Crime in Focus

Pitfalls in public crime mapping—and how to avoid them

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Ian Broadbent ● **Strategic Industry Manager, Pitney Bowes Business Insight**

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ABSTRACT

LAW ENFORCEMENT AGENCIES AROUND THE WORLD ARE WORKING TO DELIVER ACCURATE, INFORMATIVE CRIME MAPPING TO THE GENERAL PUBLIC. PROPERLY DONE, THESE EFFORTS CAN PROVIDE COMMUNITIES, PRESS AND POLITICIANS WITH IMPORTANT INSIGHTS INTO THE CRIME PROFILE OF THEIR NEIGHBORHOOD. CRIME MAPPING WILL ALSO BE AN IMPORTANT CHANNEL TO BROADCAST AND EXEMPLIFY LAW ENFORCEMENT SUCCESSES. HOWEVER, THERE ARE A NUMBER OF KEY CHALLENGES ASSOCIATED WITH EFFECTIVE CRIME MAPPING WHICH, IF NOT EXPERTLY HANDLED, WILL LEAD TO MISLEADING AND INACCURATE IMPRESSIONS OF LOCAL CRIME. KEY CHALLENGES INCLUDE:

• ACCURATE RECORDING OF CRIME LOCATION

• UNDER-REPORTING OF CERTAIN CRIMES

• CAPTURING AND VISUALIZING TIME OF CRIME

• HOW TO EXPRESS CRIME (SHEER VOLUMES OR PER CAPITA)

• THE IMPACT OF CRACKDOWNS

• OVERLAYING PROSECUTION DATA

• THE IMPACT OF SEASONALITY AND SPECIAL EVENTS

• INCOMPATIBILITY AMONG MULTIPLE JURISDICTIONS

AS A RESULT, POLICE FORCES NEED TO CONSULT WITH LOCAL GOVERNMENTS, SOCIAL AND EMERGENCY SERVICES, PLUS BUSINESS AND CONSUMER GROUPS IN ORDER TO IMPLEMENT A CRIME MAPPING SOLUTION THAT BOTH FULFILLS THE COMMUNITY'S NEEDS AND PRESENTS CRIME DATA IN A CLEAR CONTEXT.

SINCE CRIME MAPPING NEEDS WILL DEVELOP OVER TIME, LAW ENFORCEMENT AGENCIES SHOULD INVEST IN MODULAR SOFTWARE SOLUTIONS, WHICH CAN BE BUILT UP GRADUALLY FROM A SIMPLE INITIAL APPLICATION IN THE MOST COST-EFFICIENT WAY POSSIBLE. THE DEVELOPMENT OF AN EXTERNAL CRIME MAPPING SERVICE ALSO NEEDS TO BE CONSIDERED IN THE LIGHT OF EACH POLICE FORCE'S ENTERPRISE-WIDE USAGE OF LOCATION-BASED PROCESSES, IN ORDER TO ENSURE EFFICIENT AND EFFECTIVE USE OF GEOGRAPHICAL INFORMATION SYSTEMS (GIS).

THE PUBLISHING OF CRIME MAPS KEEPS THE PUBLIC BETTER INFORMED ABOUT CRIME IN THEIR IMMEDIATE NEIGHBORHOOD AND PROVIDES A CHANNEL FOR DISSEMINATING THE ACTUAL SUCCESSES ACHIEVED BY LAW ENFORCEMENT INITIATIVES.

Introduction

Fifteen years ago, Megan's Law set in motion a series of requirements where U.S. law enforcement agencies needed to make information regarding registered sex offenders available to the general public. Today, police departments around the world are responding to the public's desire for interactive crime maps. In 2008, for example, UK Home Secretary Jacqui Smith pledged that interactive maps would be put in place by every police force in the land by the end of the year, providing citizens with access to local crime information.[1]

The publishing of crime maps keeps the public better informed about crime in their immediate neighborhood and provides a channel for disseminating the actual successes achieved by law enforcement initiatives. The sharing, analysis and visualization of crime data and patterns is equally important among stakeholders in co-operative groups fighting crime, including Neighborhood Watch Groups and public-sector agencies.

Many police departments and municipalities have been publishing monthly crime statistics for years. Now, with the increased interest in crime maps, agencies can show the public where and when crime happened, down to the street level for some categories. Going forward, crime maps will be expected to feature comparisons with other areas and tell the public how crime is being tackled by their local neighborhood police force.

In municipalities across the United States, government offices have announced that city-wide crime-mapping will be made available to all citizens. The subject has also resonated across Europe. In London, the mayor has endorsed the idea of making crime maps available. In Germany, the Munich Metropolitan Police authorities have a crime mapping initiative underway. In France the observatoire National de la Delinquance is working on a National Crime Statistics Sharing scheme. And crime mapping is in use with organizations such as the Swedish National Criminal Intelligence Service, the Luxembourg Police and the Centre for Crime Analysis in Padova, Italy.

There is, however, some considerable concern among geographical information experts about how this crime mapping initiative is put into practical action. As with any such project, there are very considerable challenges in producing the desired outcome: objective information which truly informs the citizen about crime in their area. There are issues of data quality, data comprehensiveness, how crime is recorded, the axis between reported crime and its attribution to particular criminals, and so on. In order to support the introduction of crime mapping initiatives, Pitney Bowes Business Insight has compiled best practices, pointing out the possible pitfalls and recommending key principles which will allow law enforcement agencies to keep the public informed through crime mapping.

The Importance of Data Quality

Today most people are familiar with the acronym GIGO, which stands for "Garbage in, garbage out". In other words, a system's ability to offer accurate and useful analysis was entirely dependent on the quality of the data originally put into it. The situation with crime mapping is comparable, in that there are some data quality issues to consider when offering visualization to the general public and stakeholders. However, the more important concern is that, out of context, crime mapping output could be extremely misleading for the non-expert observer.

"The two most overused terms regarding public safety today are 'information'—as in information sharing— and 'intelligence'," explains Lisa M. Palmieri, President, International Association of Law Enforcement Intelligence Analysts, Massachusetts.[3] "Information is raw data; it could be an item obtained from a newspaper report, a statement made by a confidential informant, or simply an observation made by an astute police officer during a traffic stop. It is rare that action can or should be taken on raw, unevaluated information on its own. At some point, context must be provided; corroboration must be supplied; value must be added to this raw information. The major component of the process that turns raw information into something useful is analysis; the product is intelligence."

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The following section of this paper focuses on the essence of Ms. Palmieri's point—arguing that crime intelligence (here, in the form of crime mapping) must present accurate data to the public with enough context for them to understand it intelligently.

Making Crime Maps Meaningful —the Key Challenges

THE ORIGINAL DATA

While not a reason to delay pushing ahead with crime mapping for the public, certain truths about the data on which it is based should be made clear. Underlying data is drawn from each force's own records or from a national database of recorded crimes. However, a significant proportion of crime goes unrecorded, and certain offenses are more reliably reported than others. Demography also has a major affect on levels of reported crime. In a less well-off area, criminal damage (cars, graffiti, etc) is far less reported than in wealthier, middle class areas. At a finer level, crime rates can seem to have soared when in fact the regeneration of a neighborhood has simply made its inhabitants prouder of their area and therefore more likely to report malicious damage to their renewed environment.

DEFINING LOCATION

Attributing a location to a crime is obviously critical to the usefulness and accuracy of crime mapping. Yet the process is not always as straightforward as it seems. Burglary has a very distinct location. But what about an assault, which may simply be assigned to a park? What about a personal theft, undetected by the victim until some minutes after its occurrence or possession of drugs, which is not detected until a search is performed at the police station? In each of these three latter examples, location will be ascribed to a place (the middle of a park, the officer's patrol area, the police station address) which is to some extent divergent from the real location of the offense. As a result, mapping this data, without some means of contextualizing it for the non-expert, is grossly misleading.

PROBLEMS VERSUS ARRESTS

We have already noted that drugs offenses have a problem with data capture, in that the offense is only detected and recorded when a search is performed at the police station. In fact, the issue of drugs raises a wider point in that usage is not recorded in the police statistics, only arrests. Therefore, an area may well have a drugs problem, but it will not show up on a crime map unless data from other agencies (health, social services) is overlaid.

TIME OF DAY

The profile of an area can differ hugely in terms of crime between a daytime and a night-time profile. And if data is not split on this basis, the resulting combined data give the observer a false picture both ways round. The locality seems dangerous in the day, when it is not, and relatively safe at night, which is not true either. This situation may occur in the proximity of major railway stations, where the daytime commuter crowds are replaced by drugs and prostitution at night. In other cases, a district may cater to a business crowd by day, while attracting a club or bar crowd in the evening.

THE AWFULNESS OF AVERAGES

How geographical areas are defined can skew how crimes appear on a map. From a police records point of view, geography is defined in terms of division, such as a precinct and individual beats. These areas do not neatly correspond with neighborhoods, school districts and a host of other administrative areas. Moreover, fairly substantial areas— such as precincts—may well have a high density of crimes for the area as a whole, but those crimes might be mainly associated with a particular street on its western borders, or a park right in the southern corner. As a result, people living in the north or east of the precinct may in fact be well clear of crime hotspots, but would not know it if they could only see maps drawn by precincts. The clear answer here is to avoid area averages and map point data as exactly as possible. While not giving away actual victim locations or identities, geocoded point data provides for hot-spot mapping that can make crime clusters visible to the public, and therefore helps avoid misleading impressions that are typical of larger area averages.

> **"BOTH CRIME VOLUME AND CRIME PROPORTIONS NEED TO BE AVAILABLE THROUGH CRIME MAPPING FOR THE PUBLIC— WITH CAREFUL GUIDANCE TO HELP THEM INTERPRET THE TWO DIFFERENT TYPES OF STATISTICS."**

NUMBERS VERSUS PERCENTAGES

What is more important for the public to see? Total volumes of crimes, or crimes as a proportion of people living in the area? After all, the area in which 50 crimes have been committed in the last year, but which contains 5,000 people, will have a very different profile than that where 50 crimes were committed among a community of just 500 residents. Yet by the same token, a citizen also needs to know that those 50 crimes occurred just two streets away, regardless of the residential density of their area. So the answer to our question is, of course, that both crime volume and crime proportions need to be available through crime mapping for the public—with careful guidance to help them interpret the two different types of statistics.

OPERATIONAL ACTIVITY

A further factor which can contribute to the public receiving a false impression from crime maps is actual operational activity. Police initiatives are taking place regularly— crackdowns on drugs, inner-city violence, domestic abuse, drunken harassment, all sorts of issues depending on the profile of an area and its particular law enforcement priorities. However, operational success inevitably distorts the picture of crime in an area.

An operational push will usually send the arrest statistics soaring; making the area look (inaccurately) of a much higher crime density and volume than its neighbors. Often the crime was always there—but by recording arrests, the area now appears less safe when in fact the opposite is true. Here, an overlay that highlights the context of operational concentrations will help avoid false impressions and any underserved criticism of the local force.

LINKING CRIMES TO CRIMINALS

Another layer of information will substantially affect the messages that crime mapping gives to the public, stakeholders and politicians: who has committed which crimes. Again, there are certain personal data protections enshrined in law which must be protected in any crime mapping application.

Nevertheless, the sense of public safety and the fair reporting of law enforcement will be very positively influenced if, for an area experiencing 40 crimes in the last year, information is also conveyed that 30 of these offenses were committed by a single offender, who has been successfully apprehended, charged and convicted.

SEASONALITY AND SPECIAL EVENTS

Seasonality has a major effect on crime rates. The influx of tourists to a town or city provides the criminal fraternity with a seasonally inflated range of potential victims. Indeed, some areas suffer from criminal tourists who themselves visit, but for rather different touristic purposes. Motor crime, theft, burglary and vehicle damage tend to increase in the hot weather (windows left open) or in the holiday season (unattended cars left home). Events also have a major impact. The police force in one large city dreaded the possibility of their famous sports team winning a championship because of the palpable crime wave that inevitably follows such success.

Avoiding the Pitfalls—Best Practice Checklist

None of these potential pitfalls is a reason not to push forward with the laudable aims of a crime mapping pledge. They do, however, raise a number of important issues that must be accounted for if the public is not to be given a false picture of crime in their area. Moreover, the incentive to take account of these points is not merely a desire to provide a good public service. Crime maps will undoubtedly be seized upon by politicians, interest groups and the press as measures of social need and of police performance. The job of any police force is difficult enough—there's no need to add to that burden with mapping that is skewed or misleading.

In the light of the challenges involved with public-facing crime mapping, Pitney Bowes Business Insight has drawn upon their expertise and relationship with law enforcement agencies around the world to compile a checklist for anyone considering this issue:

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- Consult with local stakeholders to obtain a 'needs requirement' for public crime mapping. Consultation will also help to educate these groups about using the system for sensible interpretation. Key stakeholders include:

  - Local authorities

  - Social services

  - Health services

  - Emergency services

  - Elected officials

  - Local community groups and community leaders

  - Major crime pattern influencers (sports venues, bar & pub chains).

  - Local business groups.

- Aim to introduce rigorous crime incident recording that makes every attempt to capture the exact geography of each offense. Better data means a more accurate service, and fewer misapprehensions by public and politicians.

- Avoid area averages. Try to implement a crime mapping solution that uses point data and hot-spot mapping to show more exactly where crime and crime clusters occur.

- Introduce overlays that inform the public of contextual reasons when crime 'spikes' appear in the data, such as:

  - Operational initiatives (crack-downs)

  - Seasonal variations (weather, holidays, tourism)

  - Special events (sports, celebrity visits, festivals)

- Associate time of incident data with crimes in order to differentiate area profiles for day and night.

- Consider including relevant non-crime data (such as drug usage) that may provide context for crime statistics.

- Incorporate important data as overlays when they can contribute to public reassurance (e.g. arrest and prosecution of multiple or dangerous criminals).

- Use the system just like any other communications channel to broadcast or highlight operational successes.

- Law enforcement agencies want a comprehensive system for crime mapping. However, it is a mistake to try to achieve this immediately. Many parts of the enterprise will have an interest in an overall solution—but a staged approach can help reach an ambitious goal more effectively. As needs will inevitably develop over time, you should start simple. Choose a modular solution that allows functionality to be built over time without the expense of major re-engineering.

- Allow users to define their own geographic area, rather than being restricted to police precincts or local administrative areas. For instance, the user might be able to define their area as a ten minute walk in any direction from their house.

- Use the imperative of crime mapping to understand and integrate the force's total use of geographically-based analytical and operational processes.

Conclusions

The imperative to implement crime mapping is a tremendous opportunity to improve the engagement between the police and the public through accurate information and visualization. A well-implemented approach should allow law enforcement success to be better communicated to all stakeholders—with an interest in crime reduction. However, consultation with all key user groups is critical in producing a system that meets the community's needs and faithfully represents the true picture of policing in the area. There are many information and analysis pitfalls in this process which, if ignored, will simply misinform the public and add to the already heavy burden that we as a society place on the police force.

THE GROWING NEED TO PUT A PUBLIC-FACING SOLUTION IN PLACE SHOULD ACT AS A SPUR TO THESE FORCES TO TAKE A FRESH LOOK AT ALL THEIR LOCATION-BASED PROCESSES.

Critics have raised the point that crime mapping acts as a planning tool for criminals themselves. Certainly, any system will be the target of criminal intentions. However, within every police force and community there exists a wealth of law enforcement information expertise and geographical information system experience. Harnessing all those experts, consulting with interest groups, and careful planning judgments will combine to produce crime mapping that treads the finely balanced line between informing the community without giving away key information to the criminal fraternity.

While the focus in this paper has been public-facing crime mapping, some law enforcement agencies have not yet implemented a dynamic intranet crime mapping solution for use by internal planning and operations staff. The growing need to put a public-facing solution in place should act as a spur to these forces to take a fresh look at all their location-based processes. The ability to build a modular strategy and gradually integrate all these requirements across a single platform could result in substantial economies. The right tools can enable advanced location-based functionality, encompassing the needs of: criminal investigations, operations, corporate and business services, professional standards, planning, IT and communications.

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Pitney Bowes

Business Insight

UNITED STATES

One Global View
Troy, NY 12180

1.800.327.8627

pbbi.sales@pb.com
www.pbinsight.com

CANADA

26 Wellington Street East
Suite 500
Toronto, ON M5E 1S2

1.800.268.3282

pbbi.canada.sales@pb.com
www.pbinsight.ca

EUROPE/UNITED KINGDOM

Minton Place
Victoria Street
Windsor, Berkshire SL4 1EG

+44.800.840.0001

pbbi.europe@pb.com
www.pbinsight.co.uk

ASIA PACIFIC/AUSTRALIA

Level 7, 1 Elizabeth Plaza
North Sydney NSW 2060

+61.2.9437.6255

pbbi.australia@pb.com
pbbi.singapore@pb.com
pbbi.china@pb.com

www.pbinsight.com.au

92548-AM-1008