ISSN (Print): 0974-6846 ISSN (Online): 0974-5645

Control Center's Unification Plans to Raise CCTV Visual Data use for Crime Prevention

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Abstract

This paper raises efficiency measures to integrate and control the various CCTV's visual data engrafted into IT technologies independently operated by each municipal and provincial government owing to legal and technical restriction now.

We expect better results in the crime prevention and its suppression by paralleling the visual information of the unification control center independently operated by each local government nationwide, introducing an additional system of input crime information and its recognition, warning functions besides simple Monitoring and Recording functions, and by understanding crime information in real time.

Keywords: Control Center, Crime Information, Crime Prevention, Monitoring and Recording, Visual Data

1. Introduction

This paper raises efficiency measures of crime prevention and its suppression by making it easier to understand crime information through connecting in parallel visual information of the CCTV unification control center independently operated by each local government to the adjacent area. Nowadays, local governments have a variety of 185,000 CCTVs installed and public institutions have 462,000 CCTVs installed nationwide and 79 control centers are being operated. Also each local government is spending lots of budgets on CCTV installation and its efficiency extension as part of CPTED (Crime Prevention Through Environment Design). But we are satisfied with surveillance on crime-ridden areas through Monitoring and securement of evidence of a crime through Recording function as control center operating systems go1. Crimes are going more atrocious, more intelligent, and more technical day by day2. Therefore, I'm devising to take measures to understand crime information in real time by merging rapidly developing IT, lining up the each local unification control center and sharing the visual information. As stated above, I would judge that they will contribute to the raising of the practicality of national

visual information resources and to the improving of the effective counter measures against crimes.

2. Discussion on the Operation Status of the Crime-preventing CCTV and its Practicality

CCTV is all the equipment which transmits images collected by the use of video cameras in a limited space to a specific place through the wireless circuit system, etc. transmission line and visual information is data which enables us to confirm whether images collected by CCTV conform to the action connected to the real identity3. We can find in CEPED the basic theory about the necessity for CCTVs installment. The fundamental map is based on "Defensible Space" of Oscar Neman (1972) and is an important branch of environmental criminology, which defines crime prevention strategies controlling the time and space limitations of crime occurrence conditions1. This learning is a fusion and an application field of criminology, architecture, civil engineering and IT, etc. The basic principle of CPTED is the spatial design, which recommends the defensive power against crime

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targets, the increase of natural watch, and the strength of domains⁴. CCTV Monitoring techniques are related to the increasing of CPTED watch and in particular, is the main techniques of strengthening artificial surveillance on the space of the finished architecture¹. The operation of the crime-preventing CCTV privately launched in the 1960's in England and was extended on a public level⁵ and is being practiced in many countries of the world including Germany, France and Japan and has a practical effect on crime prevention.

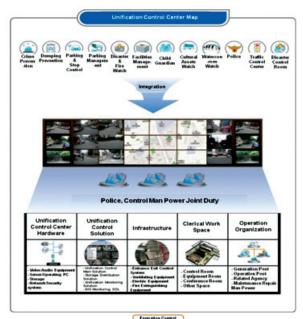
2.1 The Operation Status of Crimepreventing CCTV in Korea

Nowadays (by the end of 2013), local governments have a variety of 185,000 CCTVs installed and public institutions have 462,000 CCTVs installed nationwide 90,931 CCTVs of which are being operated for preventing crimes⁶. Each control center operates 715 cameras on the average and the 1,750 key personnel, of the control center work in three shifts of twenty-four hours. The networks of various cameras seem to be regionally integrated and the functions of crime countermeasures, fire-fighting, child-care and disaster prevention get to be integrated and enlarged. In particular, in the last four years (2010 to 2013), the joint duty with the number of 222 policemen has enabled them to deal with 13,340 cases including 2,718 cases, the five violent crimes of murder, robbery, criminal assault, theft, and violence,etc.⁷

According to the comparative analysis of the model district (Bucheon City), the police meet with effective results of the decrease in crimes, crime reporting rate, fears of criminal damage, and relation among neighbors, etc. and also get positive results in a matter of the crime-preventing CCTV installation by preference of inhabitants⁸. Local governments are spending lots of money on the crime-preventing CCTV installation in order to improve the quantity and quality of the equipment. Shown is in Figure 1 the map of an advanced unification control center to which the Ministry of Security and Public Administration points.

2.2 Discussion on the Effective Use of CCTV Visual Information for the Counter Measures against Crimes

Police's main duty is to gather materials for crime control and maintenance of order, to create information. Before CCTVs appeared in the street, the range of



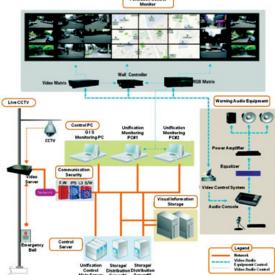


Figure 1. The operating model of CCTV unification control center.

police surveillance was limited to the number of the police man deployed on the scene, and the cooperation on civilian and informant levels in course of investigation. Nowadays the networks of CCTVs liberated the police from the limit to the degree of dependence upon information on the restricted spot⁹. Above all, the exact contents over the wide range of time and space about the information of crimes occurring on public areas can be given to the police in real time¹⁰. CCTV visual data practicality for crime prevention is a global trend and has explosively been expanded ever since 9/11

WTC Terror in 200111, latest IT technology enables the automatic detection and warning of crime situations and the function of video summary analysis to be sophisticated by utilizing the function of intelligent video analysis¹² and by measuring the previously stored criminal information and patterns against CCTV visual information, an automatic decision and its warning system is being developed¹³ CCTV, Korea has made rapid progress quantitatively, technologically and functionally since Gangnam police station utilized CCTV for crime prevention in 2002 and Korea is continuously putting expanded budget on CCTV14. But, compared with our costs and efforts, our crime-preventing CCTV operating system has an unsatisfactory one in effectively using this visual information for crime prevention and its suppression. The fundamental reason is that the closed and independent operating system of control center by each local government prevents the police from sharing a wide range of real-time information on collected visual information for preventive measures against crimes and the technical development of data entry of the past crime information and the development of recognition system leave something to be desired and the resolution and advanced features of visual information are scarce because of its obsolete equipment. In Korean National Police Agency 2011 White-Paper (2012), the National Police Agency requires the integration of the regional and functional management system for the effective use of CCTV visual information and information connection use there are more than necessary for a person to monitor CCTV vision, the operator of the control center finds it necessary that CCTV itself should inform the key personnel of the recognition techniques of emergency. This situation is largely caused by incomplete laws and systems for private life protection of a civilian, visual information security control, unstructured information integration and its communication systems and IT's practcal use and it's lack of a real time- response system. Modern crimes showing a tendency to be intelligent, ferocious, and mobile make civic consciousness for privacy protections change, the technical development of CCTV operating system makes it possible to collect better visual information and the growth of information and communications system makes it ripe to build various response systems in real time. The fact is we will still desperately need to build a highly available system for measures against crimes through a variety of CCTV visual information.

3. Raising Measures of Visual Information Practicality

3.1 Communication System Construction of Visual Information Through the Connection with the Control Centers

Palmiotto, Michael J. was very emphatic about the need for knowledge development of technologies and strategies for crime prevention and the community and its system¹².

The operation status of the crime-preventing CCTV is basically within the jurisdiction of local governments regarding equipment, facilities, manpower and cost, etc. In Korea, for the purpose of establishing our crime investigation and public order, the main body of the police action is composed of the police unit and the establishment of the police station is based on each local government unit. CCTV visual information is protected by "the Personal Information Protection Law." Accordingly, considering the police's cooperation and its convenience for the community and its crime prevention, the prevention of infringement of personal information and the security management of visual information, etc. the connection system of the unification control system should be drawn to the way we parallel the control center of each local government now. At ordinary times, in addition to applying the encrypted Monitoring and Recording of the visual information to each control center, the police should share the protocol of the server in order to decode the visual information by connecting the control center in line, if necessary, they should build communications system. At present, government's efforts to develop standardized CCTV system module will bring them compatibility.

3.2 Creation of Materials for a Suspect and **Technical Development of Recognition** System

The way of raising effective practical use of CCTV visual information is to input the past crime information into the present restricted function, (namely, crime-ridden area watch through Monitoring and Recording materials available for criminal investigation) and to add the function of warning to the necessary post by recognizing this. For this, the police should engraft abnormal audio source CCTV, susceptibility signal sensor, IVS (Intelligent Vision Sensor) technologies into the monitoring function of each control center, apply real-time automatic recognition and

warning function to them¹³ and should enhance accuracy and success rate of intelligent service types by combining organism recognition technologies including face identifying, etc. with them. The police should produce search information materials (namely, photos of suspects or videos, search vehicle numbers) for crime suppression, devise the input way, and should technically develop the system of recognizing and warning search materials by identifying videos.

Hereupon, Included are the development of the possible part with the developed IT technologies use and the advanced development of video recognition technologies.

3.3 Construction of Local Governments' Control Centers and Police's Joint System

According to the outcome of a recent research and analysis from a survey of control center policemen, we came to know that they have negative sentiments on collaboration between the local governments' control centers and the police situation room, and CCTV visual data use, etc. controlled by community police¹⁴.

The police should make it easier to get across crime information by paralleling the visual information among the unification control centersand connect pursuit of the offender, the moving-in, the arrest process with it if given the warning by catching the real-time search targets. Given a warning to law enforcement agencies that they input sources of information of a criminal in the search for a criminal, they should establish a system so that they can quickly operate "Operation Dragnet" through CCTV's picking up a criminal, tracing him, and consecutively giving them information about him and also in cooperation with law enforcement agencies concerned figuring out location of a criminal¹⁵.

The police should maximize efficiency of the arrest operation on the spot by uniting the recent remarkable PSIM (Physical Security Information Management) with GIS (Geographical Intelligence System), Virtual Tracking and giving real-time search information¹⁶.

4. Conclusion

This paper raises efficiency measures to integrate and control center's CCTV visual data engrafted into IT technologies independently operated by each local government owing to legal and technical restriction now.

We expect better results in the crime prevention and its suppression by paralleling the unification control center independently operated by each local government nationwide, introducing an additional system of input crime information and its recognition, warning functions besides simple Monitoring and Recording functions, and by understanding crime information in real time. If the standardization of vision quality is realized and plans for connecting with networks of different CCTVs are sought for, synergy effect will come out. Demanded is a growing study on law and institution for privacy protection, input crime information and its real-time recognition. IT technologies development aimed at warning and exercise of police authority and its cooperation.

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