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Algorithmic Surveillance

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Before the rise of CCTV the extent of police surveillance was limited by the number of police officers on the street at any one time and the readiness of the public to contact them with information. The limitations of police surveillance were graphically illustrated by Home Office researchers when they estimated that on average a patrol officer in London could expect to pass within one hundred yards of a burglary in progress once every eight years. Even then they would probably not even know that a crime was taking place. In effect, the majority of incidents occurring 'out there' which might warrant police intervention never came to their attention, and those which did, were because the public had decided that police intervention was necessary.

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The rise of CCTV
The rise of mass CCTV surveillance systems in public space, from transit systems to town centres, has changed all that. Potentially at least, an area can be actively monitored 24 hours a day, 365 days a year. In the main these systems consist of an operative in a local control room, surrounded by banks of television screens, monitoring them for the signs of the unusual and the out of place. When these are detected, the operator zooms the camera in to take a closer look. If the incident warrants further action, police or security personnel will be deployed to intervene and deal with the situation and decide on the appropriate outcome.

Such systems certainly extend the surveillance gaze more widely than before. They are however, still limited and partial. Their impact will depend on the presence, attentiveness and judgement of the operatives who monitor the screens. In reality, many systems are only monitored sporadically, others by low paid, poorly motivated, and inadequately supervised operatives. Even when the screens are diligently scrutinised there is only so much one or two operatives can focus upon with a multi camera system covering an airport, city centre or station. The result is that many potential and actual criminal events go unnoticed by the system operatives. Only those which cause enough concern to the public to justify contacting the police will result in a deployment. As this is likely to be some time after the incident, the system can only be used retrospectively, and the tapes viewed for confirmation and evidence.

However, some recent developments are intensifying and extending the impact of surveillance. Cameras coupled to sophisticated computer software allow the images to be converted into numerical data and analysed by complex algorithms.

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This enables the software to automatically read numberplates, calculate vehicle speed and even match facial features against a pictorial database of known offenders.

Implications for policing
There are major implications of these developments for the practice of policing. At the level of deployment, less serious incidents are no longer filtered out by the public or even by CCTV system operators. Instead intervention is triggered automatically. For instance pictures from motorway surveillance cameras can now be digitally analysed to indicate overall traffic flow. If the flow falls beyond a certain rate, indicating an accident, the main monitor in the control room can automatically show the specific pictures and police and ambulance can be alerted to immediately attend the scene.

The use of such algorithms however, is not limited to measuring traffic flow. Coupled to intruder alarm systems, they can detect that a perimeter fence has been

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breached, determine that the intruder is of human dimensions, turn on and direct cameras to the sight of the intrusion, activate a video recorder, and alert the police or security personnel. Meanwhile an automated recording booms at the suspect, "Stay where you, you are being recorded on video tape and the police have been alerted!"

More controversially, there is no reason why such algorithms cannot be programmed to remotely monitor all public spaces to detect the presence of groups of people, say a gathering of more than seven persons or vehicles, on a city street, after ten o'clock at night. Algorithms can also monitor crowds for the tell tale signs of disorder; sudden changes in activity or concentrations and dispersal of people. Once detected control room operatives can be alerted to take over manual surveillance, and police deployed to the scene.

Widening the net
In many respects, of course, such systems are full of good intentions, to apprehend

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the warehouse thief, to prevent the after-pub brawl and to ensure traffic safety and the maintenance of public order.

However, there are other consequences. As Stanley Cohen observed, crime control mechanisms may involve 'widening the net and thinning the mesh' of social control systems. CCTV in general, and automated monitoring via computer algorithms, in particular, dramatically increase the size of the net ensuring that more and more people are caught up in the formal apparatus of control. Secondly the mesh is thinned, as behaviour which would have previously been too trivial and disproportionately costly to deal with other than informally, can formally be proceeded with on the strength of the video evidence. Rather than reducing the overall level of criminality it is possible that such automated deployments may actually increase it.

It is not just at the level of deployment that algorithmic justice has implications for policing. It also has a profound effect on enforcement. The development of image recognition technologies when coupled to surveillance cameras and algorithmic computer software, immensely expand the potential of enforcement. The speeding motorist can now be detected automatically, a picture of the licence plate read into a computer for identification and matched against a database of license holders. A speeding ticket can be automatically sent through the post.

Recently in the UK algorithmic monitoring was used to catch lorry drivers exceeding the weight limit on an ancient bridge. Algorithmic software linked to cameras measured the length and axle weight of the 6000 vehicles which used the bridge every day. The algorithm worked out the classification of each vehicle and triggered a video camera if a lorry exceeded the 7.5 ton limit. Twelve violators were detected within ten minutes of the system going into operation and, within a few months some eighty lorry drivers faced prosecution.

Reducing discretion

The development of algorithmic justice signals not just an expansion of enforcement but a significant reduction in the use of discretion within policing and the consequences of this may be far reaching. Research on routine police work has shown that the manner in which incidents are dealt with and their outcome cannot merely be reduced to a strict application of the law. Other factors come into play; the officers' assessment of the moral worthiness of the offender and the victim, the demeanour of the offender to the officer, whether there are more important incidents to be dealt with, the status of any victims, and the precise circumstances surrounding any offence. The contrite offender who defers to the officer is more likely to be treated to an informal caution than arrest and an unwelcome visit to the local police cells.

Algorithmic enforcement dispenses with this. The complex moral calculus of policing is reduced to a mathematical formula. There is no discussion, no negotiation, no compassion and no empathy. There is merely a summons, through the letter box, to appear in court, and defend what, in the face of the video evidence, is likely to be indefensible. The impact on police public relations could be profound. How is the algorithm going to be programmed to account for the lesson that every police probationer learns early in their career, that over zealous policing is counter-productive?

Discretion also allows for local norms and customs to be given weight to. At a simple level it allows my local constable to turn a blind eye to the several elderly motorists who routinely park in a prohibited zone in the High Street. Undoubtedly this echoes the sentiments of the shopkeepers and of the local community that a little bit of license is good for business and that the elderly deserve special consideration.

But above all discretion fosters legitimacy, it allows officers to use their conceptions of justice and fairness to temper the overreach of law. Is it really desirable to prosecute a surgeon on her way to a life saving operation for breaking the speed limit by 12 miles an hour? Moreover most people like the idea of the police until attention is focused upon them. By under enforcing the law the police can build up legitimacy with an ambivalent citizenry and therefore ensure their cooperation and consent and their readiness to provide information in the future. The majority of crime is not solved through some latter day Sherlock Holmes, sifting meticulously through the evidence, but by a victim or witness directly naming the suspect. Without this information the police have very little chance of apprehending an offender. If the enforcement apparatus of the police is seen as a faceless and inhuman system there is a danger that public cooperation and consent will dwindle away.

Fairer enforcement

The reduction in the use of discretion may have a number of disadvantages but there is another, potentially more positive side to this story. While the exercise of discretion is often seen as a desirable and necessary element of good policing, police researchers have long been aware that discretion has the capacity to be discriminatory. Police attention is targeted disproportionately on some groups rather than others. Young males, particularly if they are black inner city residents are far more likely to be stopped and searched by the police. Further, where the law breaking of one group is persistently under enforced and dealt with informally, while another group's infractions are subject to the full force of the law, then the net result is discrimination. For instance it is often claimed that the police are far more lenient to female traffic violators than their male counterparts.

Algorithmic justice offers the potential to end this selective enforcement. Everyone will indeed be equal before the omnipresent gaze of automated enforcement cameras. Algorithmic justice offers the chance of a justice that is blind to the age, race and gender of offenders. But, whether expanded, but fairer, enforcement will enhance or further erode the legitimacy of the police is a moot point. For those who have been subject to over policing it will merely feel like more of the same. For those who have traditionally been under policed there will be a dramatic increase in their chances of being detected and convicted of an offence. Neither group is likely to take much solace in the knowledge that policing is now fairer. ∎

Further reading:
Cohen S (1985) *Visions of Social Control*. Oxford: Blackwell.
Lyon D (1994) *The Electronic Eye: the rise of surveillance society*. Cambridge: Polity Press, 1994.

For information on technical developments and recent applications see the trade journals *Traffic Technology International* (published by UK and International Press) and *CCTV Today* (published by Paramount Publishing Ltd).

Clive Norris is currently undertaking ESRC funded research into the social impact of surveillance systems.