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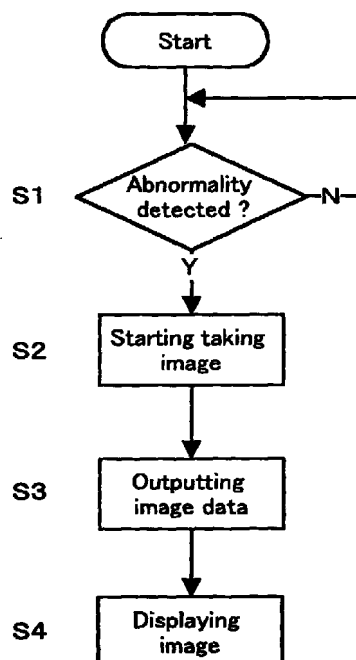
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(54) **Automatic transaction apparatus**

(57) When an automatic transaction apparatus detects an abnormality (S1), an image obtained (S2) at the time the abnormality occurred is displayed (S4) on a screen 2 of the automatic transaction apparatus. Thus, since a security guard who arrives immediately after the abnormality occurred can view the displayed image and obtain information, such as the appearance of the face and the clothing worn by a criminal, which can assist in the identification of a perpetrator, the probability that the criminal will be found can be increased. As a result, since a crime prevention function of the automatic transaction apparatus has been enhanced, an increase in the occurrence of such crimes can be prevented.

FIG. 3



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Description

[0001] The present invention relates to an automatic transaction apparatus, such as an automated-teller machine (ATM) used for various transactions, and in particular to prevention of crime related to such apparatus.

[0002] Automatic transaction apparatuses, such as automated-teller machines, which are used for the performance of a variety of transactions, tend to be susceptible to burglary because of the cash that is stored in them. Recently, as the number of units provided for public use has increased, the locations in which these automatic transaction apparatuses are set up are not limited to areas in financial facilities; they are also being installed in shopping areas, such as convenience stores, where they are not only available for cash withdrawals, but may also be used to perform such functions as the sale of tickets for various events or the vending of computer game software. In any event, since in shops such as convenience stores automatic transaction apparatuses are placed in locations where people have ready access to them at all times, it is anticipated there will be an increase in the occurrence of crimes involving these machines.

[0003] For crime prevention, conventionally incorporated in an automatic transaction apparatus is a camera which is used to record activities occurring in the vicinity of the apparatus. The camera is set up so that its field of view is centered on an area immediately to the front of the operating screen of the automatic transaction apparatus. Thus, during a transaction the camera can obtain, for direct monitoring by a supervisor, a view of the area, including a user image or images, which is recorded on a recording medium, such as video tape, and stored for future reference. Thus, when it is determined that a user of the apparatus has performed an illegal act, or when a crime, such as a burglary, has occurred, the recorded image can be employed to substantiate the circumstances concerning the crime.

[0004] Although the above described crime prevention function is provided for an automatic transaction apparatus, substantiating, on-the-scene evidence of the circumstances existing during the commission of a crime is not readily available, and can not therefore be referred to immediately after a criminal act has taken place. If just after a crime was committed a person or persons in the vicinity of a burglarized automatic transaction apparatus, or a policeman or a security guard who responded to an alarm signal, could obtain a view of the scene at the time of the commission of the crime, the probability that the criminal would be found in the immediate vicinity would be increased. In other words, enhancement of the crime prevention function of an automatic transaction apparatus is possible.

[0005] It is a consideration of the present invention to provide an automatic transaction apparatus having an enhanced crime prevention function.

[0006] In an embodiment of the present invention, when an automatic transaction apparatus detects an abnormality, an image obtained at the time the abnormality occurred is displayed on the screen of the automatic transaction apparatus. Thus, since a security guard who arrives immediately after the abnormality occurred can view the displayed image and obtain information, such as the appearance of the face and the clothing worn by a criminal, which can assist in the identification of a perpetrator, the probability that the criminal will be found can be increased. As a result, since the crime prevention function has been enhanced, an increase of the occurrence of such crimes can be prevented.

[0007] According to one aspect of the present invention there is provided an automatic transaction apparatus for performing a transaction with a client automatically with displaying transaction information on a screen, comprising:

- a detector for detecting an occurrence of abnormality;
- a first camera device for taking at least one frame of an image at the time of the abnormality; and
- a display controller for displaying the image taken at the time of the abnormality on the screen when or after the abnormality is detected by said detector.

[0008] With this arrangement, when an abnormality at the automatic transaction apparatus is detected, the image obtained at the time the abnormality occurred can be displayed on the screen of the automatic transaction apparatus.

[0009] Other aspects of the invention provide an automatic transaction apparatus according to claim 8, and a method according to claim 9.

[0010] A detailed description of one embodiment of the present invention will now be given, by way of example, with reference to the accompanying drawings, in which:

- Fig. 1 is a perspective view of the external appearance of an automatic transaction apparatus according to one embodiment of the present invention;
- Fig. 2 is a block diagram showing the arrangement of the automatic transaction apparatus according to the embodiment of the present invention; and
- Fig. 3 is a flowchart showing the crime prevention processing according to the embodiment of the present invention.

[0011] Fig. 1 is a perspective view of the external appearance of an automatic transaction apparatus according to one embodiment, in which an automated-teller machine is described, of the present invention. Various transaction information items are displayed on a screen 2 installed in a main body 1 of the automatic transaction apparatus (an automated-teller machine). A

touch panel, for example, is provided for the screen 2, and a transaction is processed when a user touches a portion labeled "deposit" or "withdrawal", and transaction information is displayed on the screen 2. A cash card insertion port 4, a bankbook insertion port 5 and a cash delivery port 6, all of which are required for a transaction, are mounted in the main body 1. A loudspeaker 7 is also included which audibly furnishes transaction guide information. In addition, a camera 3, which is provided for crime prevention and which will be described later, is mounted in the main body 1. A switch 12 and another camera 3' will also be described later.

[0012] Fig. 2 is a block diagram showing the arrangement of the automatic transaction apparatus in Fig. 1. An explanation will now be given while referring to Fig. 2 for a case wherein a user employs the automatic transaction apparatus to deposit or to withdraw cash. The transaction processes for cash deposits and cash withdrawals are stored as programs in the memory of a controller 10, and when a CPU in the controller 10 executes a program, information consonant with a selected transaction process is displayed on the screen 2.

[0013] When a user touches an area in which transaction information is displayed on the screen 2, a transaction processor 50 initiates the selected process via the card insertion port 4, the bankbook insertion port 5 and the cash delivery port 6. The transaction processor 50 includes a magnetic stripe reader 51, a cash handler 52, a bankbook updating unit 53, and a receipt issuing unit 54.

[0014] The user then inserts his or her bankbook, or cash card, into the bankbook insertion port 5, or the card insertion port 4, and the magnetic stripe reader 51 reads information, such as the account number of the user, from the magnetic stripe attached to the bankbook, or to the cash card. When making a deposit, the user then inserts the money for the deposit into the cash delivery port 6, and the cash processor 52 counts and obtains a total for the cash that has been received. The controller 10 then transmits all the information, including the account number of the user and the total obtained for the cash, via a communication unit 60 to a host computer (not shown), and performs an internal transaction process. When this process has been completed, the bankbook updating unit 53 records the value of the cash deposit in the bankbook, and returns the bankbook to the user via the bankbook insertion port 5. If the cash card was inserted, the cash card, and an accounting receipt, is returned to the user via the card insertion port 4.

[0015] When making a withdrawal, the user inserts his or her bankbook, or cash card, and enters his or her secret number and the amount to be withdrawn by touching numerals which are displayed on the screen 2. In the same manner as is described above, the controller 10 transmits the account number of the user and the value of cash withdrawal to the host computer, and initi-

ates the cash withdrawal process. The cash processor 52 thereafter obtains the desired cash value from the cash storage unit in the automatic transaction apparatus, and discharges the money to the cash delivery port 6. With the cash, the user receives his or her bankbook, or his or her cash card and an accounting receipt.

[0016] Installed in the automatic transaction apparatus is an abnormality detector 40 for detecting abnormalities. The abnormality detector 40 includes, for example, a door opening sensor 41, a vibration sensor 42 and a heat sensor 43. When the abnormality detector 40 detects the occurrence of an abnormality, the event is reported via the communication unit to the monitoring center. For example, the door opening sensor 41 may detect that a door which is supposed to be opened for the exchange of cash stored in the automatic transaction apparatus, or for maintenance of the apparatus, has been opened by a third party using an abnormal means. If the door is designed to be opened by matching a code number, the door opening sensor 41 detects an abnormality when a code number which differs from the registered number is entered, or if a door is locked with a key, the door opening sensor 41 detects an abnormality when a key which differs from the registered one is inserted. The operation performed by the vibration sensor 42 is initiated when a vibration is detected which is equal to or greater than a predetermined vibration. The operation performed by the heat sensor 43 is initiated when a temperature is detected which is equal to or higher than a predetermined temperature.

[0017] For example, if a burglar tries to forcibly open the door of the automatic transaction apparatus to steal the contents therein, the door opening sensor 41 is activated. When a third party tries to destroy the automatic transaction apparatus, the vibration sensor 42 is activated. When a tool such as a blow torch is employed to open the door, the heat sensor 43 is activated.

[0018] The camera 3, in which is included an image device, such as a CCD (charge-coupled device), is mounted in the main body 1 to obtain an image (images) of the area at the front of the automatic transaction apparatus. The image obtained by the camera 3 is converted into digital image data by an image processor incorporated in the camera 3, and the image data are stored in a storage device 8, such as a magnetic disk (a hard disk drive) or an optical disk (a DVD-RAM or an MO (magneto-optical) disk). The camera 3 may be a video camera for taking video images, or may be an electronic still camera for taking still images.

[0019] In the embodiment, when the abnormality detector 40 detects the occurrence of an abnormality, the image obtained at the time the abnormality occurred is displayed on the screen 2. When a criminal act occurs, the abnormality detector 40 detects it. It is highly probable that the image obtained at the time the abnormality was detected, will include evidence, such as the appearance of a criminal and the clothes the

criminal was wearing. Therefore, when police, security guards or third parties arrive at the crime scene in response to a notification that an abnormality occurred, they can examine the image on the screen 2 and obtain information which will assist them in immediately identifying the criminal. As a result, the criminal who has not left the immediate vicinity of the crime scene can be found in a short period of time.

[0020] In addition by notifying that an image (images) is or will be displayed on the screen 2, which is taken when a suspicious activity is detected by the abnormality detector 40, a great deal of psychological pressure will be applied to a suspect. Thus, even the knowledge that an image of the criminal will be displayed on the screen 2, if he/she attempts a criminal act, should deter the criminal from committing such an act.

[0021] Fig. 3 is a flowchart showing crime prevention processing according to this embodiment of the present invention. At step S1, the abnormality detector 40 detects the occurrence of an abnormality, and at step S2, the camera 3 is activated by the controller 10 and begins taking an image(images). The camera 3 obtains at least one frame of image at the time the abnormality occurred. When the video camera is employed as the camera 3, one frame of image is obtained each sixtieth of a second for a predetermined period of time. When the electronic still camera 3 is employed, images are obtained for a predetermined period of time at a shutter interval that is set in advance. The obtained images are stored as digital image data in the storage device 8.

[0022] At step S3, the controller 1 outputs, to the display controller 20, digital image data for the first frame. The controller 10 may directly output, to the display controller 20, digital image data transmitted from the camera 3, or may output, to the display controller 20, image data read from the storage device 8 wherein digital image data has been temporarily stored.

[0023] At step S4, the display controller 20 converts the digital image data to an analog image signal, and displays the image on the screen 2. The image on the screen 2 is not limited to the first frame, but may be an image of a predetermined frame following the first frame.

[0024] Furthermore, in addition to the image obtained by the camera 3, the time at which the abnormality detector 40 detected the abnormality may also be displayed on the screen 2. Therefore, security guards who arrive after the abnormality has occurred can immediately see how much time has elapsed since the abnormality occurred. Thus, a time function is provided for the controller 10 so that it can obtain time information relative to the detection of the occurrence of the abnormality by the abnormality detector 40, and the time information is added to the digital image data that are output to the display controller 20.

[0025] The cause of the abnormality which has occurred may also be displayed on the screen with the

obtained image. In this case, the controller 10 examines the type of sensor that was activated to determine the cause of the abnormality which occurred and was is detected by the abnormality detector 40, and adds the name of the activated sensor to information contained in the digital image data. When, for example, the door opening sensor 41 was activated, the statement, "door opening sensor" is displayed on the screen 2. As a result, security guards can determine that the illegal act involved the opening of the door.

[0026] As is shown in Fig. 1, the automatic transaction apparatus may include another camera 3' in addition to the camera 3. As is shown in Fig. 1, the position of the camera 3' is different from that of the camera 3. When the abnormality detector 40 detects an abnormality, the camera 3' begins taking an image (images). The image obtained by the camera 3' is also converted into digital image data by an incorporated image processor, and the digital image data is stored in the storage device 8. Digital image data corresponding to the first frame of the image is also output to the display controller 20 by the controller 10, so that the display controller 20 receives image data obtained by both the camera 3 and the camera 3'. The display controller 20 first displays the image obtained by the camera 3 on the screen 2. Further when a switch 12, which is additionally provided for the automatic transaction apparatus (see Figs. 1 and 2) and which is activated only upon the occurrence of the abnormality, is depressed, the image displayed on the screen 2 is switched to the image obtained by the camera 3'. Therefore, security guards can view an image obtained at a different location, and therefore, more information is available to them concerning the existing circumstances at the time of the commission of the crime, and the probability is higher that the criminal will be found.

[0027] The camera 3 may be set to constantly take images. Therefore, when the abnormality detector 40 detects an abnormality, the controller 10 can read one frame of image obtained at the time the abnormality occurred and output it to the display controller 20.

[0028] When the abnormality detector 40 detects an abnormality and the cameras 3 and 3' take a plurality of frames of images, a replay device for displaying an arbitrary image for each frame on the screen 2 may be provided for the automatic transaction apparatus.

[0029] The automatic transaction apparatus in this embodiment is not limited to an automated-teller machine which is installed in a financial facility, but can also be applied for an automated-teller machine installed in another location (e.g., a convenience store), and for an automatic transaction apparatus by which transactions are performed to provide various products and services.

[0030] Thus, in embodiments of the invention, when the automatic transaction apparatus detects an abnormality, an image obtained at the time the abnormality occurred is displayed on the screen of the apparatus.

Therefore, security guards who arrive in response to a report that an abnormality has occurred can view the image to obtain information, such as a likeness or a description of the clothing of a criminal, they require to find him or her. Therefore, the probability is increased that the criminal will be found comparatively quickly. As a result, since the crime prevention function is enhanced, the occurrences of crimes can be prevented.

[0031] The scope of the coverage afforded by the present invention is not limited to the above embodiment, and also includes the invention as defined in the claims for the present invention.

[0032] For example, although the above embodiment relates to an automated-teller machine, the present invention may be employed with any kind of transaction machine vulnerable to attack by criminals regardless of whether it holds cash or valuables.

[0033] Although the above embodiment employs an abnormality detector, this is not essential and any kind of detector may be employed to detect the presence of a person in some way, for example a motion detector, proximity detector, contact detector or the like. In this case, image data of legitimate users as well as criminals is captured.

[0034] In the above embodiment, frames of image data are stored and displayed in response to detection of an abnormality. However, this is not essential and frames from the camera may be stored during every interaction (including legitimate use) of a person with the machine. In this case, the stored images are conveniently displayed during times when no transaction information is being shown on the screen. For example, an image of the last person to attend the machine may be left on the display until such time as a next transaction is initiated.

[0035] In the above embodiment, the captured image is displayed on the display screen as soon as it is obtained. However, in other embodiments it may be preferable not to display the image(s) immediately but rather to wait for a predetermined delay time or for a request by an operator. For example, a specific button or input procedure may be provided to initiate display of the captured image(s) at the request of security personnel. In this way, the risk of damage to the screen by a criminal is reduced.

[0036] The camera or image capture means may be combined with other sensory devices, for example a microphone to pick up audio information which is stored along with the image frames.

Claims

1. An automatic transaction apparatus for performing a transaction with a client automatically with displaying transaction information on a screen, comprising:

a detector for detecting an occurrence of an

abnormality;

a first camera device for taking at least one frame of an image at the time of the abnormality; and

a display controller for displaying the image taken at the time of the abnormality on the screen when or after the abnormality is detected by said detector.

2. The automatic transaction apparatus according to claim 1, wherein said display controller displays at least one frame of an image taken at the time of the abnormality on the screen, in a case where said first camera device also takes frames at other times.

3. The automatic transaction apparatus according to claim 1 or 2, wherein said display controller displays a time at which the abnormality occurred on the screen.

4. The automatic transaction apparatus according to claims 1, 2 or 3, wherein said display controller displays a cause of the abnormality that occurred on the screen.

5. The automatic transaction apparatus according to claims 1, 2, 3 or 4, further comprising:

a communication unit for transmitting said image taken at the time the abnormality occurred to a monitoring center at a remote location.

6. The automatic transaction apparatus according to any preceding claim, wherein said camera device begins taking the image when the abnormality is detected by said detector.

7. The automatic transaction apparatus according to claim 1, further comprising:

a second camera device for taking at least one frame of an image at the time of the abnormality when said detector detects the occurrence of the abnormality; and

a switch for switching the image displayed on the screen by said display controller to the image taken by said first camera device or to the image taken by said second camera device.

8. An automatic transaction apparatus comprising:

a display screen for displaying transaction information;

a detector arranged to detect the presence of a person at the apparatus and/or the interaction

of a person with the apparatus;

image capture means arranged to capture an image of the person in response to detection of a person by said detector; and

a display controller arranged to display the image on the display screen after capture thereof, at a time when no transaction information is being displayed. 5

9. A method of identifying a perpetrator of a crime involving an automatic transaction apparatus, comprising the steps of: 10

detecting an occurrence of an abnormality using a detector in the automatic transaction apparatus; 15

taking at least one frame of an image at the time of the abnormality using a camera device; and

displaying on a screen of the automatic transaction apparatus the image taken at the time the abnormality was detected. 20

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FIG. 1

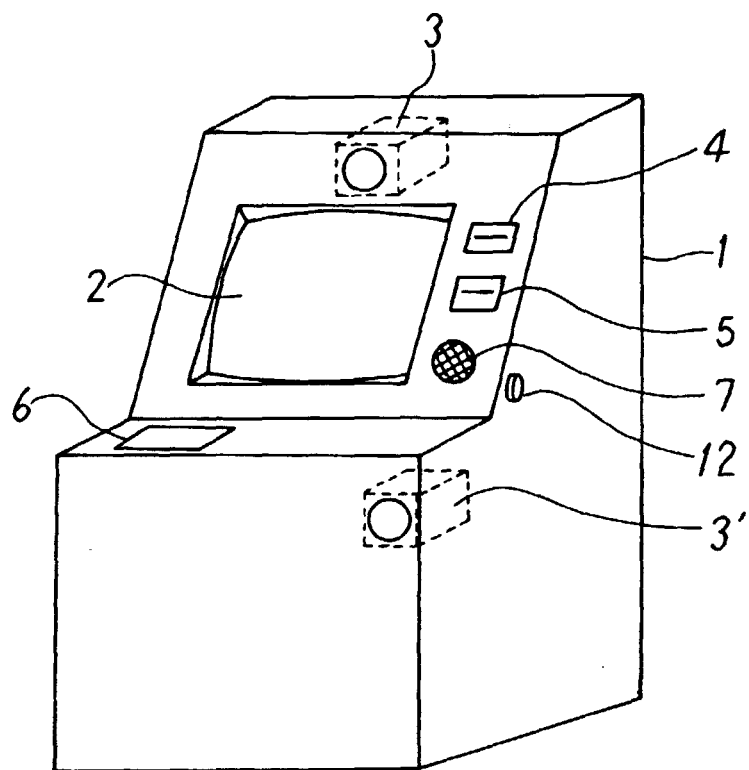


FIG. 2

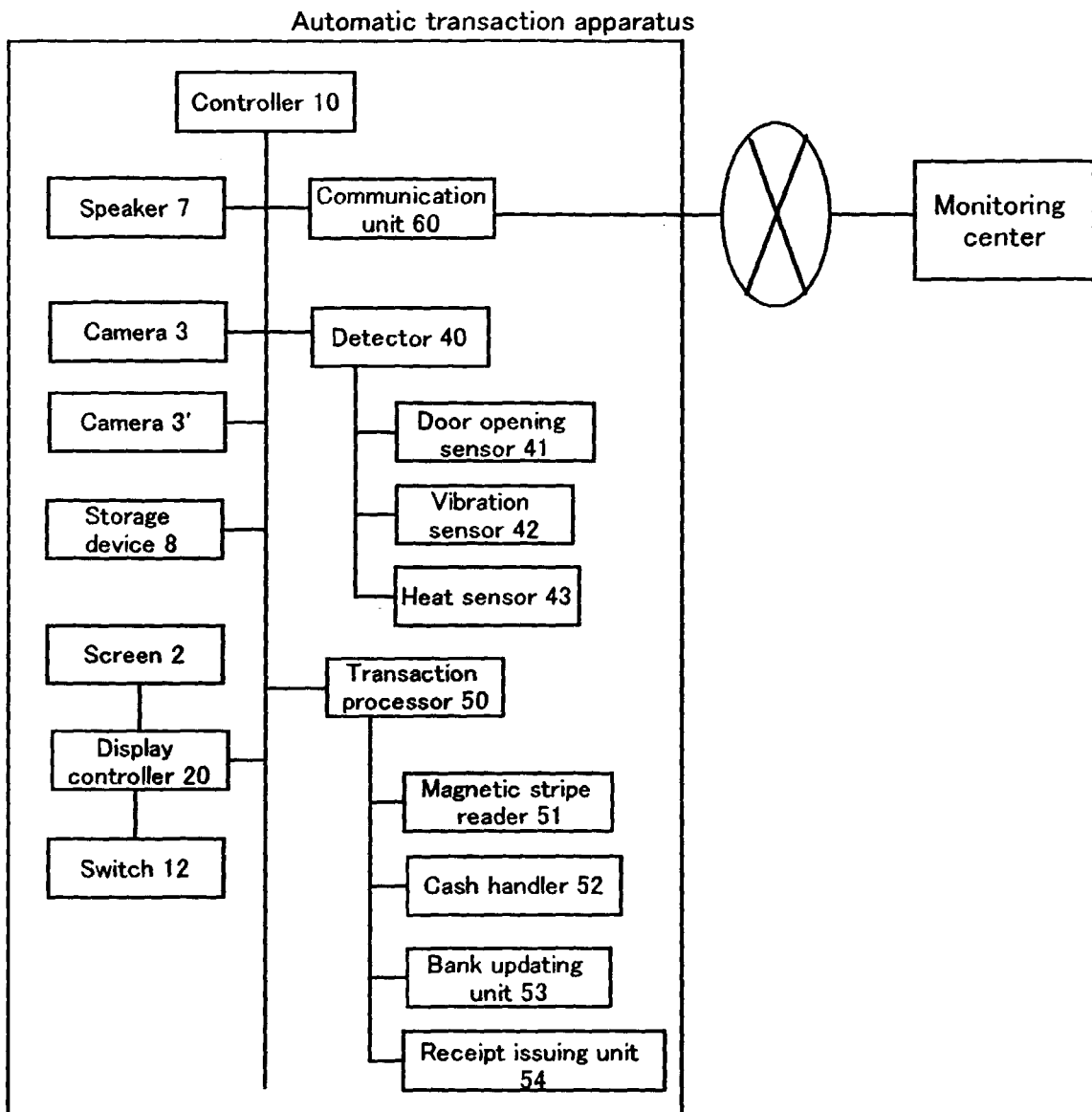


FIG. 3

