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Crime in Focus

A paper examining pitfalls in public crime mapping

and how to avoid them

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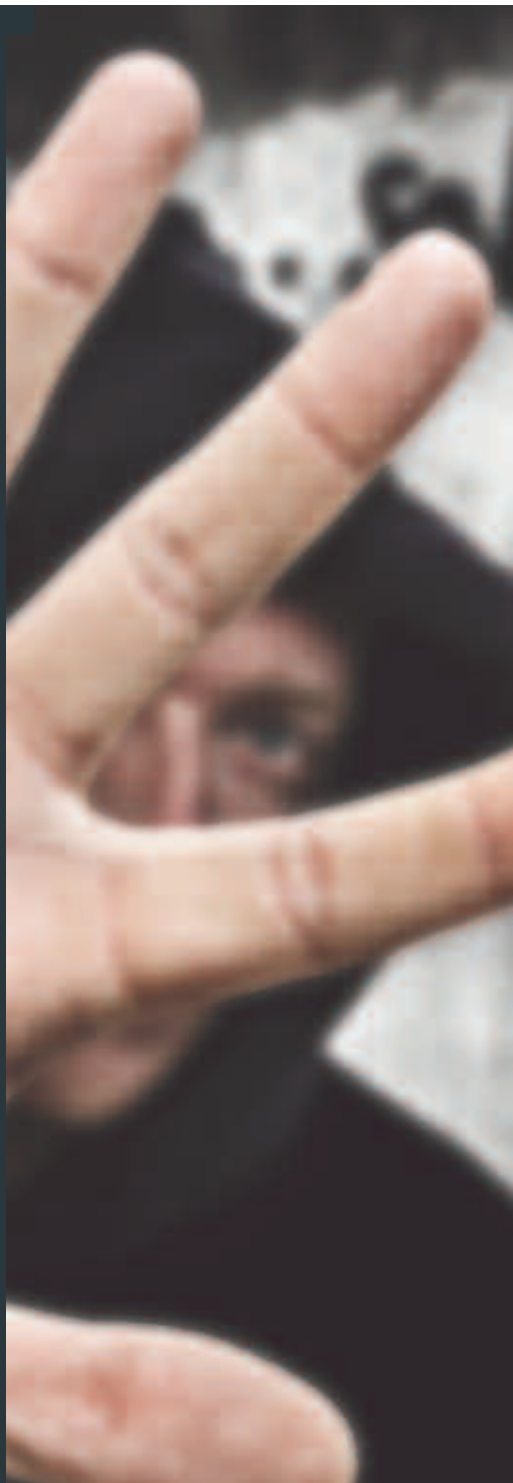
CRIME AND PUBLIC SAFETY



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MANAGEMENT SUMMARY

CRIME MAPPING, MADE ACCESSIBLE TO THE GENERAL PUBLIC, HAS BECOME PART OF AN OFFICIAL UK GOVERNMENT 'PLEDGE'. PROPERLY DONE, THIS SHOULD PROVIDE THE PUBLIC, PRESS AND POLITICIANS, WITH IMPORTANT INSIGHTS INTO THE CRIME PROFILE OF THEIR NEIGHBOURHOOD. CRIME MAPPING WILL ALSO BE AN IMPORTANT CHANNEL THROUGH WHICH TO BROADCAST AND EXEMPLIFY LAW ENFORCEMENT SUCCESSES. HOWEVER, THERE ARE A NUMBER OF KEY CHALLENGES FOR EFFECTIVE CRIME MAPPING WHICH, IF NOT EXPERTLY HANDLED, WILL LEAD TO THE PUBLIC RECEIVING A MISLEADING AND INACCURATE IMPRESSION OF LOCAL CRIME. KEY CHALLENGES INCLUDE:

- INCOMPATIBILITY OF DIFFERENT ADMINISTRATIVE GEOGRAPHIES
- ACCURATE RECODING OF LOCATION OF CRIME
- UNDER-REPORTING OF CERTAIN CRIMES
- CAPTURING AND VISUALISING 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

AS A RESULT, POLICE FORCES NEED TO CONSULT WIDELY WITH LOCAL GOVERNMENT AND POLITICIANS, SOCIAL AND EMERGENCY SERVICES, BUSINESS AND CONSUMER GROUPS, IN ORDER TO COME UP WITH A CRIME MAPPING SOLUTION THAT BOTH FULFILS THE COMMUNITY'S NEEDS AND PRESENTS CRIME DATA IN CONTEXT, SO THAT USERS ARE NOT MISLED. SINCE CRIME MAPPING NEEDS WILL DEVELOP OVER TIME, FORCES ARE ADVISED TO INVEST IN MODULAR SOFTWARE SOLUTIONS, THAT 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. UK DEVELOPMENTS ARE BEING KEENLY OBSERVED BY POLICE FORCES IN EUROPE, MANY OF WHOM ALREADY HAVE CRIME MAPPING INITIATIVES UNDER WAY.

INTRODUCTION

In July 2008, UK Home Secretary Jacqui Smith pledged that interactive maps, which allow every neighbourhood in England and Wales to access local crime information, were to be put in place by every police force in the land by the end of the year. This was one of a number of pledges made in a green paper aimed to improve policing and its appreciation by the public, business, the media and other public service agencies[1].

The motivation for publishing crime maps was laudable: to keep the public better informed about crime in their immediate environs, and to provide a channel for disseminating the actual successes being achieved by law enforcement initiatives. Sharing, analysis and visualisation of crime data and patterns is equally important between stakeholders in co-operative groups fighting crime, such as Crime and Disorder Reduction Partnerships.

The UK government says that crime maps will show the public where and when crime happened, down to the street level for some categories. Since the start of July 2008, all police websites in England and Wales have been publishing monthly crime statistics.

The British government also states that the rollout of local crime information will be taken to the next level. Crime maps will be expected to feature comparisons with other areas and tell the public how crime is being tackled by their local neighbourhood policing team.

Sir Norman Bettison, from the UK Association of Chief Police officers (ACPO), has been quoted[2] as saying: "My own police authority in West Yorkshire started two years ago to make available crime mapping data to keep the public informed about local incidents and trends. This fulfils the key responsibility to give information to communities in order that they can see the real level of crime and help the police address it."

The London Mayor, Boris Johnson, has also announced that capital-wide crime-mapping will be made available to Londoners, and has emphatically endorsed the idea of making crime maps available to the public.

The subject has resonance right across Europe. In Germany, the Munich Metropolitan Police authorities have a crime mapping initiative underway (GLADYS). In France the observatoire National de la Delinquance is working on a National Crime Statistics Sharing scheme. And crime mapping is in use with organisations 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 amongst 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 in the UK and continental Europe, Pitney Bowes Business Insight is publishing the following best practice guide for police forces, pointing out the main possible pitfalls, and recommending key principles which will allow forces to make their way towards crime mapping solutions that properly inform the public.

The Importance of Data Quality

There used to be an acronym in the information science and database analysis world - GIGO. GIGO stood 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 visualisation 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. On this subject, it is worth quoting Lisa M. Palmieri, President, International Association of Law Enforcement Intelligence Analysts, Massachusetts. She says[3], "The two most overused terms regarding public safety

1 Home office, Policing Green Paper: From the Neighbourhood to the National, July 2008

2 BBC News, Crime maps online by 2008, 28 July 2008

3 The Police Chief, Information vs Intelligence: What Police Executives Need to Know, September 2008

today are "information" (as in "information sharing") and "intelligence". 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." The following sections of this paper focus on the essence of Ms Palmieri's point - arguing that crime intelligence (in this paper, 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 forces own records, from the national database of recorded crime and from the British Crime Survey. However, a significant proportion of crime goes unrecorded, and certain offences 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 street 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 centroid of a policeman's beat, the police station address, respectively) which is to some extent divergent from the real location of the offence. As a result, mapping this data, without some means of contextualising it for the non-expert, is grossly misleading.

Problems Versus Arrests

We have already noted that drugs offences have a problem with data capture, in that the offence 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. Famously, this situation occurs in the proximity of major railway stations (London Paddington, le Gard du Nord, Milano Centrale, Madrid Atoche, Hauptbahnhof Munchen, and so on), where the daytime commuter crowds are replaced by drug activity and prostitution at night.

The Awfulness of Averages

How geographical areas are defined can have a significantly skewing effect on crime mapping. From a police records point of view, geography is defined in terms of division, sub division and individual beats. These areas do not neatly correspond with local authority wards, NHS districts, and a host of other administrative areas. Moreover, fairly substantial areas - wards are a good example - 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 ward may in fact be well clear of crime hotspots, but would not know it if they could only see the ward average mapped. The clear answer here is to avoid area averages and map point data as exactly as possible. Whilst not giving away actual victim locations or identities, geocoded point data allows crime clusters to be visible to the public, and therefore helps avoid misleading impressions that are typical of larger area averages.

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 amongst 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 available through crime mapping for the public, with careful guidance to help them interpret the two different types of statistic.

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 neighbours. Again, an overlay which highlights the context of operational concentrations will help avoid false impressions and any consequent criticism of the local force that is quite undeserved.

Linking Crimes to Criminals

Another layer of information will substantially affect the messages that crime mapping gives to the public, stakeholders and politicians – namely, 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 offences 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 (left stationary in the drive whilst away). Events also have a major impact. The police force in one large city dread the possibility each year of their famous football team doing well in the league or in international competitions, because of the palpable crime wave that inevitably comes with such success. Local derbies also come with a crime corollary. And it is well attested that cases of domestic violence soar when the national team is knocked out of the European or World Cup.

Avoiding the Pitfalls - Best Practice Checklist

None of these potential pitfalls, described above, is a reason not to push forward with the laudable aims of the UK's 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 in Europe is difficult enough. To add to the burden with mapping that is skewed or misleading would simply add to that burden.

In the light of the challenges facing public-facing crime mapping, the authors of this paper have drawn up a check list for forces approaching the issue.

- 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
  - Local MPs
  - Local community groups (often including local community leaders and reformed characters who are as influential on crime reduction as police activity).
  - Major crime pattern influencers (football clubs, bar & pub chains)
  - Local business groups
  - Analysis of Freedom of Information enquiry concentrations
- Aim to introduce rigorous crime incident recording that makes every attempt to capture the exact geography of each offence. Better data means a more accurate service, and fewer misapprehensions by public and politicians.
- Avoid area averages, and try to implement a crime mapping solution that uses point data 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 matches, celebrity visits, festivals)
- Allow crime data to be associated with time of incident, so that day and night area profiles can be differentiated.
- Consider including non-crime data that may indicate the presence of a relevant factor that does not appear reliably through crime incident information (e.g. drugs usage).
- Incorporate important data as overlays they may 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.
- All forces ultimately want an all-singing, all-dancing 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 is needed to reach this ambitious goal. Needs will inevitably develop over time. Start simple. Ideally, choose a modular solution that allows functionality to built over time without major re-engineering and the cost implications that come with it.
- Consider allowing users to define their own area or catchment, rather than being restricted to police or local authority 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 for the UK public is a tremendous opportunity to improve the engagement between police and public through accurate information and visualisation. Well-implemented, it 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 communities' 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.

Critics have raised the spectre of crime mapping acting as planning tool for criminals themselves. Certainly, any system will be the target of criminal intentions. However, within every police force, and its stakeholder partners, there exists a wealth of both law enforcement information expertise and geographical information system experience. Harnessing all those experts, consulting with interest groups, and careful planning judgements, 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.

Finally, not all police forces have yet implemented a dynamic intranet crime mapping solution for use by their internal planning and operations staff. The current 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, and build a modular strategy to gradually integrate all these requirements across a single platform. Being able to do so would introduce substantial economies, while also enabling advanced location-based functionality enterprise-wide, encompassing the needs of: criminal investigations, operations, corporate and business services, professional standards, planning and review and IT/communications.

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