to a second employee, and as a result an inaccurate or perhaps even fraudulent timesheet entry is made. This is generally refereed to as identity theft, and is costly to employers.

The use of contact based biometrics has been implemented in some instances to
25 reduce the likelihood of identify theft. However, implementation of biometrics is relatively expensive, and often regarded by employees as invasive.

SUMMARY OF THE INVENTION

It is an object of the present invention to overcome or ameliorate at least one of the disadvantages of the prior art, or to provide a useful alternative.

In accordance with a first aspect of the invention, there is provided an identification system including:

an access control terminal for receiving identification information from a user, the receipt of said information defining an information receipt time;

5 a first processor responsive to the terminal for defining event data indicative of the identification information and the information receipt time;

a capture system for capturing image data to facilitate visual identification of the user, wherein the image data is defined by one or more time-stamped image frames;

10 a second processor responsive to the receipt time for identifying a portion of the image data and associating this identified portion of image data with the event data, the identified portion of image data including an image frame that is time stamped with a time corresponding to the information receipt time; and

an interface responsive to a query for the event data for obtaining the associated portion of image data.

15 Preferably the capture system is a video capture system. More preferably the image data is a video feed defined by a plurality of sequential time-stamped image frames. Even more preferably the identified portion of image data is a video clip defined by a time-limited portion of the video feed. More preferably the video capture system includes one or more cameras located proximate the terminal. Even more preferably at least one of the
20 cameras is motion activated.

In one preferred embodiment the first processor uses a first clock for determining the information receipt time and the capture system uses a second clock for time stamping the frames, the first and second clocks being periodically substantially synchronised. In another preferred embodiment the system includes a clock having an output accessible by
25 the first processor for determining the information receipt time, this output being further accessible by the capture system for time stamping the image frames.

30 Preferably the event data is recorded in an event log. Also preferably the user is an employee and the event log maintains data indicative of employee attendance. Preferably the user provides the identification information to the terminal to commence or terminate an employee attendance period. Preferably the event log is graphically viewable as a columnar display of time and attendance records for one or more employees.

Preferably the system includes a first and second router for respectively providing the event data and data indicative of the identified portion of image data to one or more servers. More preferably the event data is provided to a first server and the identified portion of the image data is provided to a second server. Preferably the first server is
5 located remotely of the second server.

In a preferred embodiment the one or more cameras include a first camera for which image data is stored in response to a signal initiated by the terminal and a second camera for which image data is stored in response to a signal initiated by a motion-sensing device coupled to the second camera.

10 In a preferred embodiment the system includes a processor responsive to the event data for selectively communicating a message on the basis of a predefined protocol. Preferably the system further includes at least one remote communications device capable of receiving and displaying a portion of said image data.

According to a second aspect of the invention there is provided a method for
15 allowing the verification of a user's identity, the method including the steps of:

receiving identification information from the user, the receipt of said information defining an information receipt time;

being responsive to the receipt of said identification information for defining event data indicative of the identification information and the information receipt time;

20 capturing image data to facilitate visual identification of the user, wherein the image data is defined by one or more time-stamped image frames;

being responsive to the receipt time for identifying a portion of the image data and associating this identified portion of image data with the event data, the identified portion of image data including an image frame that is time stamped with a time corresponding to
25 the information receipt time; and

an interface responsive to a query for the event data for obtaining the associated portion of image data such that identification information is able to be reconciled with the portion of image data thereby to allow verification of the user's identity.

30 According to a third aspect of the invention there is provided a computer-readable medium containing computer-executable code for instructing a computer to perform the method of the second aspect of the invention.

According to a fourth aspect of the invention there is provided a timing and attendance system for monitoring and managing attendance of employees at a workplace, the system including:

a terminal for receiving identification information from an employee, the receipt of said information defining an information receipt time;

a first processor responsive to the terminal for defining event data indicative of the identification information and the information receipt time;

a capture system for capturing image data to facilitate visual identification of the employee, wherein the image data is defined by one or more time-stamped image frames;

a second processor responsive to the receipt time for identifying a portion of the image data and associating this identified portion of image data with the event data, the identified portion of image data including an image frame that is time stamped with a time corresponding to the information receipt time; and

an interface responsive to a query for the event data for obtaining the associated portion of image data.

According to a further aspect of the invention there is provided a computer-readable medium containing computer-executable code for instructing a computer to:

in response to receiving identification information from a user at an information receipt time, define event data indicative of the identification information and the information receipt time;

in response to the information receipt time, in a digital video capture system for capturing identification video to facilitate visual identification of the user, associating with the event data a video clip, wherein the identification video is defined by a plurality of sequentially time-stamped frames and the video clip includes a frame that is time stamped with a time corresponding to the information receipt time; and

in response to a query for the event data, obtaining the associated video clip.

BRIEF DESCRIPTION OF THE DRAWINGS

Preferred embodiments of the invention will now be described, by way of example only, with reference to the accompanying drawings in which:

Figure 1 is a schematic representation of a timing and attendance system according to an embodiment of the present invention;

Figure 2 shows an exemplary columnar timesheet screenshot portion for the system of Figure 1;

Figure 3 is a schematic representation of a timing and attendance system according to another embodiment of the present invention;

5 Figure 4 is a schematic representation of a camera arrangement for a timing and attendance system according an embodiment of the present invention;

Figure 5 is a schematic representation of a timing and attendance system according to another embodiment of the present invention; and

10 Figure 6 is a flowchart showing a method according to an embodiment of the invention.

DETAILED DESCRIPTION

Referring to the drawings, there is provided an identification system, in the form of a Timing and Attendance (T&A) system 1 for a workplace 2. System 1 includes an access control terminal 3 for receiving identification information from a user, presently in the
15 form of an employee 4. The receipt of identification information by terminal 3 defines an information receipt time. In overview, employee 4 provides the identification to terminal 3 to mark the commencement or completion of a period of work at workplace 2.

Following the provision of the identification information, a first processor 5 is responsive to terminal 3 for defining event data, in the form of a timesheet log entry. This
20 log entry is indicative of the identification information and the information receipt time. The log entry is routed to a database 6. This log entry, and other similar log entries in database 6, are used to create an electronic timesheet indicative of employee work periods. It will be appreciated that an employee work period for employee 4 is bounded by two events: a commencement event where employee 4 provides identification information to
25 terminal 3 at the commencement of the work period, and a completion event where employee 4 provides identification information to terminal 3 at the completion of the work period.

It is not always necessary to provide identification information at each and every event. For example, in some embodiments a user provides identification information on a
30 daily or periodic basis. By such an approach, a terminal is periodically associated to a particular user such that all log entries resulting from the period in question are inherently

associated to the same user information. In one instance, a user provides identification information when logging onto a terminal in the morning, and makes timesheet entries during the course of a day, before logging off.

Terminal 3 is preferably a terminal similar to what is used in a conventional access control system, and in some cases existing access control components are leveraged for the purpose of system 1. In the present embodiment employee 4 swipes an ID card having a magnetic strip through a reader channel defined on terminal 3. The magnetic strip contains identification information, which in practice should identify employee 4. It will however be appreciated that employee 4 could fraudulently or inadvertently provide an ID card that identifies another employee. For the purposes of this disclosure, such an act is generally referred to as identity theft. As described below, system 1 is implemented to, in the first instance, provide a deterrent to identity theft, and otherwise provide means for an employer to manage difficulties associated with identity theft.

In some embodiments rather than a magnetic-strip based identification arrangement, a short range radio frequency (RF) based identification arrangement is used. For example, employee 4 carries a proximity card including an RF identifiable chip that maintains identification information, and this identification information is read by a terminal 3 having a short range RF proximity reader. Specifically, the terminal reads the information upon employee 4 bringing the card within a predetermined proximity of the terminal. Other embodiments make use of finger scanners, biometrics, access codes, and so on to achieve employee identification.

A video capture system 7 captures image data, in the form of a video feed 8. This video feed is used to facilitate visual identification of user 4, as discussed further below. Feed 8 is defined by a plurality of sequentially time-stamped image frames 9.

The term "time-stamped image frame" should be read broadly, and is not meant to imply any need for physical stamping of a frame with a time. Whilst in some cases frames are physically stamped by digital means, in other cases the stamping is by association only. In some circumstances a time-stamped image frame is a video frame including a digital time indicator inserted by a capture device. This time indicator is often in the form of a graphical time-code. Such a time indicator may be inserted into a frame by a capture device or a downstream recording device. In further circumstances the recording device associates each captured frame with time information. For example, each frame is

allocated a unique identifier, and this identifier is associated in a database with time information.

A second processor 10 is, for a given log entry, responsive to the receipt time of that log entry for associating a portion of the image data with that log entry. In the present embodiment this portion of image data takes the form of a video clip 11. A video clip is a time-limited segment of feed 8, or a limited number of frames from feed 8. The video clip for association with a log entry includes a frame 12 that is time stamped with a time corresponding to the information receipt time for that log entry. Specifically, processor 5 uses a first clock for determining the information receipt time. Similarly, system 7 uses a second clock for time stamping frames 9. These first and second clocks are synchronised such that frame 12 provides a digital image of the moment the identification information is received by terminal 3 from employee 4.

In other embodiments system 1 includes a single clock having an output accessible by processor 5 for determining the information receipt time, this output being further accessible by the capture system for time stamping the image frames. Other synchronisation techniques will be known to persons skilled in the art.

It will be noted that the time stamp of frame 12 need not identically match the information receipt time, and in some embodiments a scaling factor is applied to increase the chances of successful identification. For example, in one implementation there is an inherent ten-second delay between employee 4 physically providing the identification information and a log entry being defined. The defined information receipt time for that log entry is therefore ten seconds after the actual time at which the employee was known to be using the terminal. In such a situation frame 12 is selected such that it is stamped with a time that is ten seconds prior to the information receipt time.

An interface, provided by a software application running on a PC 13, is responsive to a query for a log entry for obtaining the associated video clip 11. In practice, an administrator of system 1 views on PC 13 the electronic timesheet generated on the basis of entries in database 6. The employer wishes to verify that a particular commencement or completion event attributed to a particular employee was actually generated by that employee interacting with terminal 3. The point on the timesheet indicative of this event is selected, and it will be recognised that this point is defined by a log entry in database 6. As discussed above, each log entry is associated with a video clip 11. The administrator is

able to view on PC 13 the relevant associated video clip for the log entry in question, and as such make a visual identification of the employee that effected by use of terminal 3 the definition of the relevant log entry. Assuming adequate video footage is provided, the administrator can confirm or reject the contention that the employee information received
5 by terminal 3 was provided by the employee to which that information purports to relate. For example, by *post-facto* visual analysis of any one or more of the face, height, clothing, gait, and behaviour of the person shown in the video footage.

The precise nature of terminal 3 varies between embodiments, but is preferably based on known access control system technology. The application of access control
10 technology to timesheet applications is significant in the context of system 1. Whilst the present embodiments makes use of swipe cards, other embodiments use proximity readers, biometrics devices and other inputs either in conjunction, singly or separately.

Video capture system 7 includes a digital video camera 15 coupled to a digital video recorder 16. Camera 15 is located proximate terminal 3 and directed to increase the
15 chance of capturing footage of the face of employee 4. In embodiments system 7 includes a plurality of cameras to further increase this chance.

Camera 15 continually records sequential image frames 9, which are time-stamped and stored at least temporarily by recorder 16 on digital media such as a hard drive or DVD. In the present embodiment camera 15 records continuously, however in some
20 embodiments camera 15 operates intermittently in response to a motion detection based actuator. In other embodiments the camera records continuously and recorded footage is stored temporarily, and those portions of footage included in a defined clip 11 are designated to be stored on a more permanent basis. In this way, storage resources are generally reserved for those portions of digital video information that are relevant to the
25 operation of system 1. The rationale for such approaches is to record and store video only at times when a person, such as employee 4, approaches, uses and or leaves terminal 3. In an extreme case, a single digital still image defines clip 11.

In the present embodiment, clip 11 is defined to include a predetermined number of frames both prior to and following frame 12, typically equating to a video clip of between
30 two and five seconds in total duration. The precise number of frames will relate to video capture settings that are implemented. In this regard, it is in some cases preferable to record video at less than the typical rates of twenty-five or thirty frames per second to

reduce video storage requirements. For example, in some embodiments feed 8 is recorded at about ten frames per second, cutting the per-second memory storage requirements by about a third. Often the frame rate for feed 8 is selected based on the amount of time it takes for an employee to interact with terminal 3. If interaction is known to take at least five seconds, it may be decided that one or two frames per second is sufficient to effectively guarantee a frame suitable for visual identification. If interaction takes less than a second, then a higher frame rate would be more preferable.

There are a number of options for practically implementing the association between a log entry and a clip 11. Some of these options are provided below.

- For a particular log entry, storing in a file associable with that log entry a video file containing clip 11. The log entry and video file are optionally stored on different computational platforms.
- Defining clip 11 by inserting flags into video 8. When clip 11 is to be retrieved, a video retrieval component is responsive to these flags for obtaining the image frames 9 for clip 11.
- In the first instance defining clip 11 by flags, and periodically using these flags to extract video files frames from video 8 for a plurality of log entries. These video files are exported to a remote storage location where they are accessible through PC 13.

As foreshadowed, terminal 3, in combination with processor 5, allows a log to be derived from user interaction, each successful user interaction with terminal 3 resulting in the creation of a log entry. A service made up of software functions runs on processors 5 and 10, this service being typically maintained in the background of a Microsoft or other operating system. The service provides, as an inherent functionality, a router for directly delivering log entries to a database 6. This database is in some cases maintained locally, and in other cases maintained remotely of workplace 2. Log entries in database 6 are used to generate a timesheet indicative of employee attendance at workplace 2. In some cases several workplaces share a single database, and the generated timesheet reflects this.

This timesheet generated by log entries in database 6 is preferably viewable on PC 13 as an editable columnar display of time & attendance details for each employee. An example of such a timesheet is provided in Figure 2. Such a graphical display may represent segmentation of time in respect to a single person or a group or to single or

multiple time clip types that may constitute a subset of a full time sheet. A columnar time sheet entry is defined by a commencement time and a completion time. This reflects a period of time worked by an employee, a 24 hour time clip or any clip required for the purpose on hand. Within this entry are differentiated portions showing periods of varied activity, such as rest breaks. It will be recognised that such a columnar approach presents a significant advance from traditional tabular formats, which nevertheless are used in some embodiments.

In an exemplary circumstance, an administrator accesses a timesheet, selects a suitable command such as “display video clip” and from there system 1 obtains and displays one or more concurrent video clips synchronised precisely with the time sheet.

It will be recognised that system 1 acts to discourage identity theft by recording images of employees claiming a particular identity in the process of creating a timesheet log entry via terminal 3. It is anticipated that employees will regard such an approach as inherently less invasive as compared to some known biometric security techniques.

It will be appreciated that processors as defined may be constituted as a single composite processor such as a central server or as separate and discrete processing units and in the latter case, the discrete processing units may be substantially co-located, or disposed at different locations. Preferably, one or more of these processors, or additional processors if required, are used to implement one or more of the various additional steps provided by system 1. Furthermore, in embodiments, all or any combination of functionalities provided by components of system 1 are instead performed by multi-purpose integrated circuits or implemented in software executed on a microprocessor. Particularly in such cases, aspects of system 1 are additionally embodied in a computer program or in a computer program in a data signal or stored on a data carrier.

A similar embodiment to that of Figure 1 is provided in Figure 5, where like reference numerals have been used to identify like features. In the embodiment of Figure 5 video capture system 7 includes two digital video cameras: a motion-sensing camera and a swipe camera. These are, in the present embodiment, geographically located with respect to terminal 3 in the manner shown in the plan view of Figure 5.

In some embodiments, two video cameras constitute the minimum requirement for the purpose of obtaining video footage. More cameras may, however be used to supplement and strengthen the system as required. By way of example only, a third camera

may be installed at the entry of a place of employment to record the comings and goings of employees so as to serve as a backup to a time and attendance system based around an access control terminal.

In this instance, both cameras capture video continuously – typically 24 hours per day and seven days per week. However, video clips 11 pertaining to time and attendance are only stored (as opposed to being recorded) in response to an input – known as a “trigger” in this instance. A trigger is provided by a trigger mechanism, and two distinct trigger mechanisms are used. These are a relay that is opened as a result of a user interaction with terminal 3, and a motion based actuator coupled to the motion-sensing camera. The former provides triggers for the swipe camera, the latter for the motion-sensing camera. A trigger inserts a “flag” in a digital video recorder 16 so as to initiate the storing of a video clip 11.

In relation to the swipe camera, a clip 11 is defined as a result of a successful registration by an employee via access control terminal 3. The use of terminal 3 creates a trigger that results in a clip 11 being defined and associated with a log entry in a similar manner to that described by reference to the example of Figure 1. Specifically, the digital video recorder responds to a swipe-initiated trigger by placing a flag in the video data file of the swipe camera so as to generate a “pre-roll,” which is a video clip of events preceding the trigger. This is typically of five to ten seconds in duration, providing a useful and dynamic view of the employee approaching and swiping the reader, thereby enabling identification. In an ideal implementation, the length of the pre-roll is varied by an administrator, with the object of minimising file size whilst obtaining an adequate level of footage for the purposes of identification. In addition, the video clip generated by this trigger displays a short “post-roll, that is a dynamic image of the employee for a short period of time following the swipe trigger, typically of five seconds duration. The pre-roll and post-roll are continuous and seamless, constituting a single and complete video clip including frame 12.

In relation to the motion-sensing camera, detection of movement within the camera’s field of view triggers the instantaneous storing of a video clip, which typically identifies a person. A video clip captured from the motion-sensing camera is associated with a log entry resulting from user interaction at a corresponding time. As a result, for a given log entry there are two associated video clips: one from the swipe camera, triggered

by use of terminal 3, and another from the motion sensing camera, triggered by an employee physically approaching and leaving terminal 3.

In this embodiment, footage from the motion-sensing camera is stored as a clip in response to movement within the field of view of the motion-sensing camera regardless of whether or not a terminal 3 is used at or around that time. For example, a clip is stored when an employee walks past terminal 3. Likewise, a clip is stored when an employee unsuccessfully attempts to use terminal 3. This has the advantage of determining whether or not an interaction with terminal 3 was “successful,” but more importantly, determining whether or not a person claiming attendance has even attempted to use terminal 3. In instances where an employee claims attendance at a particular time, it is possible to view any activity around terminal 3 at or around that time, and in doing so provide evidence suggesting whether or not the employee was in attendance. Additional evidence is conveniently gained from reviewing video clips from the motion-sensing camera at times before and after the claimed time of attendance. In some embodiments this approach is supplemented with additional motion-sensing cameras at entrances and other locations around a workplace.

Figure 6 illustrates an exemplary method according to an embodiment of the present invention. This method is based around the example of Figure 5. In this method, an employee swipes a proximity reader at step 1, and as a result clips are defined based on footage obtained by a swipe camera and a motion sensing camera. At step 2 swipe times are held in a first log. At step 3 synchronised video clips from the two cameras are held in a digital video recorder. At step 4 the swipe times and clips are polled by a TCP/IP server. At step 5 the swipe times are processed to allow the generation of a video timesheet. At step 6 this timesheet is used to process payroll for employees identified in the timesheet based on periods they have respectively worked. At step 7 post-processing of employee payroll is undertaken, typically leveraging existing business accounting software. At step 8 stored video clips created on or before a predestined past date are archived to DVD or other storage medium. The rationale is that these clips are unlikely to be viewed regularly given that they relate to a past payroll period, and it is inefficient to maintain them on a local server where storage resources are in demand.

In some embodiments triggers and/or the generation of log entries are used to initiate additional functionalities. For example, in response to a particular employee using

an access control terminal such as terminal 3, an electronic message is defined and provided to one or more pre-identified recipients. For example, a manager carries a pager, and that pager is provided with a message indicating that a particular employee has arrived for work. In other instances messages are provided by way of cellular networks (for example using SMS), and in further instances by email or other wireless communications. In a particularly preferred embodiment some of the pre-defined recipients have remote communications devices capable of receiving and displaying video clips. Typically such remote communications devices receive the video files via the internet, however it will be appreciated that non-internet related communication means may also be used. Portable laptop computers and personal digital assistants that are connectable to the internet provide suitable communications devices. Yet other examples are the so-called "3G", "4G" or "Next G" mobile phones capable of receiving and displaying image files via high speed downlink packet access across a cellular network. With such embodiments it is possible not only to provide an electronic message to one or more pre-defined recipients, as described above, but it is further possible to use the communications devices to receive and display one or more video clips that are associated with the log event or trigger that initiated the message. By way of example, consider an embodiment that has been configured so as to provide an administrator with an electronic message each time a specified employee, say "John Smith" generates a log entry. In this example, once John Smith makes a log entry, an SMS message is generated in real time and sent to the administrator's 3G mobile phone. The SMS reads, for example: "John Smith clocked on at Terminal 3 at 8:35am. Do you wish to view the associated video clip(s)?" If the administrator wishes to view the video clip(s), the administrator makes a suitable input to the communications device, for example by using an internet browser accessed on a personal mobile telephone to access a "bookmarked" or "favourite" website from which the data can be rapidly accessed, which consequently displays the associated video clip(s) on its screen utilising known downloading and/or streaming techniques. Yet another embodiment dispenses with the notification and/or input steps and instead proceeds to immediately and automatically display the video clip(s) once the necessary log event or trigger has occurred.

It will be appreciated that in cases where TCP/IP is used for accessing logged events, software-based monitoring utilities are conveniently used to define and provide messages in response to predefined conditions being met.

In another context, this messaging functionality is used in a childcare environment. Specifically, a system along the lines of system 1 is implemented in a childcare facility. Persons registering at this facility to drop off or collect children first register at an access control terminal. In a preferred embodiment when a nominated carer arrives at the facility to pick up a certain child, a message is provided to that child's parents or another nominated carer informing them of that fact. The functionality of this system 1 may be further improved by communicating with at least some of the parents and/or nominated carers via remote communications devices capable of receiving and displaying video clips. This provides the parents and/or nominated carers with the option to access attendance data and/or to view the video clips associated with the arrival or departure of their child from the childcare centre. It will be appreciated that viewing such video footage may be particularly advantageous for some parents and/or nominated carers, for example to check on the psychological state of the child, or to double check that the child is only picked up by authorised persons.

A further embodiment is discussed below. In overview, this embodiment relates to a workplace where a system similar to system 1 operates in relation to not only a T&A terminal, but also to several access points throughout the workplace. The workplace in question is shown in Figure 3.

In this example, registration with a variety of devices, including magnetic swipe card readers, proximity readers, finger scanners and others triggers a relay in the access controller which inserts a flag into the video capture process of a digital video recorder (DVR). This generates a short video clip of the logged event.

Clips obtained from the cameras are logged by the surveillance system. These time stamped files are periodically polled by a Windows service and stored in a secondary log file within the service. They are then distributed to a database either local or remote, by a software router within the service designed for the purpose. Access to the video clip enables an administrator in many cases, if not all, to confirm the identity of the person so as to reasonably confirm (if not specifically validate) the identity of that person.

Forwarding of the video files may be manual or automated and may be executed by a variety of means known to those familiar with the art, including the use of TCP/IP protocols, local area file management and others, by way of example, into an employee's time sheet, such that a video clip record of each log entry can be appended to and accessed from the employee's video time sheet (VTS) with the date and time stamp synchronised.

One valuable aspect of the present system is the ability to route time and attendance and video files to disparate data bases in which separate time and attendance records are maintained. This has particular application to roving employees, where the data is not of necessity retained locally at any site but optimally forwarded to a common, remote database for processing.

In accessing these video time sheets (VTS), the administrator may do so through the selection of a time sheet entry in the Time Sheet editor or in a beneficial way using a graphic display in the manner of a bar code. Time sheets or clips of differing type may be accessed and displayed in an identical manner. Such a display may replace the conventional display of traditional time sheet records

An employee aware of his or her registration for time and attendance being recorded as a video clip by two or more strategically placed cameras is less likely to assume another employee's identity for the purpose of defrauding the employer. The preferred embodiment is an alternative to invasive and unpopular contact-based biometrics. The preferred embodiment is designed for implementation as a touch-free, robust method of deterrence against identity theft, on the premise that prevention is less expensive than cure. The hardware of this preferred embodiment can be configured to provide additional functions including access control and property surveillance. For example, the video system acts as a valuable backup to the T&A System, such that employees failing to log or off can have their times back-entered. The access control system operates independently of the T&A host, supported by a battery backup. When the host computer or network are "down", registration continues. Artificial intelligence is available to increase the potential data that may be extracted from the video clips, for example with the use of facial recognition software.

To consider this example from an administrator standpoint, consider a hypothetical administrator Belinda Armstrong. Belinda is the administrator of Ocean Beach Pharmacy. She uses system 1 to maintain accuracy in her employees' time and attendance records,

payroll calculations and the Site Log. This preferred embodiment may be implemented so as to provide a number of alerts, such as an Attendance Alert, Breaks Alert, Shift End Alert, and Site Log Alert. These are discussed below:

- Actioning an Attendance Alert:

- A quick visual check or a phone call to the employee's supervisor will determine (in most cases) whether or not the employee is present.
- If the employee is present, he or she has either forgotten to clock on or has attempted to do so unsuccessfully.
- Knowing the employee's roster, Belinda knows exactly when the employee should have arrived.
- She views the video log and selects camera #T&A2.
- It typically takes only a few seconds to confirm the identity of the employee and to note the log time of the video clip.
- She "actions" the employee's time sheet by entering the start time as defined by the VTS.
- She then makes a note in the time sheet detailing the event.
- If the employee is not present, the record can be amended.
- This may be as a sick leave entry for example.

- Actioning a Breaks Alert:

- A quick visual check or a phone call to the employee's supervisor may determine the status of the employee's break.
- If this fails, Belinda views the video log and selects Break camera #B2.
- It typically takes only a few seconds to confirm the status of the employee and to note the log times of the video clips.
- This done, she returns to the Alerts window and to the "action" option.
- She "actions" the employee's time sheet by entering the break times as defined either by the supervisor or the VTS.
- She then makes a note in the time sheet detailing the event.

- Actioning a Shift End Alert:

- A quick visual check or a phone call to the employee's supervisor may determine the end time of the employee's shift.

- If this fails, Belinda views the video log and selects camera #T&A2 and/or Site Log camera #SL2.
- This done, she returns to the Alerts window and to the “action” option.
- She “actions” the employee’s time sheet by entering the end time as defined either by the supervisor or the VTS.
- She then makes a note in the time sheet detailing the event.
- Actioning a Site Log Alert:
 - Employees clocking on to their shift but not first registering their attendance in the site Log have their shift start times automatically duplicated as their first site log entry for that day. A Site Log Alert is generated for the Administrator’s attention and action.
 - Employees clocking off their shift but not registering their exit in the Site Log will also generate an Alert.

The administrator actions the employee’s Site Log after referring to camera SL#2. To continue the example from an employee perspective, consider a hypothetical employee called Jane. Jane arrives at work bearing an ID means for interfacing with terminal 3, typically in the form of a personal proximity card or key fob. In other cases a finger scanner or other biometric device is used on terminal 3. Upon arrival at work, whether rostered on or not, she swipes or fingers the Site Log Reader at the entrance.

- Jane arrives at work:
 - The swipe or finger scan is acknowledged by a beep and a green light.
 - The swipe is recorded as her log-in entry in the Site Log.
 - The entry translates into an “On Site” status in the Site Log report.
 - The linked video camera #SL1 records her swipe in a short video clip.
 - A second video clip is captured by a targeted motion sensing camera #SL2.
 - A negative clip from #SL2 indicates that she has failed to arrive.
 - Alternatively, a positive clip from #SL2 proves that she has arrived.
- Jane clocks on:
 - She then proceeds to the staff area where she swipes or fingers the T&A Reader.
 - She uses the same card or key fob.

- The swipe or finger scan is acknowledged by a beep and a green light.
- The swipe is recorded as the first entry in her Time and Attendance record.
- The linked video camera #T&A1 records her swipe in a short video clip.
- 5 ➤ A second video clip is captured by a targeted motion sensing camera #T&A2.
- A negative clip from #T&A2 indicates that she did not attempt to clock on.
- Alternately a positive clip from #T&A2 proves that she did attempt to
10 clock on.
- Jane takes a break
 - Jane swipes or fingers the Break Reader at the beginning and end of each break.
 - She uses the same card or key fob.
 - 15 ➤ The swipes or finger scans are acknowledged by a beep and a green light.
 - The swipes are recorded as break entries in her Time and Attendance record.
 - The linked video camera #B1 records her swipes in a pair of short video
20 clips.
 - Additional video clip are captured by a targeted motion sensing camera #B2.
 - A negative clip from #B2 indicates that she did not attempt to clock on or off for her break.
 - 25 ➤ Alternately a positive clip from #B2 proves that she attempted to clock on or off for her break.
- Jane clocks off
 - Jane proceeds to the staff area where she swipes or fingers the T&A Reader.
 - 30 ➤ The swipe or finger scan is recorded as the last entry in her time and attendance record.
 - She uses the same card or key fob.

- The swipe is acknowledged by a beep and a green light.
- The linked video camera #T&A1 records her swipe in a short video clip.
- A second video clip is captured by a targeted motion sensing camera #T&A2.
- 5 ➤ A negative motion sensor clip from #T&A2 indicates that she failed to clock off.
- Alternatively, a positive motion sensor clip from #T&A2 proves that she attempted to clock off.
- Jane leaves work
- 10 ➤ Whether rostered on or not, Jane swipes or fingers the Site Log Reader at the exit.
- The swipe or finger scan is recorded as her log-out entry in the Site Log.
- She uses the same card or key fob.
- The swipe is acknowledged by a beep and a green light.
- 15 ➤ The linked video camera #SL1 records her swipe in a short video clip.
- The data translates into an “Off Site” status in the Site Log report.
- A second clip is captured by a targeted motion sensing camera #SL2.
- A negative clip from #SL2 indicates that she remains on the premises.
- Alternatively, a positive clip from #SL2 proves that she has left the
- 20 premises.

Figure 4 illustrates a further embodiment of the invention. In this embodiment an employee 40 interacts with a terminal 41, which forms part of a T&A system along the lines of system 1 above. In this embodiment two cameras are used in combination, so as to generate synchronous images associated with each log entry generated.

25 The first of these cameras, camera 45, is positioned relative to terminal 41 for capturing footage of an employee’s face as that employee approaches or uses that terminal, and optionally the employee’s height, clothing, gait and/or behaviour. The second camera, camera 46, is positioned relative to terminal 41 for capturing footage showing an employee using terminal 41 with additional regional context of the surrounding environment. In
30 combination, footage from cameras 41 and 45 provides a relatively comprehensive body of evidence to suggest that a particular employee used terminal 41 at a particular time. That

is, there is evidence for identifying the employee and evidence indicating the location of that employee.

An advantage of using motion-responsive cameras is a saving in video storage resources. Footage from a motion-responsive camera is stored only at times when the camera has been actuated by motion in the sensing zone of that camera, which
5 substantially matches the camera's field of view. Typically recording initiates upon the sensing of movement within the camera's sensing zone, and in response to the passing of a predefined period during which movement is not sensed – typically five to ten seconds.

Value is gained not only from the generation of clips showing employees using terminal 41. Value is gained also from the absence of a clip at a particular time. This
10 supports a contention that an employee was not in the vicinity of terminal 41 at that time, a contention an employee might wish to dispute.

The present patent specification hereby incorporates by way of reference the entire disclosures of co-pending Australian provisional patent application nos. 2006901475,
15 2006903465 and 2006905789.

It will be recognised that the preferred embodiment provides a synergistic combination of three previously unassimilated technologies: access control systems, timesheet/payroll, and video surveillance. The preferred embodiment merges these technologies to provide an advantageous solution for timesheet management, particularly
20 from an identity theft dissuasion perspective.

Although the invention has been described with reference to a specific example, it will be appreciated by those skilled in the art that the invention may be embodied in many other forms.

THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:

1. An identification system including:
 - an access control terminal for receiving identification information from a user, the receipt of said information defining an information receipt time;
 - 5 a first processor responsive to the terminal for defining event data indicative of the identification information and the information receipt time;
 - a capture system for capturing image data to facilitate visual identification of the user, wherein the image data is defined by one or more time-stamped image frames;
 - a second processor responsive to the receipt time for identifying a portion of the
 - 10 image data and associating this identified portion of image data with the event data, the identified portion of image data including an image frame that is time stamped with a time corresponding to the information receipt time; and
 - an interface responsive to a query for the event data for obtaining the associated portion of image data.
- 15 2. A system according to claim 1 wherein the capture system is a video capture system.
3. A system according to claim 2 wherein the image data is a video feed defined by a plurality of sequential time-stamped image frames.
4. A system according to claim 3 wherein the identified portion of image data is a video clip defined by a time-limited portion of the video feed.
- 20 5. A system according to claim 2 wherein the video capture system includes one or more cameras located proximate the terminal.
6. A system according to claim 5 wherein at least one of the cameras is motion activated.
7. A system according to claim 1 wherein the first processor uses a first clock for determining the information receipt time and the capture system uses a second clock for
- 25 time stamping the frames, the first and second clocks being substantially synchronised.

8. A system according to claim 1 including a clock having an output accessible by the first processor for determining the information receipt time, this output being further accessible by the capture system for time stamping the image frames.
9. A system according to claim 1 wherein the event data is recorded in an event log.
- 5 10. A system according to claim 9 wherein the user is an employee and the event log maintains data indicative of employee attendance.
11. A system according to claim 10 wherein the user provides the identification information to the terminal to commence or terminate an employee attendance period.
12. A system according to claim 10 wherein the event log is graphically viewable as a
10 columnar display of time and attendance records for one or more employees.
13. A system according to claim 1 including a first and second router for respectively providing the event data and data indicative of the identified portion of image data to one or more servers.
14. A system according to claim 13 wherein the event data is provided to a first server and
15 the identified portion of the image data is provided to a second server.
15. A system according to claim 14 wherein the first server is located remotely of the second server.
16. A system according to claim 5 wherein the one or more cameras include a first camera for which image data is stored in response to a signal initiated by the terminal and a second
20 camera for which image data is stored in response to a signal initiated by a motion-sensing device coupled to the second camera.
17. A system according to claim 1 including a processor responsive to the event data for selectively communicating a message on the basis of a predefined protocol.

18. A system according to claim 17 further including at least one remote communications device capable of receiving and displaying a portion of said image data.

19. A method for allowing the verification of a user's identity, the method including the steps of:

5 receiving identification information from the user, the receipt of said information defining an information receipt time;

being responsive to the receipt of said identification information for defining event data indicative of the identification information and the information receipt time;

10 capturing image data to facilitate visual identification of the user, wherein the image data is defined by one or more time-stamped image frames;

being responsive to the receipt time for identifying a portion of the image data and associating this identified portion of image data with the event data, the identified portion of image data including an image frame that is time stamped with a time corresponding to the information receipt time; and

15 an interface responsive to a query for the event data for obtaining the associated portion of image data such that identification information is able to be reconciled with the portion of image data thereby to allow verification of the user's identity.

20. Computer-readable medium containing computer-executable code for instructing a computer to perform the method of claim 19.

20 21. A timing and attendance system for monitoring and managing attendance of employees at a workplace, the system including:

a terminal for receiving identification information from an employee, the receipt of said information defining an information receipt time;

25 a first processor responsive to the terminal for defining event data indicative of the identification information and the information receipt time;

a capture system for capturing image data to facilitate visual identification of the employee, wherein the image data is defined by one or more time-stamped image frames;

a second processor responsive to the receipt time for identifying a portion of the image data and associating this identified portion of image data with the event data, the

identified portion of image data including an image frame that is time stamped with a time corresponding to the information receipt time; and

an interface responsive to a query for the event data for obtaining the associated portion of image data.

5 22. Computer-readable medium containing computer-executable code for instructing a computer to:

in response to receiving identification information from a user at an information receipt time, define event data indicative of the identification information and the information receipt time;

10 in response to the information receipt time, in a digital video capture system for capturing identification video to facilitate visual identification of the user, associating with the event data a video clip, wherein the identification video is defined by a plurality of sequentially time-stamped frames and the video clip includes a frame that is time stamped with a time corresponding to the information receipt time; and

15 in response to a query for the event data, obtaining the associated video clip.

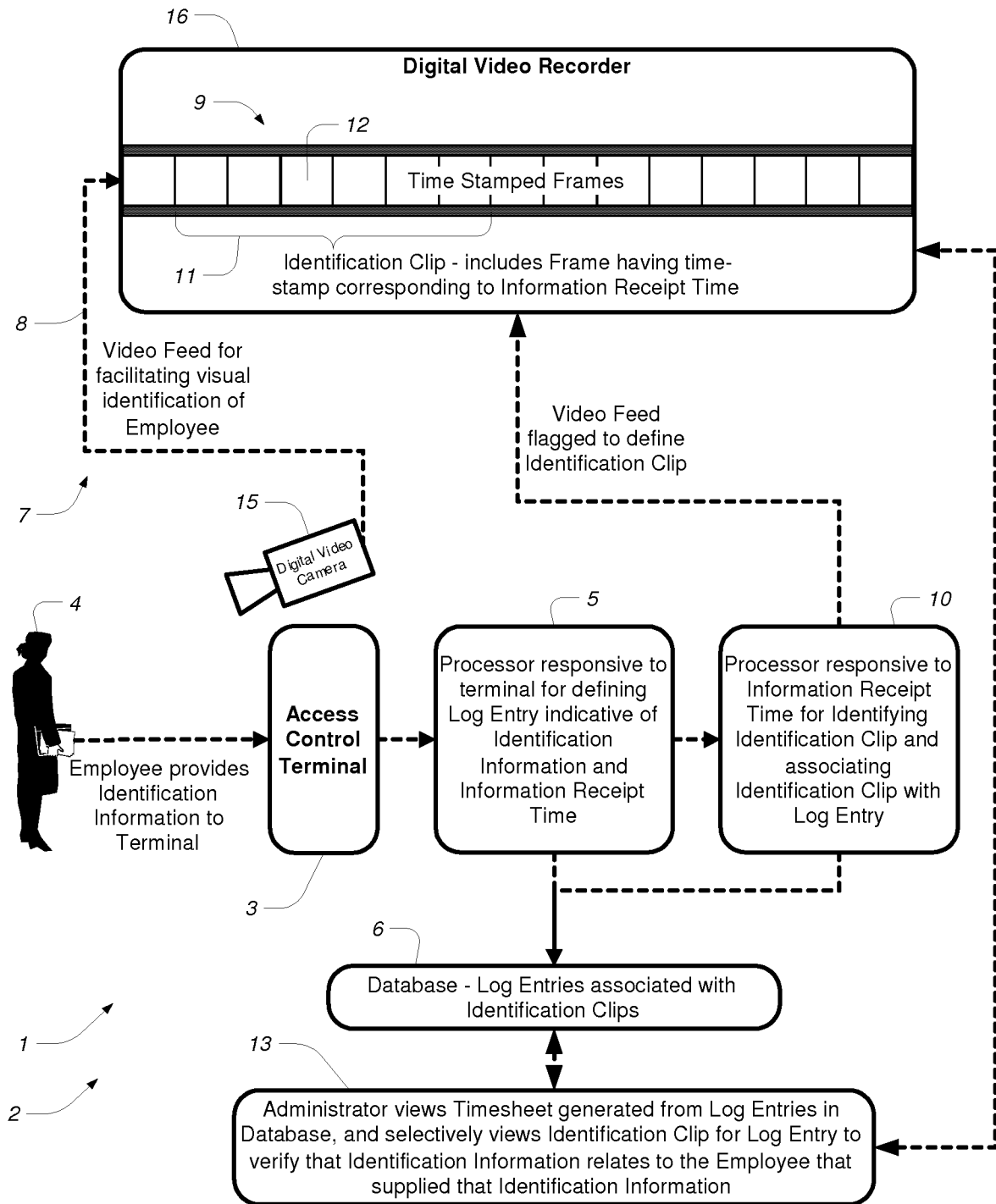


Figure 1

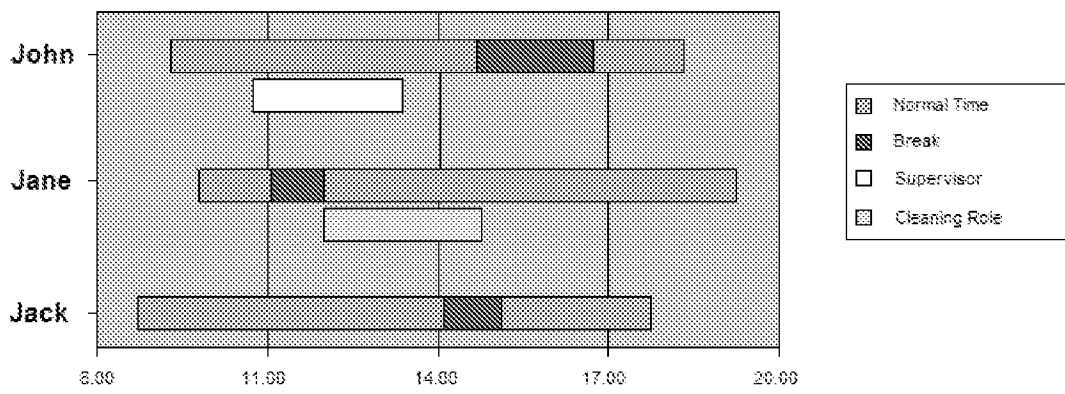


Figure 2

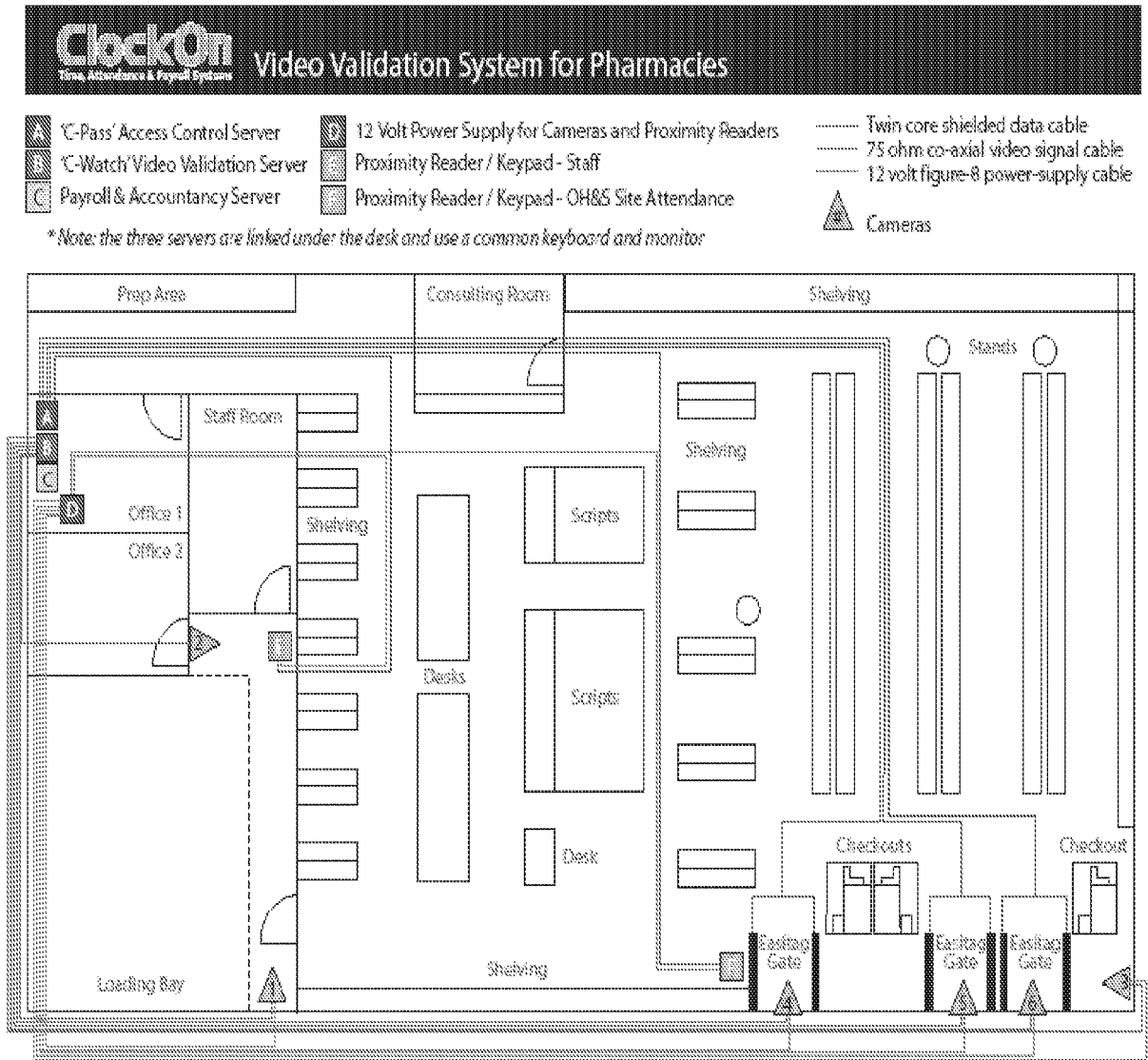


Figure 3

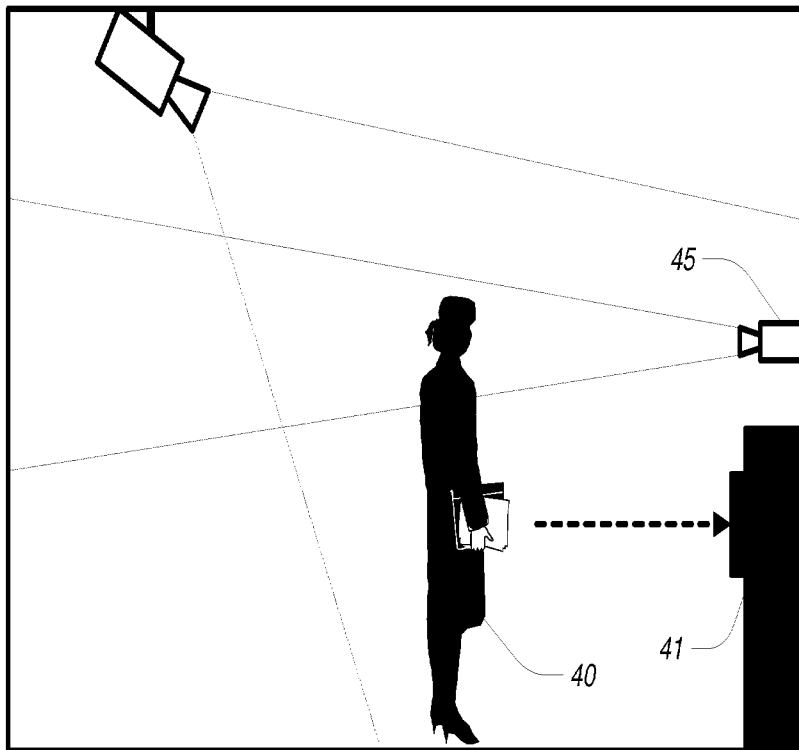


Figure 4

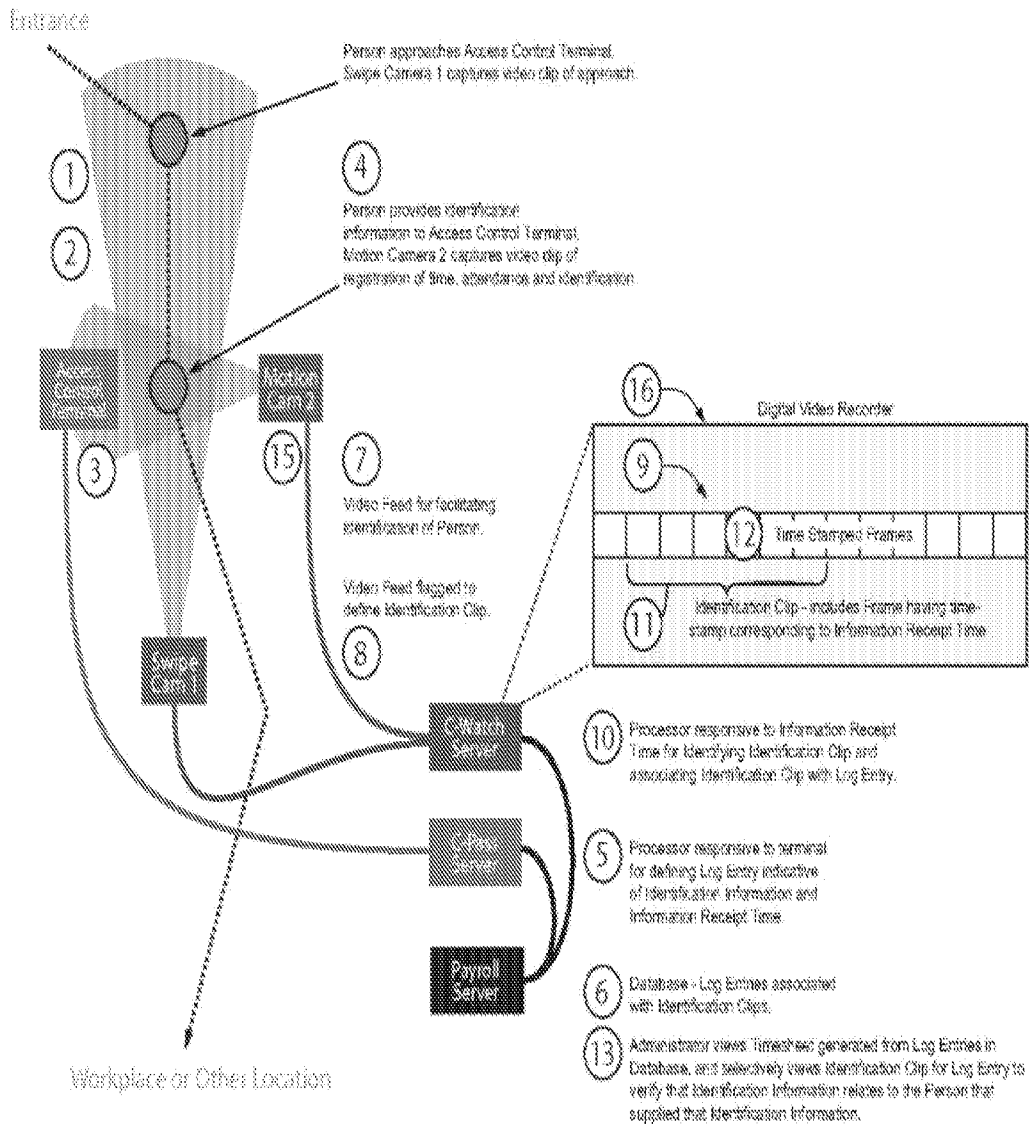


Figure 5

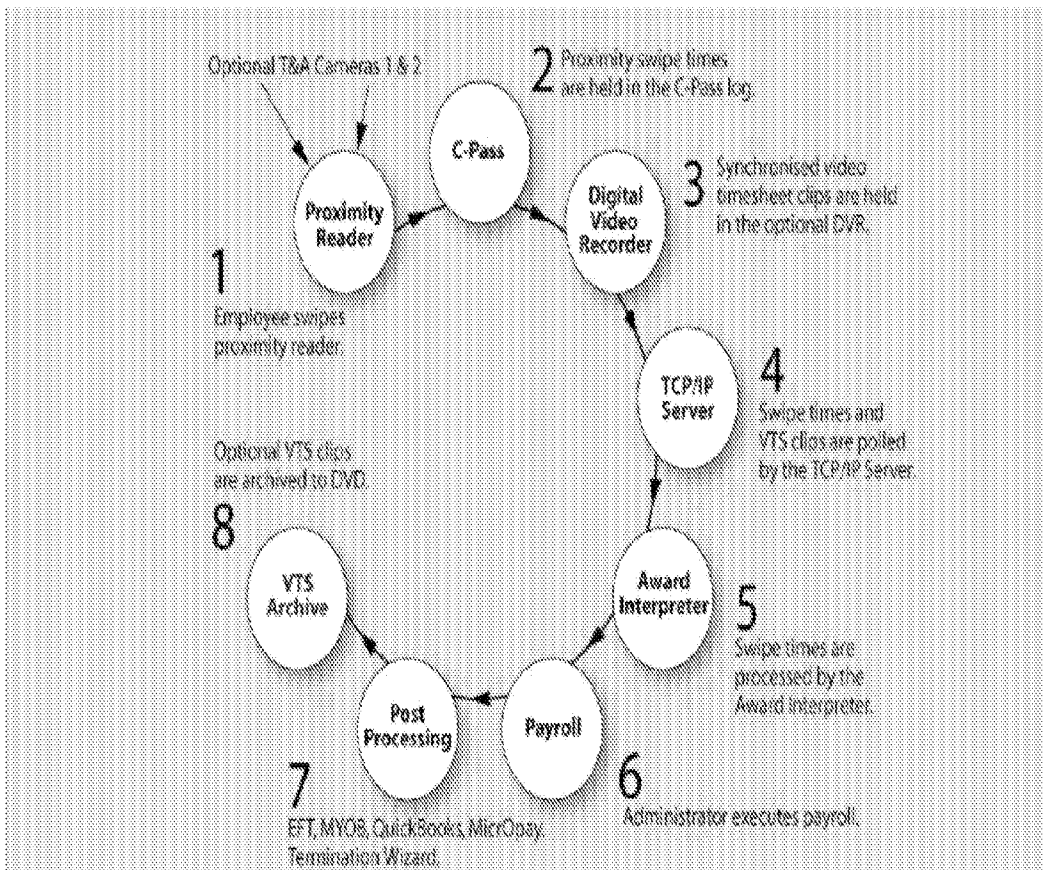


Figure 6

INTERNATIONAL SEARCH REPORT

International application No.

PCT/AU2007/000354

A. CLASSIFICATION OF SUBJECT MATTER
 IPC8Int. Cl.
G06K 5/00 (2006.01):
 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)
 IPC8: G06K

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 practicable, search terms used)
 DWPI & USPTO: attendance, timesheet, record+, query, clock, time, stamp, retriev+, camera, video, activate+, sens+, detect+, trigger, verify+, access, control

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 5550359 (BENNETT), 27 August 1996 Column 3 lines 57 to 63; column 5 lines 12 to 17; column 7, lines 45 to 48; column 8, lines 46 to 48, lines 54 to 58; Figures 1, 2, 5	1-6, 9-11, 13, 16, 19-22
Y	US 5635981 (RIBACOFF), 3 June 1997 Column 3, lines 20 to 27, line.53; Figure 9; column 4, lines 34-49; column 5, lines 5-10; Figure 12	1, 3, 6, 16, 18-22
Y	US 4323771 (CHALKER, JR. ET AL), 6 April 1982 Column 2, lines 45 to 50; column 5, lines 19 to 34; column 6, lines 58 to 59; column 7, lines 60 to 66	1, 10, 11, 19-22
Y	US 4839640 (OZER ET AL), 13 June 1989 Column 15, line 54 to column 16, line 51; column 23, line 59 to column 24, line 63; column 54, lines 15 to 21	17

Further documents are listed in the continuation of Box C See patent family annex

* Special categories of cited documents:	"T"	later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"A" document defining the general state of the-art which is not considered to be of particular relevance	"X"	document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"E" earlier application or patent but published on or after the international filing date	"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
"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)	"&"	document member of the same patent family
"O" document referring to an oral disclosure, use, exhibition or other means		
"P" document published prior to the international filing date but later than the priority date claimed		

Date of the actual completion of the international search 01 June 2007	Date of mailing of the international search report 07 JUN 2007
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Name and mailing address of the ISA/AU AUSTRALIAN PATENT OFFICE PO BOX 200, WODEN ACT 2606, AUSTRALIA E-mail address: pct@ipaaustralia.gov.au Facsimile No. 61-2-6285-3929	Authorized officer Benjamin Lam AUSTRALIAN PATENT OFFICE (ISO 9001 Quality Certified Service) Telephone No : 61-2-6225-6121
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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/AU2007/000354

This Annex lists the known "A" publication level patent family members relating to the patent documents cited in the above-mentioned international search report. The Australian Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

Patent Document Cited in Search Report	Patent Family Member
US 5550359	NONE
US 5635981	NONE
US 4323771	NONE
US 4839640	NONE

Due to data integration issues this family listing may not include 10 digit Australian applications filed since May 2001.

END OF ANNEX