Emerging Technologies For Community Corrections

By Joe Russo

The National Law Enforcement and Corrections Technology Center (NLECTC), a program of the National Institute of Justice, coordinates the annual Innovative Technologies for Community Corrections Conference. This event was created to spotlight some of the more important technological developments and applications for community corrections, to provide a national forum for information sharing on technology issues and to provide practitioners with a glimpse of technology in development. A number of interesting technologies that were presented at the recent seventh annual conference held in Atlanta are described below.

Monitoring Sex Offenders' Computers

About 70 percent of all sex offenders supervised in the community have access to the Internet. The management and monitoring of sex offenders' computer use is important for many reasons, including the following three:

- It can alert authorities of a new crime such as possession of child pornography;
- It can provide proper supervision and containment of the offenders, both by reinforcing treatment prohibitions against access to sexual material and by reducing community risk through increasing the offender's perception of containment; and
- It is essential in assisting the treatment agency to better understand the offender.

Conducting an examination of the offender's computer early in supervision, with continued monitoring thereafter, can be powerful tools to better understand and contain the offender. To help community corrections agencies perform this task, NLECTC-Rocky Mountain funded the development of Field Search. This is a free software tool designed specifically to assist nontechnical probation and parole officers to quickly and efficiently scan an offender's computer and create a detailed report of their findings. The Field Search software can be downloaded onto a CD or flash drive that the officer can bring into the field. At the offender's home, the software is run on the target computer. In about 20 minutes, it performs four major functions: Internet history search, image search, multimedia file search and keyword search.

The program quickly and automatically retrieves Internet histories from several popular browsers, including Internet Explorer, Netscape, Firefox and Opera. Results are displayed in an easy-to-read format that includes the date and time each Web site was visited and can be sorted in a number of ways to help the officer understand an offender's surfing patterns. The software quickly finds all logical images in JPEG (.jpg), Bitmap (.bmp), PNG (.png) or GIF (.gif) formats. Images are automatically displayed in a gallery view. The software can detect many of today's standard audio/video file types and can quickly locate, play and capture screens from video files. Field Search also allows officers to search for text in any logical file. Keywords are used to search for such things as pornographic materials and stories or the victim's name.

Officers can create reports by selecting any of these items for inclusion. A built-in report function automatically creates a document that includes each item's associated path and date/time stamp. In the case of images, a thumbnail is included in the report. An export-data function is provided, which allows the officer to quickly transfer all of the raw data (Internet history, images, keyword text hits) into a Microsoft Excel spreadsheet for analysis at a later time. This was built into the software for cases in which the situation in the offender's home does not allow for a complete review on-site. If the offender becomes belligerent, for example, the export-data function can be completed within a minute or two, and the officer can leave with the data to be reviewed elsewhere.

Field Search is best used as a way to gather information on newly sentenced or released offenders, for treatment purposes and as a way to ensure that the conditions of supervision and treatment are being complied with. The program is not a forensic tool and should not be used when prosecution for a new crime is the goal. It provides a point-in-time scan that can be repeated throughout supervision, but the most effective and comprehensive monitoring programs should include a system that provides the ability

to continuously and remotely monitor an offender's computer activity.

Indoor Location and Tracking

The monitoring of offenders in the community based on the global positioning system (GPS) was first piloted in 1997 and has since received a great deal of attention. In March 2005, 9-year-old Jessica Lunsford was murdered by a convicted sex offender living nearby. Since that tragic case in Florida, at least 17 states have introduced legislation that mandate the use of GPS-based monitoring technology on sex offenders. Some states such as Florida, Oklahoma and Ohio will use this technology to monitor certain offenders for life. While GPS-based monitoring has been an important innovation in community corrections, providing unprecedented surveillance capabilities and theoretically an accompanying deterrent value, the technology has some major limitations.

The GPS technology was originally developed by the U.S. Department of Defense to track military assets such as satellites in space. There are a number of environments where GPS cannot function as designed, including indoor and underground locations as well as "urban canyons" where tall buildings can block satellite signals. For offender-tracking applications this is an important issue, because offenders do not remain in open spaces within line-of-sight with satellites at all times. In fact, most offenders spend the majority of their time indoors. One technological approach that has been developed to help compensate for the inherent weaknesses of GPS capitalizes on the existing infrastructure of terrestrial broadcast television signal towers, which correlates well with the centers of population and commerce in this country. This approach is meant to complement GPS, not replace it. Broadcast television signals were designed to transmit signals to antennas within buildings and apartments. Location within buildings may be achieved by calculating the TDOA, or time-difference-of-arrival, which provides position by determining the relative time it takes a signal to reach a receiver from the tower. By combining GPS and television-positioning technologies, it is thought that a more continuous means of tracking can be achieved that works both indoors and outdoors.

Conventional GPS-based monitoring is effective in tracking offender movement in open areas, and exclusion zones can be set around sensitive locations such as schools, public pools and a prior victim's residence. As discussed, indoor locations pose a problem for GPS-based technology. To illustrate the importance of this issue, consider a large shopping mall. When a sex offender enters the mall, the GPS signal will soon be lost, with only the last known point captured. Once inside the mall, however, is the offender headed to the department store on the west end of the building to buy clothes or is he headed to the children's play area on the east end of the building? A hybrid TV/GPS solution may be able to answer that question.

Integration of Crime Data And GPS Location Data

GPS-based offender monitoring generates a tremendous amount of information. Up until recently, this information has been used exclusively by community corrections agencies to determine whether offenders are complying with their supervision conditions. The emergence of GPS-based monitoring represented exponential improvement over radio-frequency-based monitoring with regard to the amount of useful information generated about the offender. To further use the new and powerful information available, technology developers have created the capability to integrate and compare reported crime incident data with offender location data.

Through cooperative agreements between community corrections agencies and state and local law enforcement, offender location data and crime data is transmitted to a central server on a daily basis, where the time and location data points are analyzed. Automated alerts are generated when it has been determined that an offender was in the area of a reported crime at the time the crime was committed. Systems like this seek to accomplish two major goals. The first is to reduce crime by increasing offender accountability. The theory is that if offenders know they will be automatically placed at the scene of the crime they are less likely to commit the crime in the first place. The second is to provide law enforcement and corrections with an effective investigative tool to manage their resources. Once a crime has been committed, this technology can use the time/location data to quickly determine those offenders who may be suspects and those who can be cleared. Initiatives involving the integration of crime data and GPS location data have been piloted extensively in Florida, where they are currently in use in a number of counties.

Near Infrared Spectroscopy

One biotechnology developer is currently working to modify its glucose-monitoring device to an alcohol-testing product for community corrections and public safety applications. The technology uses near infrared spectroscopy to nonintrusively measure alcohol content in the body tissue. Basically, the device uses a light source, an optical detector and a spectrometer to analyze the chemical makeup of the tissue and measure alcohol levels. Results are available within one minute and are comparable to more established forms of alcohol testing such as breathalyzers and blood tests. As currently configured, the device examines a small area of the subject's inner forearm, but other parts of the body may be examined as well. The device can be set up for unsupervised testing in a probation office, work release center or the offender's home, or it could potentially be integrated with existing technology such as reporting kiosks. A particularly interesting aspect of this technology, according to the developers, is that there is a biometric component inherent in the analysis process, because each person has a unique tissue structure and tissue chemistry. Therefore, once enrolled, the device will authenticate the person when he or she comes back for testing. This feature could eventually prove to be the key component to a new

method of preventing drunk driving if it can be incorporated with existing ignition interlock technology, which currently lacks positive identification and a passive, unobtrusive method of testing.

Driver Monitoring System

Offenders with suspended, revoked or restricted driver's licenses pose special challenges to community corrections agencies. Research studies in this area have concluded that up to 75 percent of all drivers with suspended/revoked licenses continue to drive.[1] The harsh reality is that community corrections staff have not had the tools necessary to monitor an offender's driving and enforce the conditions ordered by the courts. A new technology on the horizon may help agencies better supervise the problem driver. The trademarked License Sanction Enforcement System is essentially a sensing and surveillance technology that detects and records a subject's body movements or data signatures and compares them with data signatures that are consistent with those involved in operating a motor vehicle. It accomplishes this through ankle bracelets worn on each leg containing accelerometers and rate gyros. These bracelets collect and store the relevant data created by the foot-to-brake and foot-to-gas pedal actions, and acceleration and deceleration patterns associated uniquely with driving a motor vehicle.

Analysis of this data will determine whether the subject has been driving and when the behavior occurred. The device can store and process subject data for up to 30 days. It is envisioned that an offender monitored via this technology would be instructed to report to his or her supervision officer on a monthly basis at a minimum, at which time the officer would upload the stored data from the ankle bracelets to a software program. The program would then analyze the data and determine if and when any motions consistent with driving have occurred. In the case of a restricted license, the data would be compared with the offender's individual situation to determine if the driving event occurred at a time that was prohibited (e.g., outside normal work hours, etc.). This technology could represent a potential solution to a long-standing problem confronting criminal justice, because the system passively monitors the subject rather than the vehicle. As a complement to existing ignition interlock devices, this system may prove to be a useful tool to fill a critical technology gap.

Sleep Pattern Analysis

New technology has become available recently to help screen offenders for substance abuse. The technology uses automated analysis of offender sleep patterns as a prescreen to determine if further testing is necessary. The connection between sleep patterns and substance abuse may not be immediately obvious, but substance abuse can induce sleep disorders in several ways. For example, it can cause the disruption of the sequence and duration of sleep states, alter total sleep time and increase the amount of time required to fall asleep.

To gather information about sleep patterns, an offender is fitted with a small actigraphy device that is secured around the offender's wrist with a tamper-evident band. The actigraphy device measures sleep quality by recording gross motor activity. Using this tool, it is possible to document and analyze an individual's sleep/wake patterns and sleep disorders, which may be due to substance abuse. During the course of a day, the device passively collects and records body movement information. When the offender reports to his or her probation office or drug court, the device is placed on a reader and the offender's activity data is downloaded and analyzed by the sophisticated Web-based software that is programmed to look for patterns inconsistent with those of abstinent subjects.

Results are available via e-mail in minutes. If the software indicates that there is a likelihood of drug or alcohol consumption, the offender is required to provide a urine specimen that is sent to a laboratory for analysis for the presence of the standard drugs of abuse as well as for ethyl glucuronide. This is a direct metabolite of alcohol and offers an extended window for assessment of drinking status up to 80 hours after the complete elimination of alcohol from the body. Using the 80-hour detection period, offenders have been required to report to the probation office on Mondays and Thursdays for downloading of the data. With a schedule such as this in place, any positive screens identified by the actigraphy device can be confirmed via urinalysis. This technology has been in use since 2004, and initial reports from the field indicate that it can be a cost-effective screening tool for offender drug and alcohol use.

Moving at a Rapidly Changing Pace

As an industry, community corrections has lagged behind others in its use of technology, but this is changing rapidly. During the past several years, there has been an increase in the amount of new technology developed specifically for community corrections and existing technologies are being improved continuously. NLECTC is committed to keeping the field of community corrections abreast of new technology developments and their application to enhance mission performance. The eighth annual Innovative Technologies for Community Corrections Conference is tentatively scheduled for June 4-6, 2007, in St. Louis.

ENDNOTES

[1] Voas, R. and A.S. Tippetts. 1994. Unlicensed driving by DUIs — A major safety problem? Paper presented at the 73rd Annual Meeting, Transportation Research Board, Landover, Md., Jan. 9-13.

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