BETTER DAYS AHEAD

ARTIFICIAL INTELLIGENCE, MACHINE LEARNING, AND THE QUEST FOR THE HOLY GRAIL OF ANALYTICS
POLICE OFFICERS HAVE NEVER BEEN MORE ACCOUNTABLE THAN THEY ARE TODAY. Their actions are often recorded on smartphones or CCTV cameras. Complete transparency and full and frank disclosure are the expectation rather than the exception to the rule. Split-second decisions can be cross-examined for weeks in a court of law, with serious jeopardy in store for those who cross the line, intentionally or otherwise.

The growing use of body-worn video and the increased thoroughness of police documentation serve as much as safeguards against unwarranted criticism as they represent good police work. But the lack of innovation in the field of records management systems (RMS) and computer-aided dispatch (CAD) technology is a serious problem, impeding further advances in various aspects of video storage and data retrieval.

From a technological point of view, the antiquated architecture of current records management systems resembles an electronic filing cabinet stuffed full of overlapping entities with data that require manual updates. To make matters worse, search functionality is limited to a few basic fields such as name, address, and case file number. Data entry is time consuming and prone to user error. Some police agencies have even resorted to employing data entry clerks to file reports over the phone in order to help to keep police officers on the road, but this type of 1950s thinking is merely a stopgap measure.

Law enforcement has achieved some efficiency gains in recent years, largely resulting from wireless mobility, but this is more a matter of degree, not kind. Game changers, they are not. And despite the addition of new technologies, clearance rates have remained relatively constant over the past two decades. Successful investigations are often the result of evidence left at the scene or information provided by eyewitnesses or informants, especially with regards to property crimes. It is easy to underestimate the difficulty of solving a crime without an immediate lead. In the absence of a smoking gun, an investigation is often solved only if the investigator makes a meaningful connection through serendipity and happenstance.

RMS and CAD systems significantly improved police operations when they were introduced in the 1960s. But what type of technology is available today to transform enterprise architecture in ways that better support evolving mission objectives in today’s post-industrial, highly connected world? What new tool will drive change and create greater efficiency by an order of magnitude; make police officers more productive by freeing up their time; increase officer safety through greater situational awareness; and improve risk management practices, specifically with third-party review of use-of-force incidents?

The answer to this question lies within a paradigm shift—a different way of looking at things. The good news is that it’s already started.

Artificial Intelligence and Machine Learning: A Framework for Discussion

Machine learning (ML) is a subset of artificial intelligence (AI). For example, an algorithm in Google Maps provides a set of possible routes to an intended location, while machine learning picks the fastest route based on traffic conditions. But the difference between the two concepts is not what’s important here—it’s about the end game. Will AI result in omniscient, self-aware systems like the fictional HAL-9000 computer or merely produce voice recognition software like Siri or Alexa? Does AI actually exist or is it just a glorified version of automated pattern recognition? And software that moves quickly through a decision matrix isn’t machine learning. Companies that switch to voice recognition software in place of human operators run the risk of creating mechanical firewalls that result in a poor user experience. In fact, true machine learning is intended for use when automated systems, powered by deterministic algorithms, just don’t work that well.

But as law enforcement travels down the bumpy road of technological progress, bouncing between the ditches in the collective pursuit of innovation, it would be wise to make note of Amara’s Law: “We tend to overestimate the impact of a technology in the short run, but we underestimate it in the long run.” For every example of poor business processes and faulty algorithms, where everything is connected but nothing works properly, there are instances of brilliance that resemble magic. Take Google’s AlphaZero program, for example, which taught itself to play master-level chess in four hours.

Although current machine learning technology still struggles to develop true reasoning abilities and common sense, innate to human understanding, there exists a promising role for AI within law enforcement, with immense future potential should the technology pan out. But the policing community as a whole still needs to frame the
debate over the use of AI, asking what the profession wishes to achieve with the technology and how to get there. In layman’s terms, or as any police officer would ask, “Will it fit on my belt, and will it help me catch bad guys?”

Artificial Intelligence and Cloud-Based Computing: Dawn of a New Age

Conventional RMS and CAD systems are deployed on location and connected via local networks, relying on infrastructure that is expensive and difficult to maintain. But third-party server farms, commonly referred to as cloud computing, hosted by numerous companies, including police technology providers, offer the basis for a fresh start. By making use of Internet-based RMS and CAD applications within a cloud computing environment, these service providers are quietly laying the groundwork for an entirely new model of net-centric data management.

For example, it is now possible for a patrol officer, equipped with body-worn video and glasses that capture video from his or her perspective, to utilize facial and voice recognition software to automatically produce reports within the RMS as the AI engine turns video and the spoken word into a digital document. A picture says a thousand words, so why bother with the slow and cumbersome process of typing a report when video can capture a verifiable representation of what occurred? Digital asset management programs further enhance the process, enabling police agencies to produce complete digital court packages in a timely manner.

The following are a few examples of possible efficiency and productivity gains for law enforcement:

Centralized report approval units operating on a 24/7 basis can make arrests and related charge reports available for review and approval in real time. Economies of scale can be created for small local departments or remote state police offices that lack the immediate availability of a supervisor. Disclosure of court packages can also be handled by these units.

Incident reports related to the use of force, whether or not charges are laid, can be reviewed electronically by an objective third party as part of an enhanced accountability process. Again, economies of scale can be created to allow the participation of small local police departments and remote state police locations.

Real-time database updates, connected to CAD, can provide officers with potentially life-saving information about subjects with whom they have come into contact. For example, an officer wearing video capture glasses can be alerted about a subject’s status through facial recognition software that speaks directly to CAD before the officer has time to conduct a manual query.

Enterprise risk management, supported by algorithms that drill into an organization’s various human resources and administrative databases, including the RMS, can make connections between data points that would otherwise remain undetectable. This kind of “sensemaking,” as illustrated by Jeff Jonas and his work with IBM, can even identify an employee or police applicant who might be connected in some way to a criminal organization before infiltration can occur.

By tracking court disclosure packages from arrest to final court disposition, police agencies can learn from the outcomes of their investigations as part of a closed-loop learning process. For example, changes in conviction rates, sentences, changes in the behavior of chronic offenders relative to police deployment tactics, analysis of individual criminal records, and the displacement effect of sting operations can inform an evaluation of tactics, policies, and procedures. In other words, police agencies can become increasingly adaptive over time as an outcome of positive reinforcement cycles within a semi-metacognitive process.

A new generation of records management systems paves the way for implementation of new crime classifications that provide for a more granular analysis of crime. This is one of the goals of the NIBRS program in the United States, which will help support the future development of robust analytics.
However, AI and machine learning are not meant to work in isolation of the human element. The Terminator movies were fiction—the intention is not to build a friendly cyborg or a more utopian version of Skynet. AI only enhances the human aspect of policing; it doesn’t act as a replacement. Under the conventional database model, the user has to adapt to the needs of the system, which often falls short of what is required. AI enables the data system to adapt to the needs of the user as part of an iterative learning process, building on the uniquely human attributes of perspective, judgement, and context. The ability of AI-based systems to achieve exponentially higher levels of connectivity amidst a continual cascade of information updates can provide law enforcement with a competitive advantage the likes of which have never been seen.

In Pursuit of the Holy Grail of Analytics

There is a mathematical problem related to computer science that is directly related to an age-old problem in law enforcement, which can possibly be solved through the use of AI and machine learning. The “P vs NP” problem questions of whether a solution that can be quickly verified could have been quickly identified in the first place. In other words, why did the causal factors of an incident, clear in hindsight, often fly under the radar beforehand? As far as criminal investigations are concerned, how many files could be successfully concluded if investigators knew how to find relevant RMS or CAD data that remains hidden from view because he or she didn’t know where to look for it or even knew of its existence in the first place?

In terms of data mining, the detection of anomalies (outliers) can raise a red flag, signaling the need for further investigation. Since AI can help make connections among millions of data points far more efficiently than the human mind ever could, the possibility exists that AI could one day routinely find the proverbial needle in the haystack that solves a crime. This would be a giant leap forward, symbolic of the ability to automate the discovery process, which to this day often remains dependent on luck or serendipity and happenstance, as mentioned before. The creation of an intuitive, AI-based neural network that enables
millions of individual data points to speak to each other and identify commonalities that generate leads for subsequent investigation is truly the Holy Grail of data analytics, with tremendous upside potential for the law enforcement community. And since deep learning neural networks rely on massive amounts of clean data, participation within NIBRS in a cloud computing environment might seem like a daunting task, but it is well worth the effort in the long run.

The Dream Is Real

AI, machine learning, and cloud computing hold the promise of better things to come. Just as the deployment of radio-equipped patrol cars provided 1930s policing with an advantage over the criminal element, these transformational technologies will set the stage for the next 50 years of technological advances in police operations. These are not rose-colored prophecies. Such technology has already begun to move out of the realm of science fiction with the advent of voice and facial recognition. When combined with the widespread use of body-worn video and initial attempts at the use of AI, there are the makings of a game-changer that can address ongoing concerns about litigation, public trust, and emerging crime trends.

Cloud-based platforms eliminate many of the built-in impediments to data analytics and retrieval that exist in conventional records management systems. They provide the opportunity to streamline business processes and support significant efficiency gains. Good coding, good data, and efficient business processes are the ingredients for success, supporting key outcomes such as increased productivity, enhanced officer safety, and the generation of leads that can help raise clearance rates. A safer future is in law enforcement's hands.

IACP RESOURCES

- “The Cyber Beat Partner: Harnessing the Power of AI in Law Enforcement” (article)
- “How V2X Will Be a Game Changer for Public Safety” (article)
- “Turning the Tables: Intelligent Video Analytics in 21st Century Policing” (article)

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