PRE-COG IS REAL – NEW SOFTWARE STOPS CRIME BEFORE IT HAPPENS

The police officers arrived at the parking garage in downtown Santa Cruz and spotted two women behaving suspiciously. No crime had been committed, but peering through the windows of the parked cars was sketchy enough. The officers questioned the women: one had outstanding warrants; the other was in possession of illegal drugs.

What’s strange about this scenario is that no one had called the cops. In fact, the cops didn’t even know that the women would be there, just that the probability of a crime being committed at that location, at that time of day, was especially high. In one of the first cases of ‘predictive policing,’ law enforcement were able to calculate where the criminals would be and arrest them before the crime could be committed.

Oh yeah, totally “Minority Report,” absolutely “Numb3rs.”

Except it’s not Hollywood, it’s real. In July the Santa Cruz Police Department began experimenting with an interesting bit of software developed by scientists at Santa Clara University. The researchers behind the software are like an intellectual “Oceans Eleven” team of specialists: two mathematicians, an anthropologist and a criminologist. They’ve combined their cerebral forces to come up with a mathematical model that takes crime data from the past to forecast crimes in the future. The basic math is similar to that used by seismologists to predict aftershocks following an earthquake (also a handy bit of software in southern California).
Large earthquakes are unpredictable, but the aftershocks that follow are not and their occurrence can be predicted with mathematical models. It occurred to Dr. George Mohler, one of the Santa Clara mathematicians, that criminal activity might not be random and that, similar to aftershocks, some crimes might be predicted by other crimes that precede them. The reasoning is based on the assumption that crimes are clustered – it’s what police call ‘hotspots.’ Burglaries will occur in the same area and at the same houses because the vulnerabilities of that area will be known to the burglars. Gang violence is also clustered. A gang shooting will often trigger retaliatory shootings.

Using the aftershocks-inspired algorithms Dr. Mohler and his team came up with a model, then sought to test it. In collaboration with the LAPD they plugged in data on 2,803 residential burglaries occurring within a block of the San Fernando valley 11 miles by 11 miles throughout 2004. For a given day the software calculated the top 5 percent of city blocks most likely to be burglarized. The results convinced the LAPD that, had they been using the program, they could have prevented a quarter of burglaries across the entire test region for that day.

The current, real world test of the software involves generating a map of the city areas most likely to be burglarized, the time of day they are most likely to get hit, and deploying personnel accordingly. The software is recalibrated every day when burglaries from the previous day are added to the dataset. They don’t actually expect to catch people in the act, but to deter more crimes with more effective patrolling. The test that is underway will be evaluated at six months, but already the data is encouraging. Zach Friend, crime analyst for Santa Cruz police, confirmed to the New York Times that the program led to five arrests in July. Even more impressive, compared to July 2010 burglaries, the number of July 2011 burglaries are down 27 percent. Whether or not that trend holds remains to be seen, but so far it appears that being in the wrong place at the right time works.
Mathematical models are only as good as their predictive power, and the ability to predict requires algorithms which are based on accurate data. Given the fact that the data supplied by the Santa Cruz Police Department wasn’t collected with mathematical algorithms in mind, I asked Dr. Mohler if there were another kind of data that he wished he was getting that simply isn’t available. His answer suggests there is, but it doesn’t come from the police. “Part of this falls on the public. Crimes…need to be reported if predictive policing is going to be as effective as possible. Once reported, it would be good to have high spatial accuracy and realistic estimates of time windows in which crime happened.”

The Santa Clara software isn’t the first of its kind. Other police departments have been experimenting with their own predictive software. But according to Dr. Mohler, comparisons show that their software outpredicts the others. And they plan to develop software that predicts crimes other than burglaries. Because gang violence begets more gang violence it is amenable to the same type of chain reaction-dependent analysis. Dr. Mohler and his colleagues have already begun working on a gang violence model using the activities of three gang rivalries in Los Angeles. Evidently retaliations commonly occur within days of and at nearly the same location as the initial attack. Dr. Mohler hopes software might be developed for still other types of crimes in the future.

One impetus for adopting predictive policing is the downturn in the US economy. As police departments are pressured to downsize it becomes that much more important to patrol intelligently and efficiently. With only 26 officers for every 10,000 residents Los Angeles is particularly short-handed (Chicago has 46). “We’re facing a situation where we have 30 percent more calls for service but 20 percent less staff than in the year 2000, and that is going to continue to be our reality,” Mr. Friend told the New York Times. “So we have to deploy our resources in a more effective way, and we thought this model would help.”

Given that the crime-fighting software is the real world version “Numb3rs,” the television show in which a genius helps police solve crimes through math, one might expect Dr. Mohler was an avid viewer. Turns out he’s only seen the show twice, but what he saw was pretty accurate. “The pilot episode concern[ed] geographic profiling and matche[d] reasonably well with what is done in practice. I’m sure this doesn’t hold throughout the course of the series, but getting people excited about math isn’t a bad thing in my opinion.” If the six month evaluation of the software shows it to be effective in decreasing crime its use will undoubtedly spread to other cities in the US and the rest of the world. If life imitates art and our streets are made safer, I imagine math might get more exciting for a lot of people.
So what happens when the criminals use this software to predict where the police will be focusing? I guess they would need to have the police crime data. The cat and mouse will continue though.

---

What happens when you just happen to be strolling by a hot-spot and get detained by the LAPD. This would be marginal, but nonetheless a scary possibility.

I think the math is correct, but the humans employing them is what I do not trust.

---

Nice work…

---

I think I need much more data to judge this story. Is the software accurate than, say, a policeman on the beat who knows that such and such a place is shadowy and unsafe? Or any urban dweller who knows that some neighborhoods are not safe?

Vstoriguard
http://www.amazon.com/dp/B005NCLQDA