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A Comparative Study on Awareness towards Community POLICING, Socio-Depending on Demographic Characteristics of the Police in KOREA

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Abstract

Community policing has been accepted as new paradigm of policing in many countries, including the United States, JAPAN, U.K., FRANCE. In KOREA, there has also been a growing awareness towards importance of community policing, and efforts have been made to adopt and establish community policing. However, community policing has not yet been fully established.

Therefore, the study intended to compare differences in awareness towards community policing based on socio-demographic characteristics of the police as part of measures to establish community policing.

In order to achieve such objectives of this study, the study set the community policing awareness factors as the goals and entity of community policing. Survey was conducted to the life safety departments, patrol divisions, and precinct stations of the police stations in Seoul, Gyeonggi-do, Incheon. The results were examined for statistical analysis such as t-test and ANOVA using the SPSS21.0, a statistical program.

The results of analysis showed that the objectives of community policing showed a significant differences only in 4 items, i.e., age of police officers, local administrative districts in service, type of local urban area in service, and working period of police officers.

The entity of community policing was found to show a significant difference in 5 items, i.e., gender, age, local administrative districts in service, type of local urban area in service, and organization in service.

Among the items that showed a significant difference, the 3 items, i.e., age, local administrative districts in service, and type of local urban area in service were found to be common to community policing awareness factors.

By age, extent of awareness was higher in those in their 20s and 40s than in those in their 50s. Meanwhile, those serving in Incheon had higher extent of awareness in terms of the 2 factors in connection with local administrative districts in service.

Moreover, extent of awareness was higher in industrial regions and agricultural/fishery regions in connection with type of local urban area in service.

Based on that, various types of programs need to be developed to improve awareness towards community policing, depending on working environment, region of work and age of the police officers, in order to increase awareness towards community policing. In addition, right community policing should take root through improvement of awareness towards community policing by the police force.

[Keywords] Policing, Community Policing, Police, Socio-Demographic Characteristics, Awareness towards Community Policing

1. Introduction

Community policing, which began in the United States for the first time in 1970s, has been thrust into limelight as new paradigm of

policing activities in many countries including the United States, Denmark, Finland, U.K., Japan, etc.[1], and many efforts have also been made in Korea to promote establishment of community policing

Despite much effort, community policing has not been carried out adequately even within police organization based on practical awareness towards community policing.

Understanding of community policing by the police force would be very important to ensure establishment and implementation of community policing in consideration of significant difference between current community policing and previous policing in aspects such as the objectives of policing, entities of policing, etc[2].

Thus, the purpose of this study was to compare the awareness towards community policing, depending on socio-demographic characteristics of the police, as a part of means to increase awareness towards community policing performed by the police force.

2. Theoretical Background

2.1. Definition of community policing

Clear definition of community policing has not been drawn thus far. That may be attributable to characteristics of community policing that includes various forms of policing activities and inclusive and wide-ranging nature of the word 'community' which is interpreted as local community, which leads to interpretations of various form[3].

Community policing aims to strengthen cooperation of communities to resolve overall problems facing the regions, including crimes. Specifically, community policing is a concept encompassing foot control, problem-solution, organization of communities, etc., and is rooted in philosophical base highlighting devolution, sharing of authority, re-setting the role of the police, etc[4][5].

Based on those general concepts, many scholars have drawn many different definition of community policing.

Regarding the definition of community policing which was drawn by scholars, Skogan

defined community policing as promotion of changes in decision-making process of police organization and creation of new culture, rather than meaning a series of specific programs, and is built on 3 key elements of residents' involvement, problem-solution, and devolution[6]. Trojanowicz and Bucqueroux defined community policing as the strategy and principle promoting new relationship between residents and police, which represents joint efforts of communities and police to resolve problems based on identification and prioritization of problems facing the communities such as crimes, fear towards crimes, social and physical disorder, decline of communities, etc., to achieve the goals of improving overall quality of life in communities[7].

Based on overall definitions above, the community policing can be redefined as a new paradigm of policing activities that aim to response to and prevent various problems in communities through active cooperation between communities and police.

2.2. Comparison between traditional policing and community policing

According to Sparrow, traditional policing and community policing show difference in terms of entity of policing, relationship with other administrative organizations, role of the police, performance appraisal, priority of works, particulars of handling, measurement of policing effectiveness, response of police to service requests, specialization of the police, important police information, responsibilities of the police, role of leaders, role of public relation(PR) department, position towards indictment[8].

Regarding the difference in terms of entity of policing, relationship with other administrative organizations, role of the police, performance appraisal, priority of works, and particulars of handling, it was found that community policing pursued common entity system engaging local residents in single police entity system of traditional policing and that the analysis of relationship with other administrative organizations showed horizontal relationship of the police with other administrative organizations, going beyond

conventional system that put the police above other administrative organizations

The role of the police is shifting its focus towards crime prevention and resolution of problems facing local residents away from traditional policing centered on resolution of crimes. In the community policing, the performance appraisal was found to focus on the extent of reduction in crimes and disorder in communities, rather than concentrating on investigation and arrest rate which were the main focus of traditional policing in the past.

For priority of works, traditional policing took response to violent crimes as top priority of policing activities. By contrast, community policing takes the response to all problems occurring in communities as top priority and covers wide-ranging works related to communities, unlike traditional policing, by expanding the scope of duties to address grievances and concerns of local residences in the course of service for communities.

2.3. Review of preceding studies

Studies on community policing showed that objectives and entities of policing were often mentioned with respect to difference between traditional policing and community policing.

Lee Mi-jeong considered the changes in policing entities and crime prevention as key elements of community policing, and based on those elements, stated that local policing system would need to be implemented to establish community policing in Korea[9]. Similarly, Kim Sang-ho also considered that the success of community policing was influenced by wide-ranging role-orientedness of community policing, cooperative system construction-orientedness, interest of supportive system, etc[10].

Heo Yong-hoon, Moon Yoo-seok, and Sohn Neung-soo considered the entities of community policing as key elements of community policing and stated that cooperation between the police and communities influenced implementation of community policing[11][12].

3. Methodology & Analysis

3.1. Methodology & variable details

The study conducted a survey of 3 regions, i.e., Seoul, Gyeonggi-do, and Incheon, from November 20 to December 31, 2013. Questionnaires were distributed to the police officers working in life safety departments, patrol divisions, and precinct stations of police stations located at concerned regions.

Community policing awareness factors, designated as variables in this study, were used as basis for deriving and selecting 2 elements associated with policing objectives and policing entities through comparison of Sparrow's traditional policing and community policing as examined in theoretical background and review of preceding studies in order to analyze results of survey.

For analysis of data collected from survey, t-test and ANOVA(Analysis of variance) were performed by using SPSS21.0 to comparatively examine the difference in awareness towards community policing, depending on socio-demographic characteristics of the police.

3.2. Results of analysis

3.2.1. Socio-demographic characteristics

Socio-demographic characteristics of respondents in this study are presented in <Table 1>. By gender, men and women comprised 93.9%(262 persons) and 6.1%(17 persons), respectively, which shows that male respondents outnumbered female respondents. By age, respondents in their 20s comprised 9.3%(26 persons), and those in their 30s comprised 47.7%(133 persons). Meanwhile, respondents in their 40s and 50s or older accounted for 31.5%(88 persons) and 11.5%(32 persons), respectively.

For local administrative districts in service, respondents carrying out duties in Seoul, Gyeonggi-do, and Incheon constituted 69.2%(191 persons), 26.8%(74 persons), and 4.0%(11 persons), respectively. For type of local urban area in service, respondents carrying out duties in residential area and agricultural/fishery area comprised 72.8%(201 persons) and 5.4%(15 persons), respectively.

Meanwhile, those carrying out duties in commercial/entertainment area, industrial area, and other areas accounted for 17.4%(48 persons), 1.1%(3 persons), and 3.3%(9 persons), respectively.

By rank, patrol officer, senior patrol officer, and sergeant comprised 24.4%(68 persons), 19.4%(54 persons), and 25.8%(72 persons), respectively. Meanwhile, lieutenant and captain or higher rank accounted for 29.0%(81 persons), and 1.4%(4 persons), respectively.

For the type of organization in service, it was found that precinct stations, patrol divisions, and police stations constituted 28.8%(79 persons), 32.5%(89 persons), and 38.7%(106 persons), respectively. For the working period, those in service for less than 1 year comprised 9.0%(25 persons). Those in service for 1 year to less than 1 year comprised 20.5%(57 persons). Those in service for 2 years to less than 3 years accounted for 14.4%(40 persons), and those in service for 3 years or longer comprised 56.1%(156 persons).

3.2.2. Awareness towards community policing, depending on socio-demographic characteristics of the police

The t-test and ANOVA(Analysis of Variance) were performed to examine the extent of awareness towards community policing, depending on socio-demographic characteristics of the police. The results are presented in <Table 2>.

In the first place, the study looked into the difference in the extent of awareness towards policing objectives, depending on socio-demographic characteristics of the police. The results showed a significant difference in 4 items, i.e., age, local administrative districts in service, type of local urban area in service, and working period.

By age, the results showed higher awareness in those in their 20s and 40s than in those in their 50s or older($p<0.05$). For local administrative districts in service, the extent of awareness towards policing objectives was higher among those in Incheon than those in Seoul($p<0.05$).

Based on the type of local urban area in service, the extent of awareness towards policing objectives was higher in industrial area by an average of 5 points ($p<0.001$). Based on working period, the extent of awareness towards policing objectives was highest among those in service for less than 1 year, followed by those in service for more than 2 years to less than 3 years and those in service for more than 3 years($p<0.05$).

Second, the study examined the difference in the extent of awareness of policing entities, depending on socio-demographic characteristics the police. The results showed that there was a significant difference in 5 items, i.e., gender, age, local administrative districts in service, type of local urban area in service, and organization in service.

By gender, women were found to have higher awareness than in men in terms of policing entities($p<0.001$). By age, those in their 20s and 40s had higher awareness($p<0.01$). Based on local administrative districts in service, those in Incheon showed higher awareness towards policing entities than in those in Seoul and Gyeonggi-do ($p<0.001$). Based on the type of local urban area in service, those in agricultural/ fishery regions and industrial regions showed higher awareness($p<0.001$). By organization in service, patrol divisions were found to have higher awareness towards policing entities than precinct stations($p<0.01$).

Table 1. Socio-demographic characteristics.

Type		Frequency (person)	Ratio(%)	Type		Frequency (person)	Ratio(%)
Gender	Men	262	93.9	Rank	Patrol officer	68	24.4

	Women	17	6.1		Senior patrol officer	54	19.4
	Subtotal	279	100.0		Sergeant	72	25.8
Age	20s	26	9.3	Organization in service	Lieutenant	81	29.0
	30s	133	47.7		Captain or higher position	4	1.4
	40s	88	31.5		Subtotal	279	100.0
	50s or older	32	11.5		Precinct station	79	28.8
	Subtotal	279	100.0		Patrol division	89	32.5
						Police station	106
Local administrative districts in service	Seoul	191	69.2	Working period	Subtotal	274	100.0
	Gyeonggi-do	74	26.8		Less than 1 year	25	9.0
	Incheon	11	4.0		1 year to less than 2 years	57	20.5
	Subtotal	276	100.0		2 year to less than 3 years	40	14.4
Type of local urban area in service	Residing area	201	72.8		3 year or longer	156	56.1
	Agricultural/fishery area	15	5.4		Subtotal	278	100.0
	Commercial & entertainment area	48	17.4		Industrial area	3	1.1
	Others	9	3.3		Subtotal	276	100.0
	Subtotal	276	100.0				

Table 2. Difference in awareness towards community policing, depending on socio-demographic characteristics of the police.

Type		Community policing objectives				Community policing entities			
		Mean	Standard deviation	t or F	p	Mean	Standard deviation	t or F	p
Gender	Men	3.91	0.735	1.473	.142	3.46	0.938	-4.836	.000
	Women	4.18	0.611			4.16	0.542		
Age	20s	4.08b	0.688	2.784	.041	3.69b	0.997	4.630	.004
	30s	3.83ab	0.771			3.38ab	0.954		
	40s	4.08b	0.686			3.77b	0.831		

	50s or older	3.81a	0.644			3.22a	0.926		
Local administrative districts in service	Seoul	3.86a	0.737	3.738	.025	3.37a	0.931	9.380	.000
	Gyeonggi-do	4.04ab	0.681			3.75a	0.857		
	Incheon	4.36b	0.674			4.33b	0.803		
Type of local urban area in service	Residing area	3.98ab	0.667	6.495	.000	3.54a	0.901	8.326	.000
	Agricultural / fishery area	4.37bc	0.694			4.47b	0.532		
	Commercial / entertainment area	3.59a	0.829			3.22a	0.809		
	Industrial area	5.00c	0.000			4.78b	0.192		
	Others	3.67a	0.866			2.96a	1.047		
Rank	Patrol officer	3.91	0.791	.520	.721	3.48	0.924	1.104	.355
	Senior patrol officer	3.87	0.754			3.31	0.979		
	Sergeant	3.88	0.710			3.55	0.823		
	Lieutenant	4.02	0.684			3.65	1.005		
	Captain or higher position	3.88	0.854			3.33	0.943		
Organization in service	Precinct station	3.85	0.757	1.524	.220	3.26a	0.935	5.888	.003
	Patrol division	4.03	0.714			3.75b	0.906		
	Police station	3.89	0.730			3.51ab	0.920		
Working period	Less than 1 year	4.28b	0.678	2.803	.040	3.69	1.045	.490	.690
	1 year to less than 2 years	3.98ab	0.807			3.56	0.981		
	2 year to less than 3 years	3.95a	0.714			3.50	0.970		
	3 year or longer	3.84a	0.702			3.46	0.898		

4. Discussion on Results of Analysis & Policy Recommendation

In this study, we analyzed the awareness towards community policing, depending on socio-demographic characteristics of the police. The results of analysis showed a significant difference in 4 items, i.e., age, local administrative districts in service, type of local urban area in service, and working period, regarding the community policing objectives. For community policing entity, a significant difference was observed in 5 items, i.e., gender, age, local administrative districts in service, type of urban area in service, and organization in service.

For items that showed a significant difference, 3 items, i.e., age, local administrative districts in service, and type of urban area in service were found to be common to objec-

tives and entities of community policing objectives. By age, the extent of awareness was higher in those in 20s and 40s than in those aged 50s or older in connection with the 2 elements. This suggests that younger police officers had higher acceptance towards community policing.

For local administrative districts in service, those in Incheon showed the highest awareness towards the 2 elements. For type of urban area in service, those in industrial areas and agricultural/fishery areas showed the highest awareness towards the 2 elements. It was found that environmental and social characteristics, depending on organization in service, had an influence on awareness towards community policing of the police.

Aforesaid discussions showed that programs would need to be designed which can

increase awareness towards community policing through different types of education, promotion, creation of organizational culture, etc., depending on working environment, region of work, age, etc., not the once-size-fits-all activities for community policing, in order to raise awareness towards community policing. In addition, right community policing should be established through cooperation with communities based on improvement of awareness among the police towards community policing by implementing those programs vigorously.

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Intelligent Digital Forensic Analysis Method for CYBER CRIME INVESTIGATION

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Abstract

This study aims to provide an intelligent forensic examination and analysis method for large-scale data and data of various resources on diverse cybercrimes that are recently increasing. The purpose of the proposed method is to preemptively cope with cybercrime problems by integrating large amount of data and conducting intelligent analysis of data. A semantic web-based method which performs metadata forensic investigation and analysis, the proposed method consists of four steps: collection, examination, analysis, and presentation. There is an advantage to collecting all metadata of heterogeneous sources from using XML files to represent metadata and then using metadata repository. The Semantic Web technology can integrate metadata in repositories using ontologies to retrieve related metadata. Artificial intelligence and analytical methodologies can be applied to obtain potential evidences that can be used in court in a meaningful way. Because of the increase in cybercrime, the complexity in types of cybercrime, and the limitations of time and resources, it is important to obtain desired outcome in a timely manner in any cybercrime investigation. Instead of the posterior method of chasing a cybercrime after its occurrence, a new method that can preemptively detect and eliminate cybercrime risks is required. The explosive increase of data on cyberspace also calls for efficient forensic techniques for large amount of data. It is expected that this study will ultimately contribute to reducing cybercrimes since proactive detection of and preemptive action against cybercrimes can be accomplished through the use of forensic techniques for large-scale data.

[Keywords] Policing, Cybercrime, Digital Forensics, Intelligent, Digital Forensic Investigation

1. Introduction

Looking at the trend of crime occurrence, cybercrimes are increasing more rapidly than traditional crimes. The occurrence of cybercrimes has more than doubled in the past 10 years. Because the seriousness and scale of damage from these cybercrimes are becoming more massive, the current circumstances call for consideration of strong international countermeasures against cybercrimes. Unlike traditional crimes, cybercrimes are difficult to trace because the criminals hide behind anonymity and their evasion and concealment techniques are advanced. Because the resulting damage is so grave, preemptive response is required. And for preemptive response, it

is necessary to establish a system for collecting and analyzing information about cybercrimes[1]. Departing from the posterior method of chasing a cybercrime after its occurrence, a method that can detect preemptively and eliminate the risks is required. This can be achieved through consistent work such as targeting and prioritizing the subject of investigation, recognizing hacking organizations and collecting relevant information, identifying the scale and danger of attack, and securing leads and evidences. Furthermore, given the explosive increase of data on cyberspace, it is necessary to develop efficient forensic techniques for handling large amount of data. Forensic techniques for such

large-scale data will enable proactive detection of and preemptive action against cybercrimes. Therefore, this study proposes an intelligent digital forensic method needed for preemptive actions against cybercrime problems.

2. Related Studies

2.1. Cybercrime and digital forensics

In a narrow sense, cybercrime is defined as any criminal activity that takes place through an information network system such as the Internet, which can also be referred to as internet crime. However, this definition is limited in that it does not cover crimes that are not mediated by the Internet. A more comprehensive meaning of cybercrime which is becoming more general these days encompasses all types of crimes occurring on cyberspace including existing computer crimes[1].

Therefore, cybercrime can be defined as a criminal act that harms unspecified masses in a short period of time, transcending time and space, in a computer system connected to information and communications network including the Internet or in cyberspace where such a system serves as a medium[2].

At the Digital Forensics Research Workshop(DFRWS) held in 2001, digital forensic science was defined as “the use of scientifically derived and proven methods toward the preservation, collection, validation, identification, analysis, interpretation, documentation and presentation of digital evidence derived from digital sources for the purpose of facilitating or furthering the reconstruction of events found to be criminal, or helping to anticipate unauthorized actions shown to be disruptive to planned operations[3].”

Since digital evidences stored in a digital device are recorded by magnetic fields or electric charge through a storage device, they are different from other analog evidences such as blood marks and fingerprints in that they are characteristically unidentifiable with the naked eye and easily alterable. Therefore, for digital data to be accepted as evidence in court, it should be handled according to

standardized procedure and method recognized by the law. A series of procedures and techniques, from collecting digital data from a computer system or digital device, to analyzing the data and preparing a report about the analyzed data along with the preservation of evidence, are collectively referred to as digital forensics[4][5].

2.2 Mass data analysis and related technologies

Digital forensics faces many challenges in overcoming the problem of analyzing evidences in a big dataset. For the advancement of bigdata forensics, numerous solutions and techniques for large dataset analysis are being studied including classification, artificial intelligence, data mining, data clustering and data reduction[6].

2.2.1. Data clustering

Clustering refers to the technique of grouping similar data together. In general, clustering in IT technology refers to the technology of connecting multiple servers and using them as a single server. But data clustering, as a part of data mining, means the technique involving the analysis and classification of data. Recently, data clustering is being used in many areas. It is especially studied and used in data analysis. A few data clustering algorithms and techniques have been proposed for big data analysis. The type of clustering algorithm used varies depending on the kind of data to be analyzed[7]. Accordingly, numerous studies are underway in this area. Nevertheless, all clustering algorithms are intended for finding patterns in data and grouping data that show similar patterns. K-means clustering algorithm is an analytical method that groups a data set into clusters to learn the characteristics of each cluster, and thereby understand the entire structure of the data set. The algorithm works by grouping the given data set into K number of clusters and minimizing the variance of distance between each cluster. The hierarchical clustering algorithm is one of the data mining techniques that uses a statistical analysis method.

2.2.2. Data linkage profiling

Data linkage profiling, one of the profiling techniques used to determine whether a series of crimes are caused by the same person, sorts crimes that appear to be the act of the same the perpetrator when the identity of the perpetrator is revealed[8]. As a tool for analyzing such linkage, Korean Natural Language Package(KoNLP), developed by KAIST Semantic Web Research Center and currently being managed as open source, supports data linkage profiling which detects and sorts the motive or purpose of crime[9].

2.2.3. The semantic web

Semantic Web is the next generation intelligent web that enables the computer to understand information resources and even make logical inferences. In other words, unlike the current web which is conveniently designed to be read and interpreted by ordinary people, the Semantic Web refers to an intelligent Web that expresses information in a new form of language to be understood by computers, allowing machines to communicate with one another[10]. The current web-based documents are composed of natural language that can be understood by ordinary people. However, the Semantic Web operates on the principle of changing linked meaning between information sources into a form of language that can be understood by computers, thus enabling computers to interpret the meaning of information sources, exchange information with one another and autonomously handle necessary tasks[11].

3. Intelligent Digital Forensic Analysis Method for Cyber Crime Investigation

The proposed system is intended to provide intelligent forensic examination and analysis method for large-scale data and data of various resources. The outline of the proposed method is shown in <Figure 1> and consists the general procedure of digital forensics: collection, examination, analysis, and presentation/reporting.

3.1 Collection or acquisition

The collection stage is for extracting relevant forensic information from suspicious documents. Tools such as AD enterprise, Encase and FTK can be used at this time. Imaging should be carried out on all suspicious resources that can be used in the same case. For digital media resources such as hard disks or mobile devices, a complete bit-by-bit duplicate should be created, while the images in them should be stored in a secure repository. Data preservation is carried out using hash functions that can later be used to verify the integrity of all evidences.

3.2 Examination

In the examination stage, the Semantic Web technology is used for writing XML file, which represent data filtering and reduction, metadata extraction, and metadata file. The detailed phases of this stage are as follows.

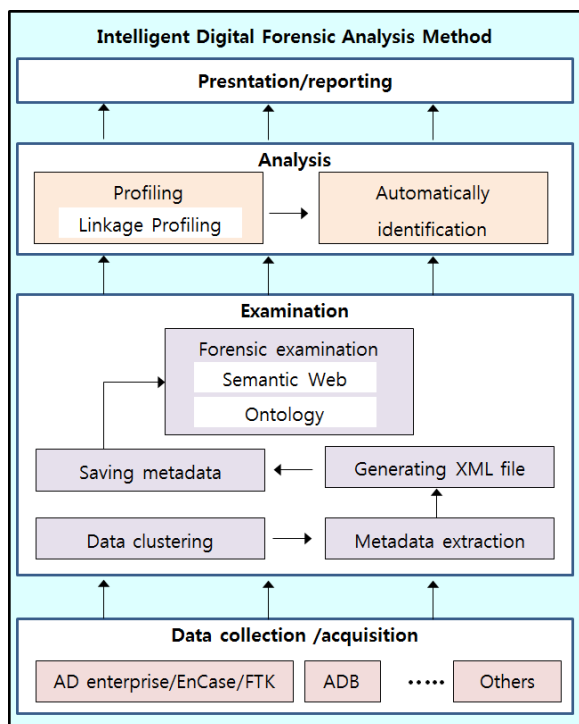
Phase 1. Data clustering

At this phase, most forensic tools and research agencies use a hashing library to compare files identified in the suspect's case with other known files and to separate related files from positive files. Consequently, unnecessary files are not examined and the investigator can save time and effort.

Phase 2. Metadata extraction

At this phase of the examination stage, metadata extractors are provided according to types of original resources including hard disk, log file, network packet and email. In order to extract metadata, metadata extractors determines the metadata to be extracted. For example, information that have general meaning can be extracted from hard disk files while events can be reconstructed by using the properties of log file and network packet as metadata. The output is provided as structured information for easy data retrieval from digital resources.

Figure 1. Proposed model.



Phase 3. Generating XML file

XML is a way that makes structural information more easy to read. After extracting the metadata, XML files are used to generate metadata for each file. Consequently, the output at this phase is XML file-based metadata forensic image. Using metadata, the XML file representing the metadata of the original file will be much smaller than the original file. When engaged in forensic activities, most investigators are interested in data admissible as evidence. With the use of XML, investigators can quickly verify data of interest in every step of the investigation. Furthermore, the size of the data set required for the next phase can be reduced.

Phase 4. Saving metadata

In this phase, the metadata extracted in the previous phase is saved in a DB. It has the ability to support metadata forensic image of various resources and data of various related digital evidences.

Phase 5. Forensic examination

At this phase of the stage, the Semantic Web technology incorporates metadata that

exists in the repository using ontologies to retrieve related metadata. Using the Semantic Web, the system can extract meanings from web contents and retrieve the results. Ontologies can automatically extract new facts or find errors that do not meet the constraints because inference rules may be specified. Therefore, ontologies can be used in collecting and expressing knowledge and also in knowledge modeling and retrieving relevant artifacts based on the queries of the investigator by supporting the inference function. Expedited crime investigation and preemptive response to cybercrime problems can be realized by establishing a digital forensic system in the form of ontology-based system instead of individualized digital forensic analysis and usage so as to determine the integrity and reliability of the collected evidences and prove their credibility.

3.3. Analysis

Phase 1. Profiling

At this stage, artificial intelligence techniques are used to find associations between artifacts, which are outcomes from the previous phase, and to reconstruct the event based on the associations. In other words, the entire context of the digital crime investigation is reconstructed chronologically or in the order of events. In a digital crime, time information of a file can be adjusted by the offender. However, since numerous time information is altered even by a single act, it is impossible for an offender to adjust all time information. Therefore, reconstruction of an event using time information must be done accurately with full awareness of possible time information modification. This stage will consequently provide the answers to 5W1H, questions that will be raised during the forensic analysis. This stage finds linkage between artifacts and provides automated artifact identification for the reconstruction of events. Eventually, the evidence of the crime is automatically identified as a result of this stage.

3.4. Presentation

At this stage, the information obtained in the previous stages are interpreted in a report format, allowing the digital classification

investigator to find out the results of interest and study about cybercrimes and countermeasures, or to help make quick decisions on the priority of evidences. Artifacts are interpreted and applied as needed, and the format of the report evolves as the tool evolves.

4. Conclusion

In this paper, a method for performing metadata forensic investigation and analysis is proposed in order to identify potential evidences from various and large resources. In the first stage, a variety of techniques are used based on the type of resource to collect and preserve the data. For example, post-acquisition may be used when collecting data from hard disks and mobile devices but not for network traffic or online databases. Therefore, research on effective techniques is required in order to obtain the necessary information. The second stage several processes are applied. The first process involves performing data reduction and filtering to determine potentially relevant data without human interaction. Since all subsequent processes depend on extracted metadata, metadata extraction is an indispensable process in this framework. The metadata is also used to reconstruct past events. Using an XML file to represent the metadata is helpful for the semantic web process. Subsequently, using the metadata repository is advantageous for collecting all the metadata of the heterogeneous source. Therefore, semantic web technology can integrate metadata existing in the repository using ontology to retrieve related metadata.

Obtaining desired outcome in a timely manner from a cybercrime investigation is becoming more important due to the increased number of cybercrimes, the complexity of types of cybercrime, and limitations in time and resources. In order to meet this need, it is necessary to improve the usage of available resources departing from those functions and constraints of currently available forensic tools and develop a more intelligent technique in digital examination process. Recognizing the need for such tools and techniques, this study suggested an intelligent

and automated digital forensic method by applying the principles and procedures of artificial intelligence to digital forensics in order to preemptively respond to cybercrime problems. The proposed method aims to preemptively cope with cybercrime problems by integrating a large amount of data and conducting intelligent analysis of them. It is recommended for future studies to implement and verify the proposed method. The use of ontology-based forensic described in this study is expected to provide an easy environment for evidence examination and contribute to crime prevention.

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A Study on the System of CRIME PREVENTION in Parks Using Augmented Reality Technology

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Abstract

Users of parks have been progressively diversified, and crimes in parks have been increasing due to the problems such as lack of police security resource and insufficiency of management and operation of the park managerial agents. Hence, this research would like to propose a park-crime prevention system based on augmented reality technology as a measure to predict and prevent crimes in parks.

Augmented reality as a type of virtual reality, is an integration of experiences in virtual and actual realities, which presents a combination of computer graphic images including virtual entities such as animation, motion, image, audio and information with images and background in real spaces. Augmented reality involves technologies tracking location, direction and movement, extracting characteristic points and transferring them to data servers, then understanding through comparisons between the characteristic points. Moreover, Registration technology creating virtual objects via computer graphics and distributing them at their exact locations identical with real images, and UI (User Interface) technology processing mutual interaction between users including the screen, are utilized.

The proposed park crime prevention system from this thesis, at first, establishes a database to comprehensively save data such as geological profiling with analysis of crime type and motion action patterns by criminals who whose main habitat is a park and stereotyped data which space-time pattern has been analyzed from the distributions of crime occurring times and locational spaces during past cases occurred inside of parks. Then, park users will be able to use parks safely from crimes by checking downloaded park crime prevention application in their smart phones, linked with the database storing information.

[Keywords] Policing, Park-Crime, Crime Prevention, Augmented Reality, Vision Base

1. Introduction

A park offers spaces for relaxation and contemplation for park users to enhance their health, rest and sentimental lives, and has been contributing to establishment of healthy social atmosphere as well as discovering life energy of people. However, unlike the expected positive function of parks, as more number of park users increase and the shape of parks is diversified, rate of park crime has increased due to insufficiency of park management and operation as well as lack of practical agents for crime prevention

According to the data from the National Police Agency, occurrence state of park crimes has increased from 2,476 in 2001 to 4,420 in 2010, hence, rose by 178.5%[1]. Looking at an actual recent park crime case examples, a 1st year female student of an elementary school in Muan-gun, coming home from school via a neighboring park road, was almost about to be kidnapped by a strange male with a car, and other examples such as a female tourist murder case in Jeju Olle Route and a case which a woman at fifty was found in a park lake in Gangseo-gu left naked

and dead proves that various crimes including murder, rape and violence are occurring frequently and centrally around parks[2][3].

Therefore, this research urges a proposal which allows preventing park crimes by providing park users the data which cannot be acquired by human senses through augmented reality technology, an integration of actual environments and virtual reality created by a computer.

The composition of this thesis as follows. Chapter 2 analyzes augmented reality technology, augmented reality used for current police operations and the present state of park crime occurrences. Chapter 3 proposes a system that is used for park crime prevention by using augmented reality and Chapter 4 examine the proposed model. At last, in Chapter 5, the thesis is concluded.

2. Theoretical Background

2.1. Augmented reality

Augmented Reality is a technical mixture of actual and virtual images in order to make the computer graphics look actually real from the perspective of users by inserting the computer graphic images into real environment[4].

The major technologies required for Augmented Reality implementation is Tracking technology on location, direction and movement of a user, Registration technology which creates a virtual object and place it on the accurate position in real world, and UI(User Interface) technology dealing with interactions between users such as displays[5].

Augmented Reality works thanks to the Interaction which allows displaying virtual images provided by augmented reality and input image by a user, through devices. If a user input images, the system notifies Detection and Perception of the images and enters Tracking of the target based on the locational / directional basis as well as image basis. Information of the input images during this process are overlapped with a virtual image that the user wants, then Rendering procedure is conducted so that the augmented reality is

visually expressed on a user device. Through mutual interactions of such a Visual Feedback and constant user image input, implementation of augmented reality application is practicable even in a form of video, not only static images[6].

Tracking Module of augmented reality can be divided into halves, a sensor-based technology and vision-based technology, and the vision-based technology can be divided again into marker-basis and non-marker-basis.

Sensor-based technology is a technology incorporating GPS(Global Positioning System), Gyro Sensor, Acceleration Sensor to track location and direction of an object, to figuring out the location of augmented reality, and to visualize contents of related contents.

Among vision-based technology, marker-based technology utilizes camera and recognizes markers such as QR code and it is a technology for tracking and mapping, while non-market technology is a technology providing related data after filtering the filmed images and comparing subjects[7].

2.2. Augmented reality used for police operations

Life-Tracking is a service which automatically records and analyzes data of physical condition and personal behaviors[8]. Physical data including location, image and voice is stored through sensors attached to smartphones and physical bodies, then the data is analyzed, displayed on personal applications in smartphones to help the life habits be improved. Applying this notion in situations when high-risk criminals or sex offenders with an Electronic Bracelet approaches to or enter a crime-ridden district, alarming information is transferred to the augmented devices of the application users, hence, a crime can be prevented.

England Police is planning measures to deal with crimes by utilizing Hololens, an augmented reality hardware made by Microsoft. If police officers enter a crime scene through Hololens using augmented reality technology, by the technology, the crime scene is recon-

structured and various data in the scene is gathered and transmitted to data sever via attached devices[9].

IAPLS is a product of an augmented reality smart phone, developed by an Austrian surveillance system company, if a picture of a suspect is taken with a smartphone, characteristic points of the image is extracted and compared with the images of criminal database, then the product identifies actual criminals. If the suspect is figured out as a criminal, user can use alarming through an automatic loudspeaker and the data is transferred to smart phones of police officers and facilitates tracking the criminal[10].

USMC(United States Marine Corps) has implemented augmented reality for infantry service training. Wearing a HME, trainees can deal with a virtual enemy such as enemy helicopter or tank appearing at a random location by attacking the target. This system creates a virtual enemy on a broad plain, practices attacking the target with actual weapons, and the various weapons are actually implemented, hence the effect of the training gets maximized[11].

2.3. Analysis of park crime occurrences and the present state

Looking at the past crimes occurred in parks or amusement parks between 2011 and 2013, the types are as <Figure2>.

Figure 1. Number of park crime.

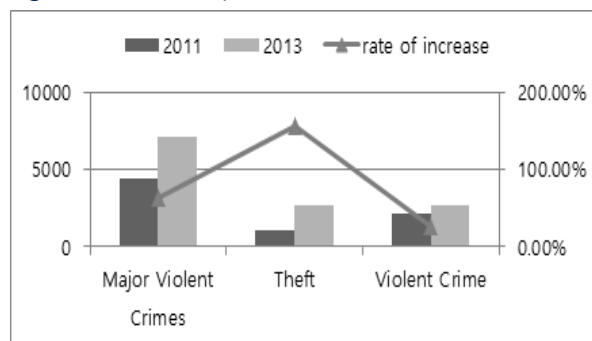


Figure 2. Type of park crime.



For violent crimes occurred in parks, the number increased from 4,376 in 2011 to 7,097 in 2013, by 62.1%, and for theft, the number increased from 1,033 in 2011 to 2,636 in 2013, by 155.1%. Furthermore, in case of crimes of violence, the number increased from 2,137 in 2011 to 2,687 in 2013 by 25.7% of the number in 2011, therefore, the crime rate in parks and amusement park is increasing by and large[12].

Especially, for violent crimes occurred in parks, murder crime was 9 in 2011, 7 in 2012 and 9 in 2013, and theft crime was 29 in 2011, 19 in 2012 and 12 in 2013. However, the number of crimes of rape and incident act by compulsion was 165 in 2011, 183 in 2012 and 296 in 2013, hence, occurring much more frequently than other violent crimes such as murder and theft[12].

The fact that these crimes are constantly increasing means a crime prevention measure is strongly need for park crimes and it is perceivable that crimes of rape, incident act by compulsion and violence are continuously increasing among the various types of park crimes, compared with other crime types. Accordingly, to prevent park crimes, patrol reinforcement around parks is urgent, however, due to the problems such as lack of budget and police human resource, the reinforcement of patrol is not an easy task in a short period of time. For that reason, a park crime prevention system incorporating an augmented reality technology is proposed.

3. Park Crime Prevention System Using Augmented Reality Technology

The proposed park crime prevention system consists of Augmented reality display, Device-in-smart phone, Location-based network, Location server and Crime information-database server.

A smart phone is the augmented reality mobile device for implementation. After installation and running the application, location data of the user is transmitted to the location server via GPS, then if a picture of a suspect is taken with the smartphone, the image is sent to crime information-database.

Location-based network provides various services to users by using gathered location information via GPS or cable/radio mobile communication network.

Location server provides a service notifying location information where the user is located and a map service displaying the user location, as well as the locations where crimes have frequently occurred.

Crime information-database server store a synthetic data including geological profiling with analysis of behavior patterns and crime types of criminals whose main habitat is a park and stereotyped data which space-time pattern has been analyzed from the distributions of crime occurring times and locational spaces during past cases occurred inside of parks.

The execute phases of park crime prevention system with augmented reality technology as follows.

Phase 1)Application Download and Run

Park users download and install the park crime prevention application from the National Police Agency web site on smartphones. When the application is run, the location data of the user is automatically stored in location server.

Phase 2)Marker Scan

Park users take a picture of the marker established at the park entrance with

smartphone cameras. Once the taken marker image is transferred to location server, park information that contains an identical image is searched. If park information is found, crime information of the given park is searched from the crime information-database server and through integration of image and crime information and Rendering procedure for augmented reality implementation on smart phones.

Phase 3)Utilization of Park Crime Prevention System

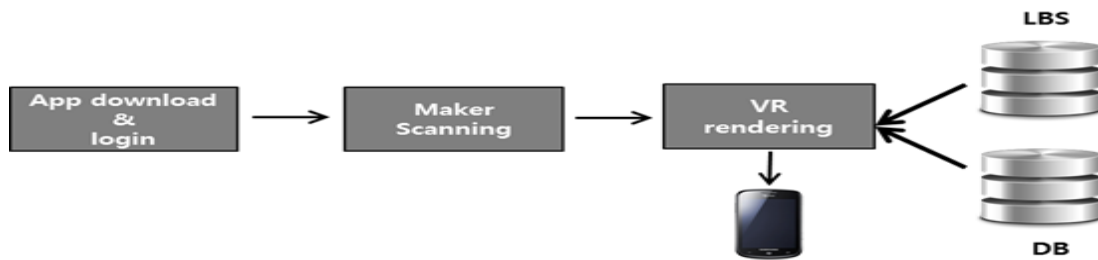
If any suspicious suspect is found in parks, smart phone cameras photographs the suspect. The filmed images are sent to the crime information-database and any related crime information is searched. If any matching data with the suspect is identified, alarming sound is generated from smart phone at the same time the location information and criminal data are sent to police. Then, the criminal data identified by the park users is updated to the crime information-database server.

4. Contemplation of the Proposed Mode

This thesis proposed a park crime prevention system utilizing augmented reality technology to ensure safe use of parks. The proposed system consists of smartphones, location-based network, location server, crime information-database server.

By integrating the saved crime information in crime information-database server with the real-time image from a park, the system is implemented through the smartphone of a user. Park users can prevent crimes as they can be notified with frequent locations and time of crimes by having augmented reality implementation according to their own time and location. Furthermore, if the image of the suspicious person is transferred to the crime information-database server and be confirmed, then the system can help the patrol operations of police by provision of the data to police.

Figure 3. Proposed system.



5. Conclusion

Due to the constant increase in park crimes for the past 10 years, parks where people can get rest have been giving huge inconvenience to people with the senses of unrest and being threatened upon free park uses. Upon the increasing park crime, police supposed to be reinforcing its patrol forces as a measure for civil protection, however, due to the problems of lack of budget and difficulties in sufficient human resource acquisition, coping with the park crimes in a short moment is not easy. Therefore, this thesis proposed a park crime prevention system incorporating augmented reality technology.

By inserting computer graphic images into real images, utilizing augmented reality which is a technology synthesizing actual and virtual images and allowed provision of park crime data according to the location and service time of users, making people assume the computer graphics as actually existing ones became available. Moreover, any information regarding any encountering suspicious suspects in parks becomes available through augmented reality technology and can be transferred to police.

Augmented reality, organically interacting with actual reality, is looked as if it will be used for more efficiency in various police operations and training fields which involves more rapid and reasonable decision-making procedures.

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Analysis of POLICE Portrayal Patterns in KOREA Crime Films: Focusing on the Two Crime Films of Box Office in the 2000s

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Abstract

This paper analyzed Korea 'crime films' in 2000's, extracted the characteristics and problems of 'the police' portrayal patterns and searched for the right direction for the reproduction of the mass media of the police in the future. Particularly, it examined the portrayal patterns of the police, focusing on the box office movies <Public Enemy>(2002) and <Memories of Murder>(2003), which were produced and screened since the 2000s. Related to the common model after that, I tried to find a way to improve the image of the police properly. The theoretical background of this paper is based on the cultural contextual analysis methodology. Film is a multi-layered product formed in an influence relation with various discourses derived from society, rather than an embodiment of its own autonomous and independent meaning. The three common aspects are shown as follows. The three films commonly deal with violent crimes committed during the same period of 'serial murder', and they also created a model for police by creating specific meaning for 'crime' and 'police'. Specifically, <Memories of Murder> reproduces the violence of the police, and <Public Enemy> reproduces police image of the illegal small heroism. Therefore, it is required that the efforts of the police in order to settle the old remnants and negative factors of the police that have been going on to date and to form the image of the scientific, rational and ethical police.

[Keywords] Policing, Crime Films, Mass Media, Violence, Illegality

1. Introduction

The purpose of this paper is to analyze the Korea 'crime films' in 2000's, to extract the characteristics and problems of 'the police' portrayal patterns and to find out the right direction for the reproduction of the mass media of the police in the future. Generally in the nature of the media, the police exposed to various mass media tend to show 'visual portrayal', that is, as a sort of spectacular image rather than their actual role in the investigation process. When this happens, it is natural that the degree and direction of perception is determined by the image of the police exposed to the mass media. Actually, the police investigation process copying with vio-

lent crimes in society has been exposed directly to mass media, including the press, so that public opinion about the role and image of the police has become more frequent in recent years. This can be guessed from the following discussion. "The mass media and the police also assess what is right in solving the case, define 'what is justice of this society' by expressing their views on moral values and norms and popular myths together with facts". This discussion suggests that in close interaction between police and mass media work to define social justice is being done. It should be noted, however, that these interrelationships are fundamentally the consequences of the police investigation process

being consumed by the public. If fundamentally the role and image of the police exposed to the mass media are limited and negative, the mutual cooperation process of the mass media and the police for the realization of 'social justice' becomes scarce. Rather there is concern that the public may be distrustful of the police and a negative image be fixed.

In this article, 'film' is not only recognized as attractive to many people as called the whiteboy of the 'mass media' but also problematic in that it can inject certain ideology. Since the process and role of various incidents and accidents reported on TV or the Internet are usually transmitted as a 'one-off' articles of short-breathing information, it is

dealing with violent crime from the box office films produced and screened after the 2000s, and examined the police portrayal patterns. Through the analysis of the common model extracted from the representation of the police, I try to find a way to improve the image of the police properly.

2. Theoretical Background

The theoretical background of this paper is based on the cultural contextual analysis methodology. 'Cultural Contextual Methodology' is a methodology of reducing 'film' to one dimension of 'cultural products' formed in the antagonistic relationship between var-

important to inform the public about the specific incident and the police, there is a limit to form deep thinking, there is a limit to form a deep thinking for a specific incident and the police investigating it[1]. On the other hand, it adds a certain value judgment on the information of the incidents and the accidents as well as the long breathing since the film is based on a specific 'Narration' and 'Theme'. Thus it is easier to form an in-depth thought about the 'police' investigating the case and create a specific image.

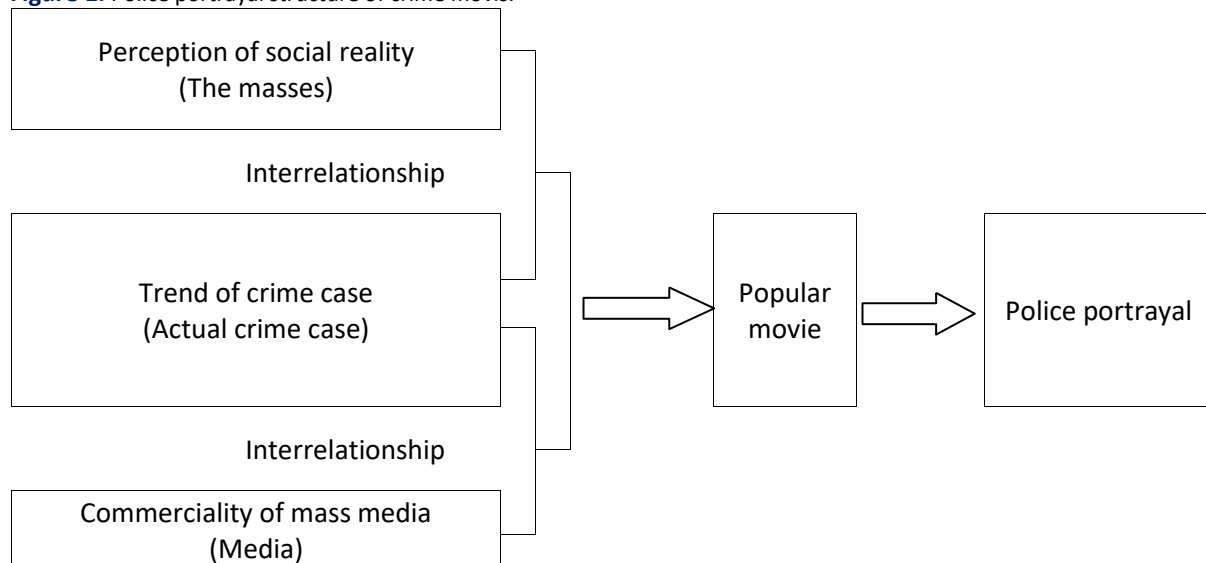
Therefore, in this paper, I analyze the portrayal patterns of police in 'film'.

In particular, I selected two movies

ious cultural discourses. Film is a multi-layered product formed in an influence relation with various discourses derived from society, rather than an embodiment of its own autonomous and independent meaning.

The representative factors related to the production of Korean films dealing with 'crime' can be summarized three category as follows. This is the relationship between 'public perception of social reality', 'commerciality of mass media' and 'trend of crime'. Within these three correlations, a 'public film' that deals with 'crime' is produced and a specific police image reproduced in the film can be extracted. This is roughly illustrated as follows.

Figure 1. Police portrayal structure of crime movis.



3. Reference Research

Two recent studies related to this study are as follows. First, 「The Formation of Narrative Convention and the Social Implication of Cop movies: An Analysis of South Korean Cop Movies from the 1990s to 2000s.」 analyzed overall the genre and narrative convention of cop movies while tracing the genealogy of 'Cop Movies' since the 1990s[2]. This study basically analyzed the works focusing on the media characteristics of 'movie', 'plot', 'character' and 'image expression system'. In a similar way, the research that focuses on 'narrative convention' is 「The Representation of Cop and Korean Society : An Analysis of Narrative Structure of Korean Cop Movies」 [3]. This paper also selected movies that can be categorized as 'cop movies' from Korean films produced from 1990s to 2009, and then discusses the narrative convention of cop movies in relation to the ideological specificity of Korean society. However, these studies have not been able to analyze the interrelationship of 'commerciality of mass media' that constitute society, 'perception of reality of the masses' and 'crime case', simply expose the limitation of reproducing the patterns of the police in the big discourse of 'ideology'. For example, in the way of recreating the image of 'police' as 'the common householder', this paper focuses on the aspect of economic polarization in the present day and associates the image of 'ordinary people' with the image of 'police'. As a result, the total reality of the present day is confined to the 'economic' dimension. It is a simple logic to join the police as an economical weak.

Another question is that it is possible to select a specific 'genre' called 'cop movie'. Previous researchers have defined a film that focuses on 'police' as a specific genre called 'cop movie'. However, even if the film's main character is policeman, it is often referred to as a 'thriller' or as a 'crime film'. Therefore, rather than attempting to analyze movies within a specific genre of 'cop movie', it is more reasonable to analyze police portrayal patterns in a more comprehensive category of 'crime film'. Jung points out "It is difficult to say that crime film constitute a genre like

melodrama or comedy[4]". It can be seen from this part that the term 'crime film' can be used as an arbitrary category for analyzing movies that reveal a certain tendency rather than forming a certain genre.

Therefore, it is necessary to tie a certain tendency of 'crime film', 'a movie dealing with crime as a material' under the category of 'crime film', and to examine the police portrayal patterns. It would be appropriate to analyze the image of the police reproduced in Korea crime films as a product of popular culture.

4. Analysis of Police Portrayal Patterns in Korea Crime Films

4.1. Image of violent police, <memories of murder>

Director Bong Joon-ho's movie <Memories of Murder> was the number one Korea movie of box office that year when it opened with 526 million viewers. It was a social issue in that it made a film about the 'Hwaseong serial murder' that actually occurred as the movie that combines quality and popularity. It is also very easy to research police portrayal patterns because the process of investigation of the incident itself forms a 'narrative'. Each of the three police officers in the film is reproduced as a different character. Park du man is a violent policeman of homicide bureau who forsakes false confessions by interrogating suspects such as Baek kwang ho, who is a witness of crime, with a bullying investigation. If you follow the narrative of the movie, it is easy to find that violent investigation which are representative of Park doo man, interfere with the statements of important suspect and distort and report the incident rather than the failure of the field preservation and the lack of scientific investigation techniques. Cho, who appears as a colleague of Park doo man, shows the typical behavior of 'torture detective'. The horrific violence of Cho in the shaded and closed 'interrogation room' located in the basement of the police station, reproduces nakedly the physical violence implicated in police power, breaking down the boundary between the 'legality' and 'illegality'. "The composition of

the film that individual men who are former - incumbent police are trying to take the killer by violence, without the functioning of the police organization as a national organization, pose a significant problem. The biggest problem is that the weak people are perceived to be desperate to demand protection from the state or society[5]". In the reality of the rapid increase of crime in society in the 2000s, the ruthless violence that is reproduced in the film and the recreation of illegal torture in the veil of legitimacy caused distortion of perception that further heighten the public's doubts and despair over the social safety net. "According to the National Statistical Office's Social Security Survey, 57.2 percent of the respondents said they were fearful of crime in 1997, 56.6 percent in 2001, and 57.9 percent in 2005[6]. Fear of the crime of the masses is increasing day by day in the social reality, this portrayal of the police recreated in <Memories of Murder> can serve as an unconscious mechanism causing anxiety about crime. Of course, there are rational, logical and gentle policemen like Seo tae yoon on the other side of violent cops such as Park doo man and Cho. In the film, Seo makes an effort to carry out scientific investigation under the belief that the documents do not lie. However, as soon as the result of the genetic test of Park hyun gyu, a prominent suspect, did not come out as expected, Seo is transformed into another face of Park doo man and Cho. He tries to kill him while confirming Park hyun kyu as the perpetrator. As a result, Seo is also represented as a person who weighs more on violence and self-assurance than on objective evidence and logical investigation. It is clear that the movie <Memories of Murder> seeks to preempt the cinematic significance of criticizing the abuses and harms of the power of the day by remembering the serial killings that occurred in the 1980s. However, the violence of the police recreated in the film contributes to the amplification of the increasing crime and anxiety about it, thereby making the public unconsciously internalize the public power represented by the police and doubt and despair of the nation.

4.2. Police image of the illegal small hero, <public enemy>

<Public Enemy> is a movie that shows the process of being born as a hero of a citizen in a police station after Kang cheol jung, a former athlete, was hired as a police officer. In the film, Kang emerges as a corrupt police officer who runs a criminal offense of drug trafficking. However, by the death of the senior detective and the emergence of the serial killer Cho, which emerged as a public enemy, He retrieves the original identity of the policeman and gradually reborn as the guardian of the city. He is the one who speaks out the social demands for the police and the code of ethics that are publicly disseminated to the society that "the child should not kill his parents", "the people's cane", "should not kill people for no reason". The police officers are the representative characters who carry out the 'social role' which is the purpose of the police.

In fact, the persistent interest in Cho and the process of resolving the crime are connected with the notion of social ethics that he speaks out rather than the responsibility and duty as a 'police'. So his rational investigation method as a cop cannot be found throughout the film. He visits Cho suddenly and uses violence, violates the principle of field preservation, disobeys the order of the officer, and conducts illegal practices as a police officer without guilty or ethics. He thoroughly ignores the legitimacy and principles of the process and means to achieve the goal of 'criminal' arrest. This can be interpreted as a cinematic interpretation that reflects the public's psychological desire to regain the stability and order of society by arresting Cho, a 'public enemy' who is the most feared in the movie and uneasy person in the street or the gangster. It is the public calling the existence of the 'police' as the one who carry out voluntarily the so-called small heroism to preserve the city and thoroughly clean the garbage. The increasing number of murders since the 2000s and the emergence of psychopaths including Yoo young chul added to social unrest. In particular, "As for the psychopath which is regarded as dangerous among the criminals, the biased media coverage is likely to overcrowd fear and anxiety of crime[6]" the appearance of powerful police, which seems to be above the law like 'Kang

chul jung', called by the public in the social reality where the rise of criminals such as psychopaths is increasing, is likely to be an important factor in resolving the public anxiety fantastically.

However, the 'heroism' demanded by Kang has a problem in that the police should basically ignore the legal procedures of the investigation process and all the methods of logical verification. The fact that this is not much of a problem for the masses, in itself, allows the public to assume the unconscious consensus of the police. The image of Kang, who stands at the opposite side of the legitimacy of the investigation process, the legitimate procedure, and the logical verification, must be filled with elements such as 'ignorance', 'misdirection', 'illegal act' and 'violence'. The public anxiety about the social reality in which the violent crime increases, and the commerciality of popular culture serve to provide 'dangerous catharsis'.

5. Conclusion and Suggestions

"The appearance of a police officer in a mass media is mostly an image of a crime buster who is fighting against very masculine and tough crime". However, it is also true that 'violence', 'illegality' and 'incompetence' are concealed behind the image as masculine and rough 'crime buster'.

The images of police reproduced in three movies where 'crime incident', 'perception of reality by the masses' and 'commerciality of mass media' are efficiently combined are very negative. Above all, this type of police should be considered more seriously in the sense that it is not so different from the negative image of the police, who was a perpetrator of violent public authority in the past dictatorial period. This is because stereotypes that the police do not change even if the age changes can be internalized to the masses.

Even if you look at the cops who make a false report to the boss in order to pursue Cho, a symbol of chaebol and evil in the movie <Veteran> released in August 2015, you can see that these images of the police are being reproduced to the present time.

Therefore, it is required that the efforts of the police in order to settle the old remnants and negative factors of the police that have been going on to date and to form the image of the scientific, rational and ethical police. Police investigations are gradually evolving into cutting-edge scientific methods due to advancing science and technology, and it is a reality that police reshuffle and reasonable investigation system become established. It is also a challenge that the police should continue to develop in the future.

Therefore, considering the mass influence and power of mass media, it will be necessary to practice various efforts to form a rational, democratic and scientific police image to meet the times.

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Changes in Private Security with Changes in the PUBLIC SAFETY Environment

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Abstract

Public safety is an important index for the quality of life of the public, and the public are taking an increasing interest in it. South Korea is coming up with various public safety policies in order to increase the level of public safety. The police force of a country is the most powerful institution for maintaining public safety but the police is faced with challenges due to insufficient manpower and budget. Furthermore, demand for private security is increasing, with structural expansion and reorganization taking place in the public safety service market. With increased importance in private security, taking private security into account when establishing public safety policies has become not an option but mandatory. Hence, understanding changes taking place in private security from diverse perspectives and understanding the role that it plays must serve as the basis when deciding on the country's policies or systems related to private security and putting them into effect.

The aging population is expected to aggravate the abnormality in the age distribution of the labor market, especially the private security market, when it sees an increased inflow of older workers. But the private security market structurally has an abnormally more older workers than other industries, so when it sees an increased inflow of old labor, it may firmly cement its image as the market for older working population, and problems with the their work capabilities would cause a shift in how private security is viewed.

With increased individualism and increased income made by the public, there would be a continual increase in the demand from the private security industry. With this, the type of demand for private security would change from "place-centric" to "individual-centric." According to the Profit-Oriented Enterprise Theory, increase in personal income would bring about the public's increased desire for ensuring their personal safety and protecting their property, and this would continually increase the demand from the private security industry. Moreover, as individualism takes greater hold in society, the concept of private security is changing from "place security"(concerned with buildings, offices, etc.) to "personal security."

The dual aspect of advancements in science and technology — advancements in telecommunications and IT technology versus increase in various threats — is expected to diversify the ways in which supply/demand works and change how transactions take place in the private security industry. This dual aspect is expected to bring advancements in private security, and advancements in science and technology would bring diversity to public safety services. The diversity in public safety services would also bring about a change to how transactions take place between the provider and the consumer, with advancements in IT technology.

Changes in the laws and regulations would have both a favorable effect and an adverse effect. On the upside, it would increase the size of working age population and reduce the number of older people in poverty. On the downside, it would decrease level of professionalism and the public would have a stereotypical view of the private security sector in terms of the kind of people working there, especially when it comes to their age. The Security Industry Act made it easier for workers to enter the private security sector, and attempted to increase the number of private security firms and beef up the security staff with subsidies given to senior citizens applying for the job. However, with a low level of professionalism in private security and with the program to necessitate paying more than the minimum wage, there is a concern for quality.

1. Introduction

With the rapidly changing 21st century, countries in the world are in fierce competition with each other, all in a bid to increase their own national competitiveness. Public safety in particular is an important index for the quality of life, and has seen an increased interest as of late, with the result of diversification in public safety services and a rapidly growing demand for them.

Private security is one of the pillars of public safety, and the scope and impact of public safety services being provided are increasing. Now, taking into account private security when establishing public safety policies is no longer an option, but mandatory. Recognizing changes taking place with private security from diverse perspectives and understanding its role should serve as the basis when deciding on the introduction of the country's policies or systems related to private security and carrying them out.

The purpose of this study was to examine changes taking place with private security, amid various changes happening with the public safety environment, and examine what kind of a role private security should play in that backdrop, in a bid to expand the frame of understanding when it comes to private security, and to provide basic data for the academic field pertaining to private security.

2. Literature Review

Studies on the role of private security following changes in the public safety environment have largely focused on role recognition, international events/terrorism, collaborative public safety, and large-scale events. Previous studies on how the role of private security is viewed or the role of private security depending on the types of work or collaboration methods attempted to establish the role by expanding the scope of the role through changes in how private security is viewed and

through an active collaboration with the police.

Lee(2009) studied how the role of private security is viewed. His findings indicated that private security was seen as playing a support role to the police, and it was viewed ineffective when it comes to preventing crime and maintaining social order[1]. Gong (2008) found that, while limitations with the police force were recognized, the role of private security was not sufficiently recognized, and called for a need to change how the role of private security is viewed[2]. Jung(2011), Gong(2010), and Suk(2010) studied the role of private security for collaborative public safety. They advocated establishing a collaborative public safety institution involving the police and private security, and called for its active use by changing how private security is viewed[3][4][5]. In their study, Choi(2003), Kwon(2011), Suh(2002), and Bak(2007) called for changes in how private security is viewed by the privatization of the government-led security system, and by improving its self-capabilities, taking some of the power away from the government, and by private/public collaborations[6][7][8][9].

3. Public Safety Environment and Private Security

3.1. Public safety environment

Public safety, according to a dictionary definition, is to maintain and protect the peace and order of a country. According to survey data by Statistics Korea, a greater proportion of people felt unsafe(37.3%) rather than safe (13.7%) when it came to their overall sense of safety in society. Their greatest anxieties had to do with crimes(64.2%) and traffic accidents (51.2%). They felt greater anxiety in the area of everyday living that they can actually see and experience rather than more intangible

things like wars, nuclear weapons, and food security.

3.2. Private security

Private security refers to individuals', organizations', or companies' provision of services related to security and safety, for protecting an individual's profits from various kinds of threats or protecting their life or property, after a payment is received from the individual for the service[10]. Private security guards employed in the private security market are divided into two different types, an ordinary security guard, and a special security guard, as outlined in the Security Industry Act, as employees hired by a corporation with approval from the security industry. According to 2015 data, there are 153,767 private security guards employed in the private security industry, across 4,449 security firms.

4. Effects of Changes in the Public Safety Environment on Private Security

4.1. Changes in the composition of population

With aging population, changes in the composition of population is something that happens in every society as it experiences economic growth. But for South Korea, its compressive economic growth has led to a rapid decline in the birth rate and population aging is happening faster with its population composition. Such aging of population is expected to have various ripple effects across the entire South Korean economy. The age distribution is especially abnormal for the private security market in particular, and if there is an inflow of older population into this industry the proportion of older workers would only increase, which would cement the industry as an industry of older workforce and there would be concerns raised about their ability to do their jobs. The reasons for the inflow of older population include their willingness to keep working into old age, increased labor demand from the sector, and senior citizens preferring to work as security guards.

4.2. Changes in the culture of a society

Triandis et. al(1988) asserted that the complexity of a society and the collectivism/individualism had a relationship in the shape of U. The Korean society has rapidly achieved modernization and industrialization, going from the collectivism of the past to the individualism of today, and in terms of the U shape, we are at the latter half[11][12]. With individualism taking greater hold in society, individuals now want to have greater safety for themselves, as according to the Profit-Oriented Enterprise Theory. This desire for personal safety and increase in personal income ultimately leads to increase in the use of private security services. Individualism brought changes to the consumer demographic targeted by private security firms as well. In the past, private security firms primarily targeted public organizations and facilities used by many people, such as important government facilities, buildings and offices, financial institutions, hotels and department stores ("place security"), but recently they have shifted their focus to providing personal security and self-protection services like home security and safe return home ("personal security").

4.3. Advancements in science and technology

Before the advancements in science and technology, the kind of threats faced by people were mostly natural threats like natural disasters but with industrialization, new kinds of threats are emerging and making a greater impact. Because recent threats like crimes and human-induced disasters are largely a consequence of advancements in modern technology, advancement in science and technology is a major cause of threats.

With advancements in science and technology, more money is spent and more technological developments are made for maintaining security. At the same time, threats also increase. In other words, advancements in science and technology would bring about an expansion in the private security industry by the virtue of improved technology itself, and the dark side of the advanced science and technology — society under greater threats — would also contribute to the increase in

the demand for private security, ultimately making the private security market bigger.

4.4. Changes in the laws and institutions

Laws and institutions for protecting the public's lives and their property are extremely important in society, even more so than other social institutions. Among institutions for public safety, there are those that are changing the landscape of private security. The Security Industry Act, security guard worker program, minimum wage immunity program, and senior citizen subsidies are bringing changes to the private security landscape. Through all this, the private security landscape attempted to transform itself for the better, particularly with the Security Industry Act, which made it easier for workers to enter the industry, and with the subsidies for senior citizen workers working in the industry. However, with the security guard worker program and the minimum wage immunity program, there is a concern that the changes may not be for the better, in terms of quality.

5. Conclusion

Changes in the population composition, changes in the culture of the society, advancements in science and technology, and institutional changes have led to changes in the private security landscape, including its role. In the following we take a look at these changes.

First, the aging population is expected to aggravate the abnormality in the age distribution of the labor market, especially the private security market, when it sees an increased inflow of older workers. But the private security market structurally has an abnormally more older workers than other industries, so when it sees an increased inflow of old labor, it may firmly cement its image as the market for older working population, and problems with their work capabilities would cause a shift in how private security is viewed.

Second, with increased individualism and increased income made by the public, there

would be a continual increase in the demand from the private security industry. With this, the type of demand for private security would change from "place-centric" to "individual-centric." According to the Profit-Oriented Enterprise Theory, increase in personal income would bring about the public's increased desire for ensuring their personal safety and protecting their property, and this would continually increase the demand from the private security industry. Moreover, as individualism takes greater hold in society, the concept of private security is changing from "place security" (concerned with buildings, offices, etc.) to "personal security."

Third, the dual aspect of advancements in science and technology — advancements in telecommunications and IT technology versus increase in various threats — is expected to diversify the ways in which supply/demand works and change how transactions take place in the private security industry. This dual aspect is expected to bring advancements in private security, and advancements in science and technology would bring diversity to public safety services. The diversity in public safety services would also bring about a change to how transactions take place between the provider and the consumer, with advancements in IT technology.

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