Space & Environment is a quarterly magazine published by KRIHS. Its purpose is to introduce current issues on territorial planning in Korea and disseminate research achievements and international activities of KRIHS and other Korean institutes.

Vol. 61 **April 2015**

SPACE & ENVIRONMENT

ISSUES & TRENDS 01

Building a Smart and Safe City: Focus on Reducing Crime

Lee Jae Yong

Prevent Crime with Technology

Crime is one of the worst social problems that negatively affect a society in all facets by undermining a safe urban environment and causing a sense of fear and anxiety among the citizenry. Despite governments' long-standing and ongoing policies against crime, it is still a deeply rooted part of our lives, triggering ever stronger calls for security measures.

Even with anti-crime measures such as Crime Prevention through Environmental Design (CPTED), neighborhood patrol, and closed-circuit TVs (CCTV), crimes are more violent and criminals more intelligent than ever, leading to a corresponding rise in citizens' fear. Particularly worrisome is the sharp rise in crimes against the weak and vulnerable such as children/minors and women. While the increase triggers calls for action, the reality leaves much to be desired in terms of policy and institutional reaction.

Corresponding to this backdrop, there has been an increase in cases using smart information and communication technology (ICT) and private big data for effective crime prevention in some major countries including the United States. ICT and big data are gaining attention worldwide because of their effectiveness in using limited human, physical, and financial resources compared to traditional crime prevention methods largely based on identical facilities and policing. ICT and big data are expected to develop and spread at a rapid pace thanks to their ability not only to proactively respond to increasingly sophisticated crimes but also to effectively prevent ordinary crimes that upset everyday life.

This study reviews the cases using smart ICT and big data to prevent crimes in and outside of Korea and seeks ways to build safer cities based on such technology.

KRIHS Gazette

KRIHS (Korea Research Institute for Human Settlements) was established in 1978 with a mission of creating a beautiful and pleasant living environment. To achieve the mission, KRIHS has been committed to enhancing the quality of life and well-being of the people in the nation with its spatial planning studies and policy suggestions.

Since its foundation, KRIHS has carried out a variety of studies on the efficient use, development, and conservation of territorial resources. Its research areas range from sustainable and balanced territorial development and conservation of the territory to the provision of housing and infrastructure.

Build Urban Safety Networks

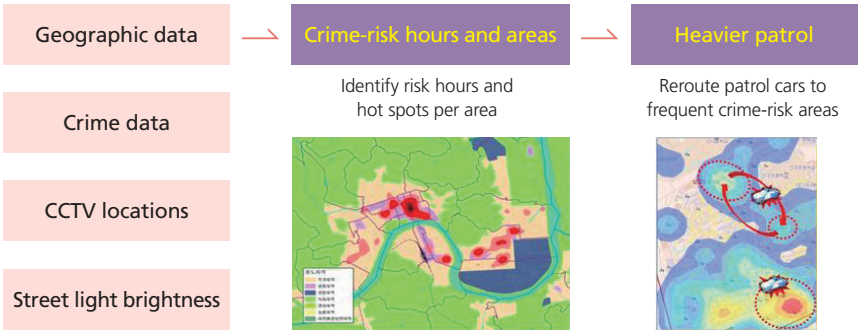
Using big data to build a social security network (i.e., to prevent or investigate crimes) is an issue vigorously discussed in many countries including Korea today. As of 2014, there were 38 big data-related projects underway in Korea with a combined budget of 55.6 billion Korean won.

The National Police Agency's "Geographic Profiling System (GPS)" is a leading example of fighting crime with big data. GPS is a mechanism that applies different types of spatial statistics analytics to criminal investigation data to yield predictions of crime-risk areas. The result can be used for developing anti-crime strategies or conducting investigations based on predictions of serial criminals' locations. Using big data in the field of criminal investigation plays a key role in the "Government 3.0" project designed to protect citizens' lives and properties in Korea.

The GPS two-step process first analyzes a comprehensive set of data including nearby geographic features, crime data, CCTV locations, and street light locations and brightness; and then identifies the high-risk hours and areas in geographic blocks (not administrative districts). The information achieved can be used to determine or modify security measures such as concentration of patrol cars and higher frequency of police patrol in high-risk areas.

Such profiling data are also expected to have an important impact on CPTED.

Fig 1. Geographic Profiling System Process



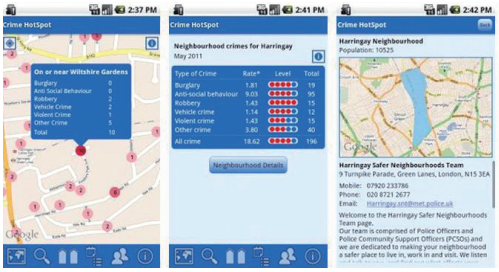
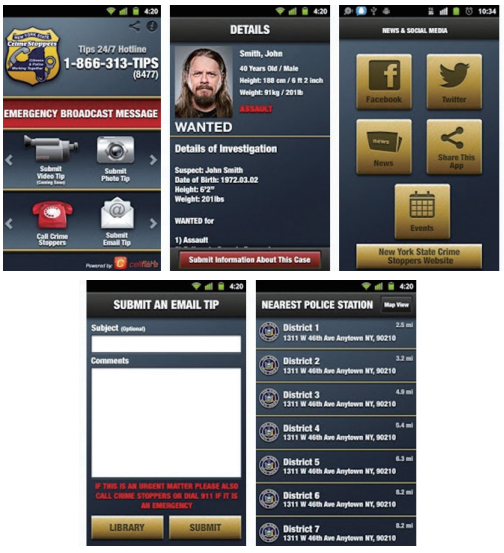
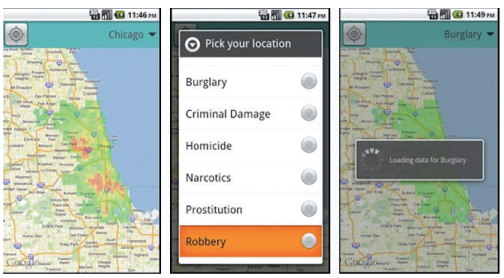
Outside of Korea, one of the best-known cases of the effectiveness of big data is the Boston Marathon bombing in 2013, when the suspect was captured only four days after the bombing.

At the heart of the system that enabled such a speedy arrest was big data. Immediately following the attack, the Boston Criminal Investigation Bureau collected all and any data that could lead to identification and capture of suspects. It amounted to 10 Terabytes of data, including data from CCTVs installed on streets as well as text messages, photos, and videos sent by citizens. To analyze the enormous amount of data, the Boston authorities unified the data format and allocated identification codes. Through this process they were able to narrow down the pool of suspects, and identify the person and his whereabouts, which lead to his capture.

These cases demonstrate that it is not an overstatement to call investigation using big data a revolution compared to traditional methods of relying on the investigator's intuitive judgment or questionable leads.

Other cases of big data and smart ICT use that enable a social security network include the United Kingdom's Crime Map and the U.S. Crime Alert Network. The trend is expected to pick up the pace.

Table 1. Crime Prevention Using Smart ICT based on Big Data: Overseas Case Studies

Crime Hotspot UK (Application)	Provides the monthly UK police data (www.police.uk) crime statistical information (e.g., crime locations, types/number of crimes per street) 
Promotion Strategies	Information on the police station nearest to the user's current location; main information on crimes in the state of New York can report suspects 
Focus	Mapping the location of each crime using Chicago crime data; information on crime risk of each area by color-coding the risk level 

Consider Present and Future Challenges

As discussed earlier, big data and smart ICT have become essential elements in preventing crime. Crime-proofing using cutting-edge technology can be an effective tool in reducing the crime rate and improving the suspect capture rate. But some controversial issues remain unresolved. Especially tricky are issues of privacy and the uncertainty of predicting whether or not a certain kind of crime will occur, and where, when, and how. Certainly how the algorithms are built into a police agency's crime prevention system is a particularly sensitive issue that warrants a cautious approach. For example, algorithms embedded with stereotypes or prejudice based on race or criminal records could present a serious human rights violation. Moreover, the question of whether potential criminals can be questioned based solely on the outcome of a crime prediction algorithm is an issue that will undoubtedly attract a heated juridical debate.

In summary, big data and smart ICT, already enabling more efficient crime prevention, need to be developed further and must be accompanied by efforts to minimize potential side effects. Policy and institutional clarifications need to be mapped out on the allowable extent of police surveillance on private citizens, and the objective basis must be developed allowing the use of personal information for crime prevention.

Lee Jae Yong
Associate Research Fellow, Korea Research Institute for Human Settlements
jylee@krihs.re.kr

ISSUES & TRENDS 02

Mitigating Disaster through Urban Planning

Han Woosuk

Climate Change and Recent Disasters in Korea

Abnormal climate conditions are occurring throughout the world, and the impacts of climate change are easily observed across Korea. Climate change progresses more rapidly in Korea than the average trend in other parts of the world. Average temperature on the Korean peninsula in the past