

# The Role of Data Analytics in Predictive Policing

BY: [Eyragon Eidam](#) | September 2016

From the right vantage point, it is almost possible to watch the steady tide of technology seeping into the briefing rooms and patrol cars of American law enforcement agencies.

The devices and technologies that may have once started as benign civilian conveniences have transformed into powerful tools that enable agencies to pinpoint their resources, prevent crime and cast a wider net for wrongdoers. The exponential escalation of mobile computing and analytics has given officers intelligence on the go and greatly improved their chances of being in the right place at the right time.

While these tools come with profound benefits to the men and women behind the badges and the communities they serve, there are ramifications that ripple far into the public space as well as considerations that must be made to prevent misuse and infringement on civil rights.

But we still seem far from the broad-stroke reports of many in the mainstream media who might tell you that cops everywhere can peer into your life with the click of a mouse or a well placed drone — at least at the local level. Despite some of these overblown stories of advanced surveillance capabilities, many in local law enforcement would tell you that funding for boots on the ground will almost always win out over bids for the latest NSA-style tech. Even if smaller agencies want it, they probably can't afford it.

This is not to say there aren't those with a spy-style kit they can't or won't talk about. These methods tend to encourage public distrust and suspicion, but we'll cover that a bit later on.

Despite the gloomy and often mischaracterized capabilities of police powers in the U.S. and the tools they use daily, a wider look at the profession and its emerging capabilities can show us just how important technology is and will become in policing.

## Seeing Crime Before It Happens

It's 4 p.m. on a Tuesday in June in Santa Cruz, Calif., and the squad car radio echoes off with chatter about a strong-arm robbery near the rail bridge that connects the popular boardwalk with a nearby beachfront neighborhood. The suspect, a woman with a backpack, has taken another woman's belongings by force and was last seen making her way toward the network of vacation homes and beachgoers enjoying the sunny afternoon.

But Santa Cruz police officers are already nearby and move in to track the perpetrator within moments of the first report. There's nothing random about their presence in the area. What on the outside might look like blind luck or coincidence is actually part of a predictive system the department has been perfecting with the help of academic partners turned businessmen since 2011.

And this is not someone sitting in a room with a crystal ball or tarot cards trying to pinpoint the next crime; this is the intersection of advanced probabilistic algorithms and community policing. It's appropriately called PredPol, short for Predictive Policing.

Crime data fed into the PredPol system provides officers with 15 different zones for four types of crime — auto theft, vehicle burglary, burglary and gang-related activity — at the start of each shift. Each zone covers an area of 500 square feet.

In a city where tourism can double the population in a single night, the deputy chief said maximizing the efficacy of his department was a no-brainer. The technological edge provided by the advanced software would help to close the gap between what was, at the time, increasing crime and staffing limitations.

"Time is a zero-sum game. I only have the number of officers times the number of hours that they're working to address crime issues in the city. If now all of a sudden a chunk of our time is dealing with radio calls for service, that greatly reduces my proactive policing time. The only way to increase that is you either lower the demand or you get more officers to dilute or diffuse the calls for service so you have more proactive time," said Deputy

Chief Steve Clark. “I couldn’t afford more officers, so I had to get smarter about how we were going to deal with our limited time resources.”

Despite giving officers a substantial leg up when it comes to patrolling the city, Clark said the system still requires them to interact with the community and walk the beat, as it were. They cannot, and do not, rely solely on the system’s predictions to do their jobs. They still patrol the city as any cop would, but they’re looking for any indication that the predictions were correct.

However effective the system might be in predicting crime, Clark said the job of policing is more than simply following the data. “You can’t become too reliant on these things. The officers have to continue to sharpen their saws as far as their instincts, their training, their experience, their instincts — those things that we spend a lot of money to teach them and train them, those years of experience,” he said. “Public safety is a discipline or a field, if you will, that you can never lose the human element in.”

*Clark demonstrates different aspects of Santa Cruz’s predictive policing system. Photo by Eyragon Eidam.*

From Clark’s perspective, the platform does more than just point cops in the right direction; it also removes the potential for race- and income-based biases so often a concern in policing. The predictive platform doesn’t see race, financial status or any of the other indicators that often lead to the perception of police profiling. All PredPol sees are the reports of crimes that have occurred, which are then translated into where they are likely to occur next.

“There’s nothing in there about demographics,” Clark said. “Whether it be the population type or monetary demographics. These are actual crime reports, and that’s what it makes its predictions from.”

Halfway across the country in Eden Prairie, Minn., a town of about 63,000 people, predictive policing has taken on a slightly different form. Officers rely on a dedicated analyst for up-to-the-moment intelligence on their patrols.

The public safety system may not rely on advanced probabilities and mapping, but rather law enforcement analyst Ryan Kapaun, who tracks each crime and translates it into usable intelligence for the department, which averages 60,000 calls for service a year.

Using fairly simple tools, like the Microsoft Office suite and IBM’s Analyst’s Notebook, Kapaun funnels officers’ suspect descriptions, potential patterns and anything else that may help stop or catch a criminal.

“To just map every burglary, for me, doesn’t tell me a lot, because it doesn’t tell me that those burglaries are linked. So one might be an overnight garage burglary [and] one might be a front-door-kicked-in burglary during the day while people are at work,” he said. “What I’m most interested in is not aggregating and mapping all of the burglaries. What I want to know is, what are the anomalies? What doesn’t fit? What are the burglaries, as an example, that aren’t fitting the other burglaries?”

The concept took time to catch on with his badge-wielding colleagues, according to the analyst. But now Kapaun’s work represents one more tool in each officer’s belt that can help them make split-second decisions on patrol.

*Santa Cruz’s predictive policing system on a tablet. Photo by Eyragon Eidam.*

“Everyone is using data, and they might not either be aware of it or understand it, and if you think of it, a police department has a wealth of data — they’re data-rich. It’s just figuring out how to take that data and use that data in a way that’s meaningful,” he said. “I think a lot of agencies end up using the data to just say, ‘Burglaries are up 15 percent from this week over last week.’ For a patrol officer, when I used to do that, eyes would glaze over. What does that mean? You have to tell the story with the data.”

Kapaun said the program’s successes have the department looking at how to expand it and potentially bring in other analysts.

## **The Rise of Biometrics and Fingerprint Alternatives**

In recent years the push to include alternative identification methods in daily police work has exploded past fingerprinting and the classic mug shot. Law enforcement agencies are now looking toward options like facial

recognition to help “finger the right perp.”

At the federal level, the FBI’s Next Generation Identification program has given new identity tools to federal, state and local law enforcement, and has stoked the flames of critics, who believe the system is little more than a way to catalog people — the guilty, the innocent and those somewhere in the middle.

But the program seems to be the next logical step in a national process where fingerprints and photographs don’t always tell the whole story of a person’s criminal past. The larger program, which extends its database services to participating state and local agencies, relies on a growing index of finger and palm prints as well as facial and iris scans to identify persons of interest.

In San Diego, the city’s police department (SDPD) employs facial recognition equipment to identify people its officers come in contact with. For example, if an individual does not produce an ID during a traffic stop, facial recognition could close the information gap for the officer.

According to Officer Steve Thorn, the SDPD facial recognition program coordinator, around 100 facial scanners have served the department well since the city first signed on with the Automated Regional Justice Information System, a larger regional law enforcement collective.

“Officers use the devices to assist in the identification of individuals lawfully detained or arrested when those persons are unwilling or unable to provide identity. A typical situation would be when officers contact an individual for a crime. The crime could be minimal in nature, such as littering or jay-walking, or more severe such as battery or theft,” he said. “If the individual has no identification on them or would not provide their name, the officers could use the device to verify their identity and issue a citation in the field versus having to transport the individual to a police station and take fingerprints, which could be very time-consuming.”

But the usefulness of the tools extends far beyond identifying criminals. Thorn said officers also use the department’s 100 or so scanners to work with the homeless community and identify potential missing persons.

“I have spoken to a number of officers who use the device regularly. They all say the device works very well, saves time and helps prevent misidentification. The device is extremely useful for officers assigned to the quality-of-life team and homeless outreach team. Both teams are a resource to the homeless population, but also take enforcement action as necessary. A vast majority of homeless peoples have no identification in their possession, and the device enables the officers to make quick identification and take appropriate action.”

For critics, programs like these represent a way to capture and store permanent, vital information about civilians with little oversight. Most recently, the Next Generation Identification program took fire from critics when the FBI petitioned to exempt it from federal privacy regulations, which critics say would prevent the misuse and abuse of data.

In a U.S. Government Accountability Office report, published in May, the agency pointed to gaps in the FBI’s processes and recommended steps the top domestic law enforcement agency could take to improve the program’s accuracy and transparency.

## **Video: Anytime, Anywhere?**

Police video is not a new concept by any stretch of the imagination. What started as the occasional camera capturing a liquor store or bank robbery has grown into cameras being installed on seemingly every street corner. In the past few years, law enforcement agencies across the country have started equipping officers with body cameras to document interactions with citizens.

The prevalence of video and its societal benefits are the reason that researchers at Purdue University are working on the CAM2, a cloud-based platform that links publicly available cameras through a single, easily accessible portal. Despite how popular reports may have painted the research to this point, the team scoffs at the idea that it’s a way for police to peer into the lives of unsuspecting Americans.

Yung-Hsiang Lu leads the team behind CAM2. From his perspective as a technologist, the system has applications in law enforcement environments, but it doesn’t give them anything sensitive.

“We do not use any data that requests passwords, and furthermore we actually take reasonable efforts to exclude any camera we think may look at a private space,” he said. “Most of the cameras we have in our system come from Departments of Transportation of different governments, different states, different cities. For

obvious reasons, because our research is about data management, it is not about looking at whether you are sitting on your sofa or not.”

*Santa Cruz officers begin each shift with a report detailing predicted hot spots and items of interest. Photo by Eyragon Eidam.*

The scalable video platform allows users to log in and view a wealth of publicly available cameras collected from around the world, which can be watched in real time or recorded for later. In terms of potential, Lu said the analyzable data from the platform could ultimately help in a number of sectors, including transportation planning.

The problem facing the system is the fragmented sources of the video feeds, Lu said. Engineers have had to work around the multitude of camera systems to adapt them to a singularly accessible platform.

The larger challenge of video is inextricably linked to big data and has unsurprisingly been the focus of researchers around the world. While the platform may not equate to the next big surveillance tool, there are undeniable benefits for police, first responders and the communities they serve.

David Ebert heads up Purdue University's Visual Analytics for Command, Control and Interoperability Environments in conjunction with the Department of Homeland Security's Centers of Excellence, and said the video platform has sparked the interest of some in the larger law enforcement environment who see more potential applications.

“One of the things that I see as a great potential for this also is in the emergency response and disaster response fields,” he said. “Basically a tornado comes through or hurricane comes through, you’re trying to do assessment of damage and where your resources should be allocated. Being able to pull up that information through this sort of system is a good way to crowdsource the information instead of having to wait until people upload photos, or look through Twitter images or Snapchat information and things like that.”

But the tool comes with the need for the inclusion of best practices, Ebert added. While it may not be peering into the living rooms of everyday citizens, he likens it to how local agencies address the collection of information on publicly available social media platforms.

“I think a similar set of guidelines for these type of cameras would be very appropriate. Depending on your current interpretation of the laws, the view is that all of the information that people put out on social media they’re making publicly available if they don’t have privacy settings turned on, so there is no violation of privacy. That’s the perception, but the question is, have the laws caught up with what the public expects?”

## **The Evolution of Data Analytics and Collection**

And now to the stuff agencies seem a bit shy about.

The Stingray made recent national news as information slowly trickled out that the U.S. Justice Department had provided local agencies with the funds to purchase so-called cell-site simulators. The devices are designed to intercept cellular communications, access the data within them and track locations. But as quickly as the technology made its way to the headlines, legislation began to consider the implications of what many considered to be the possibility of mass surveillance by local agencies.

States like Illinois and Nebraska began to propose legislation to strip agencies of their simulators and bar them from buying new ones. But this isn’t the only kind of tech that has some people concerned. The Los Angeles Police Department declined interview requests about its use of a software platform produced by a company called Palantir, which also won’t discuss its work with law enforcement agencies.

On the upside, the department talked about the product and its potential for a company testimonial, so we do have a small idea about what it is capable of, even if it’s just the stuff the company needs to sell it to other departments. While the lack of transparency might seem like a cause for concern for residents, the system appears to be little more than an advanced data analytics platform geared toward law enforcement applications.

Basically Palantir’s platform uses available data sources to “make sense of all of the noise that is out there,” according to Police Chief Charlie Beck in a 2013 testimonial. “For years we’ve had stovepipe systems that have a lot of information, but don’t talk to each other and don’t compare that information, and Palantir allows us to do that,” he added.

While details are limited, as of a few years ago, the company was gaining momentum. In 2012, Palantir founder Alex Karp told *TechCrunch* that while he could not disclose how many government contracts the company had, he did say that doubling his staff would help it meet demand.

By pulling untapped or underutilized data sets into the investigative process, officers are now able to piece together information that might otherwise appear unrelated. Combining information like crime and arrest records, field interview cards, automatic license plate readers, Department of Motor Vehicle information and rap sheets, as well as publicly available camera footage and police body cameras, is helping to usher in effective predictive policing programs across the country.

This article was printed from: <http://www.govtech.com/data/Role-of-Data-Analytics-in-Predictive-Policing.html>