Music

Clash - I Fought the Law and the Law Won
Life Inside a Skinner Box: Confronting our Future of Automated Law Enforcement

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Disclaimer

The views in this talk are the authors’ and don’t reflect the official policy or position of the United States Military Academy, Samford University, the Department of the Army, the Department of Defense, or the United States Government.
Why?

We don't want to live in a police state
Meditation on the Law

Driving the Speed Limit on the Atlanta Perimeter

http://www.youtube.com/watch?v=1B-Ox0ZmVIU
Three Points

1. Networked technologies have the potential to automate enforcement of the law.

2. Reckless and pervasive automation can have disastrous and unintended consequences.

3. This audience is in a unique position to defend society and appropriately confront law enforcement systems.
Automated Law Enforcement

Any computer-based system that uses input from unattended sensors to algorithmically determine that a crime has been or is about to be committed then takes some responsive action, such as to warn the subject or inform the appropriate law enforcement agency.

Additionally, these systems will be capable of automatically imposing some form of punishment. Our proposed conceptualization of automated law enforcement is based on a model that is subject to automation at various points.
The Precursors are in Place
Increased Proliferation of Sensors
Increased Diversity and Sensitivity of Sensors

State Police Pull Over CT Medical Patient for Tripping Radioactivity Detector

Compulsory Sensing

US Senate Passes Bill Requiring All New Cars in America to Come Equipped with a Black-box by 2015
Mobile Sensors

“Intended to provide the dismounted soldier with Reconnaissance, Surveillance, and Target Acquisition (RSTA) and laser designation. Total system weight, which includes the air vehicle, a control device, and ground support equipment is less than 51 pounds (23 kg) and is back-packable in two custom MOLLE-type carriers.”

Honeywell T-Hawk
3 Billion+ Mobile Devices

Happiest place on earth, meet the most magical app.

Call 4MAGIC (+62442) or visit to download. Disney Mobile Magic App, the official Disney Parks App on Verizon.
Connected Cars

OnStar
Instrumented Communities

Washington DC Area Traffic Cameras

http://app.ddot.dc.gov/services_dsf/traffic_cameras/map_10.asp
We are Losing Control of our Technology

So when I get into a car—a computer that I put my body into—with my hearing aid*—a computer I put inside my body—I want to know that these technologies are not designed to keep secrets from me, or to prevent me from terminating processes on them that work against my interests.

- Cory Doctorow

* Note that this quote is taken a bit out of context. Mr. Doctorow was speculating that he may require a hearing aid at some point in the future.
Crowdsourced Identification

Identify the rioters
Help identify the people behind the Vancouver riots on Wednesday, June 15th

Can you identify the (alleged) rioter or looter in this photo?

This site does not make accusations - Once an alleged rioter is positively identified by multiple people, the riot picture is sent to the Vancouver Police Department, along with the name of the identified individual. Remember you can always tip the VPD directly too by sending an email to robbery@vpd.ca

Vancouver Riots
www.identifyrioters.com
Improved Algorithms

Cordon: 32 Vehicle Tracking Across 4 Lanes

http://www.engadget.com/2011/10/31/cordon-multi-target-photo-radar-system-leaves-no-car-untagged-
Crowdsourced Crime Detection

Internet Eyes - “Detecting Crime as It Happens”
Tech Transfer

Miami-Dade Police Department's Drones Ready to Fly

Augmented Reality

Google's Project Glass: One Day...
Conversion of Analog Systems to Digital
Increased Analytics

Wide Area Motion Imagery (WAMI)

See also Persistent Stare Exploitation and Analysis System (PerSEAS)

Reid Porter, Andrew Fraser, and Don Hush. "Wide-Area Motion Imagery." IEEE Signal Processing Magazine, September 2010
Increased Linkages
India Launches Universal ID System with Biometrics
Location Tracking

Get The Best of Both Worlds With Our Top Two Products

**Live GPS Tracking**

Spark Nano GPS Tracker
- Live real-time reporting
- 5 day battery life
- SMS / e-mail alerts

**Small GPS Logger**

The Flash GPS Reporter
- 90-Day Swappable, Rechargeable Battery
- Most Storage with Over 240,000 locations recorded
- Speed Notification Reports
- Works with Google Earth

http://www.lightninggps.com/
Predictive Policing is on the Rise

California Police Praise Predictive Policing

http://www.officer.com/video/10604045/california-police-praise-predictive-policing
See also Samuel Greengard's "Policing the Future" in the March 2012 Communications of the ACM
Lots of Interested Parties

Federal, State, and Local Law Enforcement

Insurance Companies

* Note that we aren't stating that these specific entities are necessarily interested in Automated Law Enforcement, but in general we argue such types of entities are.

http://www.coolgadgetconcept.com/coolest-police-badge/
Well Intentioned Officials

New York City Soda Ban
Well Intentioned Law Enforcement...

Suspicious Activities

“Overly concerned about privacy”

“Always pays cash”

“Use of anonymizers... to shield IP address”

“Uses encryption”

“Downloads information about electronics”

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<table>
<thead>
<tr>
<th>People Who:</th>
<th>What Should I Consider Suspicious?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Always pay cash or use credit cards (indifferent names)</td>
<td></td>
</tr>
<tr>
<td>Apparently use tactics such as lookout, block or someone to distract employees</td>
<td></td>
</tr>
<tr>
<td>Act nervous or suspicious behavior inconsistent with activities</td>
<td></td>
</tr>
<tr>
<td>Are observed switching SIM cards in cell phone or use of multiple cell phones</td>
<td></td>
</tr>
<tr>
<td>Travel (long distance) to use Internet Café</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Activities on Computer indicate:</th>
<th>What Should I Do?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Evidence of a residential or business based internet provider (signs up to Comcast, AOL, etc.)</td>
<td>Be part of the solution.</td>
</tr>
<tr>
<td>Use of anonymizers, portals, or other means to shield IP address</td>
<td>Gather information about individuals without drawing attention to yourself</td>
</tr>
<tr>
<td>Suspicions noted in writings, use of code words, chats, cryptic ledgers, etc.</td>
<td>Identify license plates, vehicle description, names used, languages spoken, ethnicity, etc.</td>
</tr>
<tr>
<td>Encryption or use of software to hide encrypted data in digital photos, etc.</td>
<td>Do not collect metadata, content, or search electronic communications of individuals</td>
</tr>
<tr>
<td>Suspicious communications using VoIP or communicating through a PC game</td>
<td>Do not do additional logging of online activity or monitor communications</td>
</tr>
<tr>
<td>Use Computers:</td>
<td>If something seems wrong, notify law enforcement authorities. Do not jeopardize your safety or the safety of others.</td>
</tr>
<tr>
<td>Download and transfer files with “how to” content such as:</td>
<td>Preventing terrorism is a community effort. By learning what to look for, you can make a positive contribution in the fight against terrorism. The partnership between the community and law enforcement is essential to the success of anti-terrorism efforts.</td>
</tr>
<tr>
<td>- Content of extramural nature with violent themes</td>
<td>Some of the activities, taken individually, could be innocent and must be examined by law enforcement professionals to determine whether there is a basis to investigate. The activities outlined in this handout are by no means all-inclusive but have been compiled from a number of terror events over several years.</td>
</tr>
<tr>
<td>- Gunlock Cookbook, explosives or weapon information</td>
<td></td>
</tr>
<tr>
<td>- Military tactics, equipment manuals, chemical or biological information</td>
<td></td>
</tr>
<tr>
<td>- Terrorism revolutionary literature</td>
<td></td>
</tr>
<tr>
<td>- Preoccupation with press coverage of terrorist attacks</td>
<td></td>
</tr>
<tr>
<td>- Defensive tactics, police or government information</td>
<td></td>
</tr>
<tr>
<td>- Information about persons, electronics, or revenue transmitters/receivers</td>
<td></td>
</tr>
</tbody>
</table>

It is important to remember that just because someone’s speech, actions, beliefs, appearance, or way of life is different, it does not mean that he or she is suspicious.

Joint Regional Intelligence Center (JRIC)
www.jric.org
(888) 705-JRIC (5742) mention “Tripwire”

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http://yro.slashdot.org/story/12/02/02/1719221/do-you-like-online-privacy-you-may-be-a-terrorist
“Strict Enforcement” Business Models Exist

http://autoclubsouth.aaa.com/pgr/traffic_traps.aspx
August 25, 2011 - This is to remind all PBA members that any threat of retaliation for failure to perform a specific numbers of police actions (summonses, stop and frisks, arrests etc.) within a specified time period is a violation of the quota law and a grievable offense. We encourage all of our members who experience the threat of retaliation or punishment to file an immediate grievance with the PBA. The attached form was developed to expedite the grievance process in these cases.

Fraternally,
Patrick J. Lynch
President

Bait Cars

and Other Types of Bait…
And Illegal Enforcement...

And 'ol Charlies workin' out real good down at the corner store where the red light is. He sees them out-of-state plates two blocks away. Whey they get right on top of that green light, ol' Charlie pushes that secret button underneath the corner drug store counter. And that yellow light only lasts for a tenth of a second.

- Hoyt Axton (Speed Trap)
Some Regimes May Take Enforcement to a Whole Other Level
Citizens Who Want a Free Lunch...
Social Media

Successful Prototypes

Bus Lane Enforcement
Red Light Enforcement
Speed Limit Enforcement
Stop Sign Enforcement
Congestion Charge
HOV Lane
Railroad Crossings
Illegal Parking
Illegal Turns

The Inadequacy of Law

Sniffer Dogs

Florida v. Harris
Flortida v. Jardines
So Where is all the Heading?

- ✔ Enabling technologies
- ✔ Ubiquitous sensors
- ✔ Promiscuous data sharing
- ✔ Security and financial incentives
- ✔ Well intentioned law enforcement
- ✔ Complacent citizenry
- ✔ Law lagging technology
- ✔ Successful prototypes
So How Does the Law Work?
Punishment Feedback Loop
# Punishment Capabilities

<table>
<thead>
<tr>
<th>Current Capability</th>
<th>Notice</th>
<th>Warning</th>
<th>Embarrassment</th>
<th>Citation/Points / Fine</th>
<th>Arrest</th>
<th>Prosecution</th>
<th>Confinement</th>
<th>Execution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Currently Implemented</td>
<td>Signs &amp; websites warning about sensors</td>
<td>&quot;Flash&quot; when camera activates at speed trap or intersection</td>
<td>Listing on a website or database</td>
<td>Red Light Cameras, Radar speed traps</td>
<td></td>
<td></td>
<td>Ankle bracelets for house arrest</td>
<td></td>
</tr>
<tr>
<td>Current Capability not yet Implemented</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td></td>
<td></td>
<td>Lethally-armed robots</td>
</tr>
<tr>
<td>Future Capability</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>Networked Sensor-DB Prosecution Algorithms</td>
<td>More sophisticated location control better enforcement of restraining orders, for instance</td>
<td>More advanced lethally-armed robots that might even be autonomous</td>
</tr>
</tbody>
</table>
Notice

Virginia Traffic Information

http://www.511virginia.org/
Montgomery County, Maryland

Intersection Safety Signal Warning Notice

This is only a warning notice. Please take notice as the registered owner(s) of the vehicle described and pictured herein, that the driver did not stop for the red traffic signal at the place, date and time specified. Therefore, as the registered owner(s) you are liable for a violation of Maryland State law (§21-202(1)). Maryland law imposes a civil penalty in the amount of $75.00, which normally must be paid by the date shown on this notice. No points are assessed against the registered owner(s) driving record and this violation is not reported to Motor Vehicle Administration nor any insurance companies. Therefore, your insurance rates are not affected by this violation.

You owe nothing for this warning. However, normally if you fail to either remit payment or contest your liability by the date shown, then you would be deemed to have admitted liability and would be subject to an additional monetary penalty of $25 and a default judgment may be entered against you. In addition, failure to take timely action may result in the referral or suspension of the motor vehicle registration.

This notice serves as a warning only. Do not pay the amount shown below.

A Public Safety Program of the Montgomery County Department of Police Automated Enforcement Unit

I certify that I am a duly authorized employee of the Montgomery County Police and have reviewed the associated image of the described vehicle, which was acquired in violation of §21-202(1), according to the above images.

Notice
Warning

Highway Speed Display
Embarrassment

Ohio Department of Rehabilitation and Correction Offender Search Database

<table>
<thead>
<tr>
<th>Name</th>
<th>Number</th>
<th>DOB</th>
<th>Status</th>
<th>Offenses</th>
</tr>
</thead>
<tbody>
<tr>
<td>SMITH H</td>
<td>...</td>
<td>...</td>
<td>INCARCERATED</td>
<td>DRUG TRAFFICKING</td>
</tr>
<tr>
<td>SMITH H</td>
<td>...</td>
<td>...</td>
<td>INCARCERATED</td>
<td>AGG ASSAULT, BURGLARY</td>
</tr>
<tr>
<td>SMITH H</td>
<td>...</td>
<td>...</td>
<td>APA SUPERVISION</td>
<td>DISCHARGE FIREARM AT H/P</td>
</tr>
<tr>
<td>SMITH H</td>
<td>...</td>
<td>...</td>
<td>INCARCERATED</td>
<td>ARSON, INTIMIDATE VICTIM</td>
</tr>
<tr>
<td>SMITH H</td>
<td>...</td>
<td>...</td>
<td>INCARCERATED</td>
<td>ROB OF PROPS</td>
</tr>
</tbody>
</table>
Citation / Points / Fine

Howard County, Maryland, Traffic Camera Fine
TASER and iRobot are Collaborating on a TASER-Shooting Robot
public bool ConfigureSnapshots
{
  get { return configureSnapshots; }
  set
  {
    configureSnapshots = value;
    snapshotsLabel.Visible = value;
    snapshotResolutionsCombo.Visible = value;
  }
}

/// <summary>
/// Provides configured video device.
/// </summary>
///
/// <remarks>
/// The property provides configured video device if user confirmed
/// the dialog using "OK" button. If user canceled the dialog, the property is
/// set to <see langword="null"/>.
/// </remarks>
public VideoCaptureDevice VideoDevice
{
  get { return videoDevice; }
}
Confinement

The New Generation III Alcohol and Marijuana Sensing House Arrest Ankle Bracelet With Active GPS Is Now Available for only $3.00 per day!
Confinement

The New Generation III Alcohol and Marijuana Sensing House Arrest Ankle Bracelet With Active GPS Is Now Available for only $3.00 per day!

Electronic Monitoring Just Got Better!

http://www.housearrestbracelet.com/
Execution
<table>
<thead>
<tr>
<th></th>
<th>Subject</th>
<th>Law Enforcement Agency</th>
<th>Judicial System</th>
</tr>
</thead>
</table>
| **Advantages** | • Safer more secure society  
• Reduced Bias                   | • Safer more secure society  
• Community financial incentives  
• Increased and more effective enforcement  
• Potential efficiency gains | • Safer more secure society  
• Potential efficiency gains |
| **Disadvantages** | • False positives  
• Chilling effect  
• Societal harm  
• “Perfect” enforcement  
• Misidentification  
• Enforcement of minor infractions  
• Creating infrastructure for abuse  
• Security of ALE systems | • False positives  
• Loss of discretion  
• Lost jobs  
• Less compliant populace  
• Loss of “professional courtesy”  
• Sensor data as legal defense | • False positives  
• Potential overload |

**Advantages and Disadvantages**
More Secure Society
More Secure Society

Safer Society

BE CAREFUL
THE BEST SAFETY DEVICE IS A CAREFUL WORKER, GET THE SAFETY HABIT
Increased Efficiency
Financial Incentives
Reduce Bias

Respect the badge
He earned it with his blood
Fear the gun
Your sentence may be death because
I am THE LAW!
You won't f**k around no more
I am THE LAW!
I judge the rich, I judge the poor
I am THE LAW!
Commit a crime, I'll lock the door
I am THE LAW!
Because in Mega-City
I am THE LAW!

- Anthrax (Judge Dredd / I am the Law)
Protection from Abuse

Dallas set to pay $1M for two Separate Police Abuse Cases

http://cityhallblog.dallasnews.com/2012/06/dallas-set-to-pay-1m-for-two-separate-police-abuse-cases.html/
Increased Opportunity for Abuse

McCarthy-era Propaganda Comic Book

http://en.wikipedia.org/wiki/McCarthyism
Increased Opportunity for Abuse
False Positives

Please put down your weapon, you have 20 seconds to comply...

<p>puts down weapon</p>

You now have 15 seconds to comply

I am now authorized to use physical force

... Dick, I am very disappointed... Sir, I'm sure it's only a glitch...

ED-209

http://www.youtube.com/watch?v=A9l9wxGFl4k
False Negatives
Misidentification

“If they have that kind of difficulty with a member of Congress, how in the world are average Americans, who are getting caught up in this thing, how are they going to be treated fairly and not have their rights abused?”

- Senator Ted Kennedy

Terror List Snag Nearly Grounded Ted Kennedy

http://sansalvador.usembassy.gov/tedkennedy_500x500_articulo.jpg
Societal Harm
Chilling Effects
Less Compliant Populace
Loss of Human Discretion
Equal and Fair Enforcement of Law

Driving While Black

http://www.aclu.org/racial-justice/driving-while-black-racial-profiling-our-nations-highways
Risk of Unproportional Response

Equal and Fair Enforcement of Law

Crack

Cocaine

http://en.wikipedia.org/wiki/Cocaine
http://en.wikipedia.org/wiki/Crack_cocaine
Perfect Enforcement of the Law

No Jaywalking

http://en.wikipedia.org/wiki/File:Singapore_Road_Signs_-_Restrictive_Sign_-_No_jaywalking.svg
Social Control
Loss of Power

Montgomery County Maryland Police “Photographed Speeding Past Camera with Extended Middle Finger”

http://www.aclu.org/racial-justice/driving-while-black-racial-profiling-our-nations-highways
Lost Jobs
Overflowing the System
Case Studies
Driving Case Study

- Speeding
  - Windshield wipers without lights in rain
  - Foglights without fog
  - Algorithmic specifications for laws
  - built in time constraints, warning periods, higher limits?
  - Driving the speed limit will get you run off the road in most major metropolitan areas
  - License plate identification
  - Emergency override?
  - Remote disable by police?, on star, manufacturer, change programming of engine chip, corvette with key to disable 4 of eight cylinders
  - Requirement to broadcast laws? (like marking w/speed zones, school zones with signs, "speed zone ahead"
  - Security vulnerabilities in ALE systems, failure modes, possibilities for misuse
  - Ignorance of law is no excuse
  - Internal sensors (limited knowledge of local laws? centrally fed? updated? validated?)
  - External sensors (like a speed camera) may have localize knowledge?
  - Law DB, updates? validated how?
  - What legal loopholes/defenses will emerge
  - For some areas technology isn’t ready to enforce laws, but in some areas it is
  - Rental cars (you don’t own it, therefore you rights are less)
  - Road use tolls (in news)
  - Role of easy pass like systems
  - Role of onstar

- Case Law / Legal Defenses
  - Legal defenses against ALE systems (look to radar guns, red light cameras, speed cameras)
  - Calibration
  - Radar vs GPS tracking device http://www.csmonitor.com/USA/2009/0911/p02s01-usgn.html
Windshield Wiper Before Headlights

[Image: Windshield wiper in use before the headlights]
Mainstream Media

The Strip by Brian McFadden 27 May 2012

https://www.nytimes.com/slideshow/2012/01/08/opinion/sunday/the-strip.html#1
Questions Necessary to Confront Automated Law Enforcement

Method of Implementation
Control
Discretion
Perfection of Enforcement
Legal Integration of Algorithms
Preemptive / Post Hoc Enforcement
System Error / Malfunction
Administrative Burden
Procedural Safeguards
The Social Cost of Automation
3
Analysis
Procedural Safeguards

Due Process
Privacy
Freedom of Expression
The Necessity Defense
Transparency
Countermeasures
Countermeasures

Detect
Monitor
Bypass
Shield
Exploit sampling rate
Scattering
Disable
Destroy
Jam
Spoof
Camouflage
DOS

For more see our HOPE 9 talk

and more...
Algorithmic Laws?
Emerging Brain Computer Interfaces

See...

• Feed by M. T. Anderson
• My Second Implant by Estragon, 2600, Summer 2010

The OODA Loop Applies

Law Resistant Systems

• Please include a manual override
Security of ALE Systems

- Vulnerabilities in Car Electronics
- CALEA wiretap infrastructure abuses
- http://www.forbes.com/2010/02/03/hackers-networking-equipment-technology-security-cisco.html (probably should cite Tom’s BH talk instead)
- Whit Diffie, Susan Landau
  http://queue.acm.org/detail.cfm?id=1613130
Research Agenda

- Metrics to Assess Risk/Benefit
- Design for Transparency
- Design for Accountability
This isn't Going to Happen Overnight

Cuyahoga River Fire
Be Careful What You Build

Three Points (redux)

1. Networked technologies have the potential to automate enforcement of the law.

2. Reckless and pervasive automation can have disastrous and unintended consequences.

3. This audience is in a unique position to defend society and appropriately confront law enforcement systems.
For More Information...


We'd also like to thank John Nelson and Dominic Larkin for their support of this work.
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Questions?