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(54) **System of management of data, relating to security, based on cirteria of distributed intelligence.**

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Description

This invention has as its object a system of management of data, relating to security, based on criteria of distributed intelligence.

As it is known, in general, theftproof and burglarproof security installations, which are used for the protection of high-risk premises such as banking institutions and the like are now made up of three basic components, which are correlated and conceptually distinct, namely: the central, connections and sensors.

An example thereof is described by TN-Nachrichten No. 87, 1985 in an article headed: "Verteilte Intelligenz in Gefahrenmeldesystemen".

In such types of installations the central has the function of collecting, by the connections, the signals that originate at the sensors, when the latter are activated by outside events, and the sensors simply constitute passive elements that have only the function of detecting a signal but are not able to provide for its immediate processing, at least for some types of functions.

This dispersion creates notable collection problems and does not make it possible to obtain a truly effective service, able to meet the individual needs that occur.

The object of the invention is to eliminate the above-mentioned drawbacks by achieving a system of management of data, relating to security, based on criteria of distributed intelligence, which makes it possible to have sensors able to perform determined functions and to be interconnected to follow an overall program for the entire defense system.

In particular, said data management system should be able to use, by interconnection of the various sensors, the data network existing in banking institutions, thus having the possibility of simplifying the connections themselves and making them efficient.

Further, the system, according to this invention, makes it possible to correlate, by logical programs, signals coming from various sensing sections, to filter, on a single device, possible false alarms and spurious signals coming from the environment.

Finally, in the management system a particular sensor unit is provided, which constitutes an optimal block for the entire functioning system.

The above-mentioned object as well as said aims and others, which will be shown better below, are achieved by a data management system, relating to security, based on criteria of distributed intelligence, characterized by the characterizing portion of the appended claim 1.

A said plurality of sensor units are connected to a main loop, able to verity and organize the data received from individual sensor units in a file.

Further, a concentrator is provided, able to access data filed in the main loop and to make a comparison between the data and its own logical maps.

The concentrator communicates with a computer, at the central level, using data networks existing in the banking institutions.

Further characteristics and advantages of the invention will be shown better by an examination of the description of a preferred, but not exclusive, embodiment, of a data management system, relating to security, based on the criteria of distributed intelligence, which is illustrated in the accompanying drawings in which:

fig. 1 represents a block diagram;

fig. 2 represents the block diagram of a main loop.

With particular reference to the numerical symbols of said figures, it is noted that the data management system, relating to security, based on criteria of distributed intelligence, comprises a plurality of sensor units, indicated overall by reference number 1.

Each sensor unit has a significant processing capacity and contains an 8-bit microprocessor and has 32 K of ROM and 32 K of RAM.

Further, internally, the sensor unit has two EIA standard serial interfaces.

The sensor unit manages the communications on one of the interfaces, by a standard protocol, which permits its connection to the network.

Further, the sensor unit has input and output ports, which allows interfacing of the sensor with external security devices, operating with ON/OFF logics.

In its practical use, sensor unit 1 performs the task of managing, in an optimal way, the sensors that it has on board, for example of the type: seismic, microphone, thermal.

In particular, it performs a series of local activities such as: calculation of mobile media, elimination of offset, detection of peaks and of threshold slow passages, comparison of variable thresholds and the like.

Besides the specific operations relating to its sensors, the sensor unit collects and transfers data from and for external security devices.

For example, it is possible to connect to a sensor unit eight open logic inputs (contacts with resistances in series) -- and four actuators controlled by contacts.

The input lines coming from the external devices are monitored by using the intelligence of the sensor unit, with a modulation logic of the supply voltage of the lines themselves.

Further, the sensor unit interprets, as commands, some messages routed by the network and transforms them into activations of the corresponding outputs (for example, microwave test devices, other test devices).

The concentration of the messages exchanged with the sensor units and the connection between the

network of sensor units and the central system take place, by a specialized card, with loop function, which is connected to a concentrator consisting of a personal computer.

Each main loop, indicated by 2, is able to manage a network of sixteen sensor units, which is turn are connected to clusters of ON/OFF security devices, and to concentrate their data.

Advantageously, main loop 2 consists of a card compatible with the bus of any MS/DOS personal computer; several main loop cards can be introduced into a personal computer, to enable the latter to concentrate the data supplied by several groups of sixteen sensor units.

More in detail, each main loop 2 exhibits a buffer 10 in communication with sensors 1 and connected to a USART group 11, which, by a line 12, is in communication with a data bus 13, placed between ROM 32 K, RAM 32 K and RAM 32 K, indicated by 14, and a control group 15.

Line 12 is connected to input coupling 16 and output coupling 17, and also to a second USART group 18, which, by buffer 19, is connected to a HOST communication line.

Buffer 19 is then connected to a buffer 20, which communicates with a multiplier 21 for return to USART group 18, controlled by a baud speed generator 22, associated with a baud speed generator 23, of group 11 and interconnected to a real time clock 24, controlled by a clock generator connected to group 15.

Coupling input 16 and coupling output 17 are connected to one another by a PC interruption line 30 and are connected to a PC data bus 31.

The functions of the security system are distributed at three different levels corresponding to the hierarchical levels of the network.

The first level consists of sensor unit 1, and at this level functions are delegated that have a local value; in particular, management of going beyond thresholds and of the states of the sensors or devices external to the sensor unit, which give rise to "events" to be communicated to the higher level.

Further, sensor unit 1 performs management of test cycles and diagnostics of the various sensors.

Main loop 2 has the task of managing the protocols of communication with the cluster of sensors; it does not perform logical functions on the data received from the various sensor units but verifies it and organizes it in a file, in which it is accessible by a concentrator, indicated by 3.

The concentrator performs a filtering action on the events indicated by the various sensor units, comparing them with its own logic maps.

These logic maps can refer to: modalities of processing of events, schedules of activation, type of effect desired, messages to be correlated, physical locations, and others.

In addition, the maps refer to the connection between events indicated by the different sensor units and to the management of the sequence of events, actually, in some cases and event, by itself, is not a cause for alarm but becomes one in case it is followed, within a certain interval, by one or more events of another type.

The management of these maps comprises the recognition of time zones for which the concentrator manages a clock, with hour and data, and able to distinguish holidays and work half-days.

In addition, concentrator 3 has a magnetic disk unit and a printer, on which are recorded the events, alarms and modifications made in the logic maps which define the functioning of the entire system.

In turn, the concentrator is able to communicate with a computer 4, at the central level, being able to be introduced in the data system of a banking institute, by the hardware and software supports themselves (modems, concentrators, protocols, data networks) used for the transactions.

With respect to the central computer, it constitutes the node of the concentration of the data and management of the functions relative to security: it sends the signal of alarms detected and possibly receives updating of the maps and orders for local operations.

On concentrator 3 is installed a user interface software that has the task of guiding the operator in the definition of logic areas, time zones, holiday programming, test cycles, connections, introduction of overtime, disabling of broken sensors and other functions at the system level, and to transform these indications into logic maps.

The invention, as conceived, is capable of numerous variants and modifications, all coming within the scope of the inventive concept.

Further, all the details can be replaced by other technically equivalent elements.

In practice, the means used, because they are compatible with the specific use, can be any kind, depending on the requirements.

Claims

1. Data management system, relating to security, based on criteria of distributed intelligence, comprising a plurality of sensor units, said plurality of sensor units being connected to a main loop able to verify and organize the data received from the individual sensor units, in a file; a concentrator being further provided, able to access the data stored in the main loop and to make a comparison between the data and its own logic maps; the concentrator communicating with a computer, at the central level, using the data networks existing in the banking institutions, characterized by the

fact that each one of said sensor units is able to manage specific sensors of the seismic, microphone, thermal type and to perform a series of local activities comprising calculation of mobile media, elimination of offset, detection of peaks and of threshold slow passages, comparison of variable thresholds, interpretation of messages routed by the network and activation of corresponding outputs, and the like.

2. Management system according to the preceding claim, wherein each sensor unit has the function of performing the management of going beyond the threshold and of the states of the sensors or devices external to the sensor unit, which give rise to events to be communicated at the higher level.

3. Management system according to one or more of the preceding claims, wherein each sensor unit is able to perform the management of test cycles and diagnostics of the various sensors.

4. Management system according to one or more of the preceding claims, wherein sixteen sensor units are connected to each main loop.

5. Management system according to one or more of the preceding claims, wherein the logic maps refer to: modalities of processing the events, activation schedules, type of effect desired, messages to be correlated, physical location and the like.

6. Management system according to one or more of the preceding claims, wherein the logic maps are able to make connections between events indicated by different sensor units, also the management of sequences of events.

7. Management system according to one or more of the preceding claims, wherein the concentrator has magnetic disk units and a printer to record the events, alarms and modifications made in the logic map.

Patentansprüche

1. Datenverwaltungssystem, das die Sicherheit betrifft und auf Merkmalen verteilter Intelligenz basiert, mit mehreren Sensoreinheiten, die mit einer Hauptschleife verbunden sind, welche die von den einzelnen Sensoreinheiten empfangenen Daten in einer Datei verifizieren und organisieren kann; wobei ferner ein Konzentrator vorgesehen ist, der auf die in der Hauptschleife gespeicherten Daten zugreifen kann und einen Vergleich zwischen den Daten und seinen eigenen Logiktabellen ausführen kann; wobei der Konzentrator mit einem Computer auf der zentralen Ebene in einer Datenaustauschbeziehung steht, welcher die in Bankinstituten vorhandenen Datennetze verwendet, gekennzeichnet durch die Tatsache, daß jede der Sensoreinheiten spezialisierte Sensoren des seismischen, mikrophonischen, thermischen Typs verwalten kann und eine Reihe von lokalen Aktivitäten ausführen kann, die die Kalkulation beweglicher Medien, die Beseitigung von Offsets, die Erfassung von Spitzenwerten und von Schwellen-Langsamdurchgängen, den Vergleich variabler Schwellenwerte, die Interpretation von vom Netz geleiteten Nachrichten und die Aktivierung von entsprechenden Ausgangssignalen und dergleichen umfassen.

2. Verwaltungssystem gemäß dem vorangehenden Anspruch, bei dem jede Sensoreinheit die Funktion besitzt, die Verwaltung der Überschreitung des Schwellenwertes und der Zustände der Sensoren oder der der Sensoreinheit äußerlichen Einrichtungen, die Anlaß für Ereignisse geben, die auf der höheren Ebene ausgetauscht müssen, auszuführen.

3. Verwaltungssystem gemäß einem oder mehreren der vorangehenden Ansprüche, bei dem jede Sensoreinheit die Verwaltung von Prüfzyklen und der Diagnose der verschiedenen Sensoren ausführen kann.

4. Verwaltungssystem gemäß einem oder mehreren der vorangehenden Ansprüche, bei dem mit jeder Hauptschleife sechzehn Sensoreinheiten verbunden sind.

5. Verwaltungssystem gemäß einem oder mehreren der vorangehenden Ansprüche, bei dem sich die Logiktabellen beziehen auf: Modalitäten der Verarbeitung der Ereignisse, Aktivierungspläne, Typ der gewünschten Wirkung, zu korrelierende Nachrichten, physikalische Lokalisierung und dergleichen.

6. Verwaltungssystem gemäß einem oder mehreren der vorangehenden Ansprüche, bei dem die Logiktabellen Verbindungen zwischen Ereignissen herstellen können, die durch verschiedene Sensoreinheiten angegeben werden, und außerdem Folgen von Ereignissen verwalten können.

7. Verwaltungssystem gemäß einem oder mehreren der vorangehenden Ansprüche, dadurch gekennzeichnet, daß der Konzentrator Magnetplatteneinheiten und einen Drucker besitzt, um die Ereignisse, Warnungen und Modifikationen, die in der Logiktabelle geschaffen werden, aufzu-

zeichnen.

Revendications

1. Système de gestion de données, ayant trait à la sécurité, basé sur le fait d'une intelligence répartie, comprenant une série d'ensembles capteurs, cette dite série d'ensembles capteurs étant reliée à une boucle principale capable de vérifier et d'organiser dans un fichier les données reçues des ensembles capteurs individuels ; un dispositif concentrateur étant de plus prévu, lequel est apte à accéder aux données emmagasinées dans la boucle principale et à effectuer une comparaison entre les données et ses propres cartes logiques, le dispositif concentrateur communiquant avec un calculteur, au niveau central, utilisant les réseaux de données qui existent dans les institutions de banques de données, caractérisé par le fait que chacun des dits ensembles capteurs est capable de gérer des capteurs spécifiques du type sismique, microphonique, thermique, et d'accomplir une série d'activités locales comprenant le calcul de milieux mobiles, l'élimination de déports, la détection de pics et de passages lents, la comparaison de seuils variables, l'interprétation de messages acheminés par le réseau et l'activation de sorties correspondantes, et analogues.

2. Système de gestion selon la revendication précédente, dans lequel chaque ensemble de capteur remplit la fonction d'effectuer la gestion des dépassements de seuil et des états des capteurs et de dispositifs extérieurs à l'ensemble capteur, qui produisent des événements devant être communiqués au niveau supérieur.

3. Système de gestion selon une ou plusieurs des revendications précédentes, dans lequel chaque ensemble capteur peut accomplir la gestion de cycles d'essais et de diagnostics des divers capteurs.

4. Système de gestion selon une ou plusieurs des revendications précédentes, dans lequel seize ensembles capteurs sont reliés à chaque boucle principale.

5. Système de gestion selon une ou plusieurs des revendications précédentes, dans lequel les cartes logiques concernent : des modalités de traitement des évenements, l'activation des listes, le type d'effet désiré, les messages à faire correspondre, la situation physique et similaires.

6. Système de gestion selon une ou plusieurs des revendications précédentes, dans lequel les cartes logiques peuvent réaliser des liaisons entre des événements indiqués par différents ensembles capteurs, et aussi la gestion de séquences d'événements.

7. Système de gestion selon une ou plusieurs des revendications précédentes, dans lequel le dispositif concentrateur comprend des ensembles de disques magnétiques et une imprimante afin d'enregistrer les évènements, les alarmes et les modifications apportées à la carte logique.

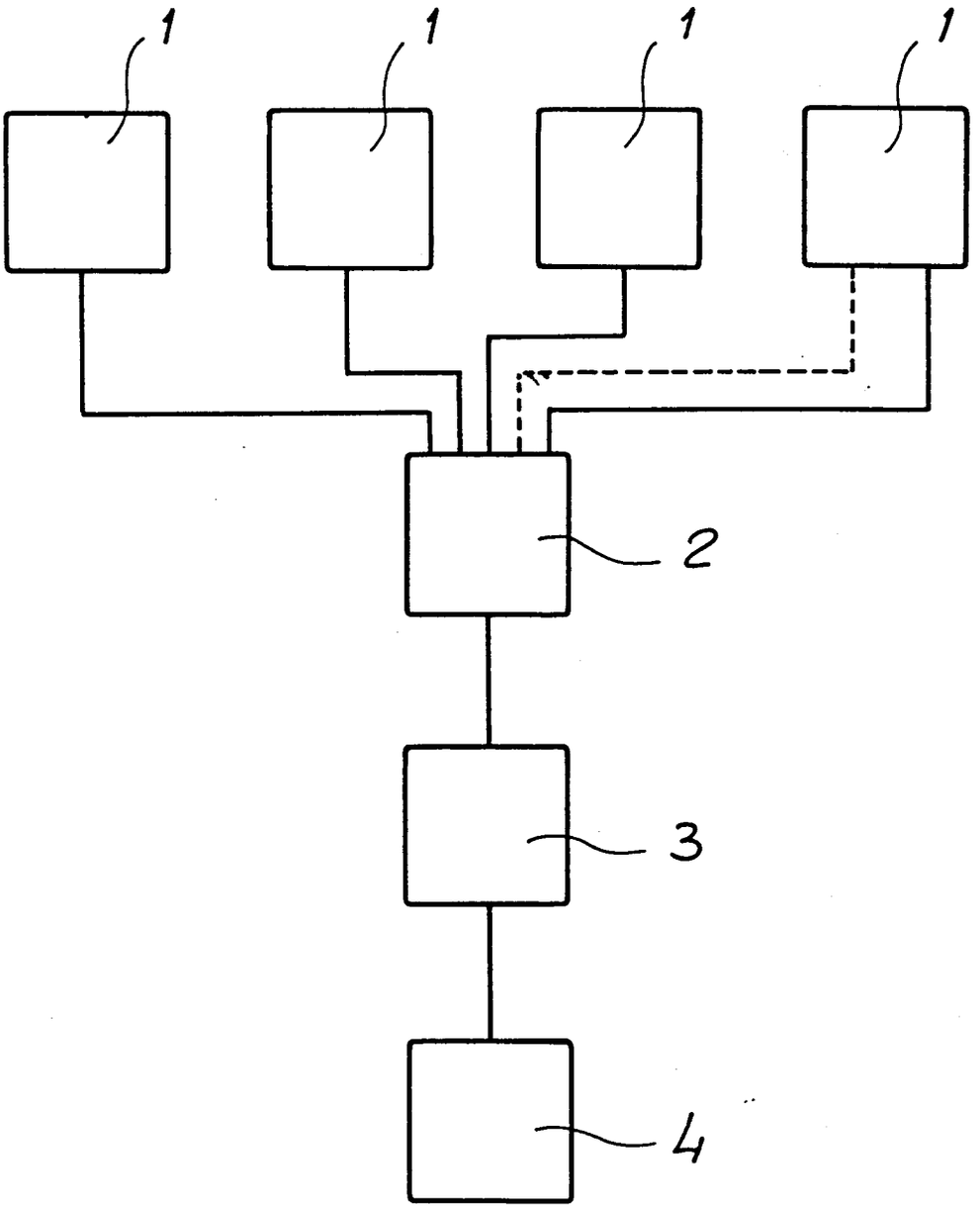

Fig.1

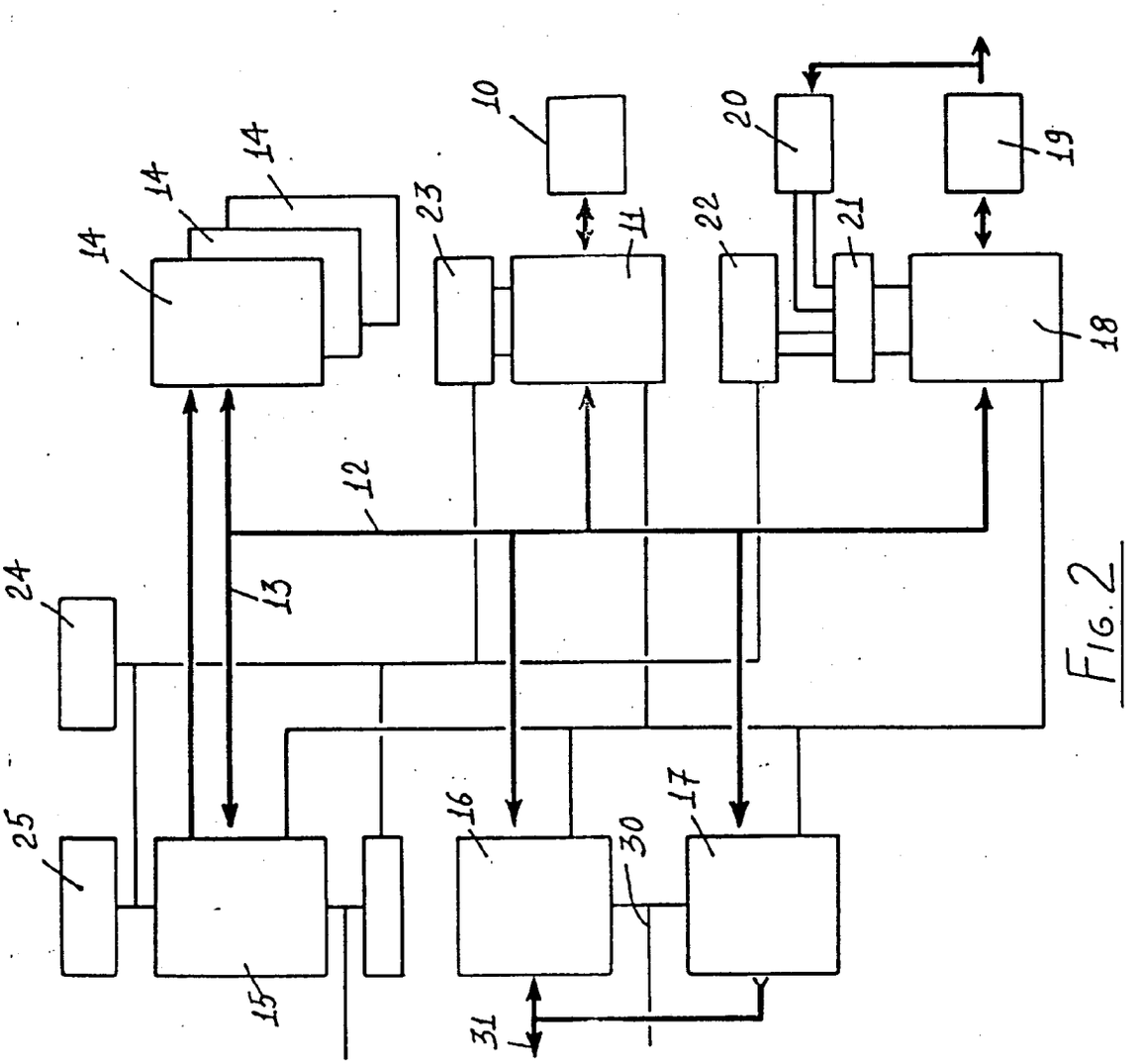

FIG. 2