Smarter Public Safety

John Hollywood, Senior Operations Researcher, RAND Corporation
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John S. Hollywood
RAND Corporation
Arlington, VA

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Emerging Findings on Technology and Governance to Improve Public Safety

• *What’s ahead:* issues that will result from the next iterations of information technologies

• *Staying ahead of the game:* from technology at the center to supporting users at the center
  – Providing displays of information *as needed*
  – With improved governance and processes
  – Ensuring data, security, privacy and civil rights protections

• *Making smart IT investments:* tips and lessons learned
Examples of Emerging Issues from NIJ’s *Future Internet Technologies* Workshop

- Self-driving and flying vehicles – how will we interface with them?

- Internet of Things / widespread cameras – how do we take advantage of the volumes of data? How do we ensure security, privacy and civil rights protections?

- Intelligent agents – which tasks could be automated? Which need tools to help humans?
  - E.g., scene and interview capture; report-writing assistance; prioritizing tasks and workloads
Some Technologies That Have Received a Great Deal of Recent Attention

Video Analytics (Ref. NISTIR 8164)
- Capabilities to interpret physical features and activities in video streams
- Analyses Matching Features with Identities
  - Facial recognition
  - License plate recognition

Sensor Fusion
- Capabilities to analyze multiple sensor streams to help make inferences beyond what one can do with a single stream
- Focus on “video plus other sensors”
  - E.g., “move camera to where a shot was detected”
Four Key Business Cases for Video Analytics & Sensor Fusion

Real-time monitoring
• Crimes & suspicious activity
• Hazards

Video forensics
• Data management to support investigations

Automatic reporting
• Help describe an event
• Help capture interviews

Performance monitoring
• For individuals
• For agency performance

Crosscutting Cyber, Security, and Civil Rights Protections
What a Video & Sensor Fusion Network Might Look Like

Real-Time Monitoring

- Monitoring for alerts
- Review alerts / get additional information
- Act on alerts & supporting info

Post-Event Investigation & Reporting

- Video & sensor feeds
- Initial search & data porting
- Permanent storage
- Auto-indexing
- Case / event search
- Speech to text
- Preparation for de-anonymization
- De-anonymization
- Anonymization/redaction
- Reports generation
- Metrics generation
- Distribute to public
- Distribute to courts
- Distribute internally

Security, forensics integrity, privacy & civil rights protections

External integration (RMS, CAD, etc.)

Monitoring has higher precedence: “We want to make it stop, not assess it afterwards”
A Technology on the Way to SA Policing: Predictive Policing

Input data
May include:
- Crimes
- Disorder calls
- Suspicious activity
- Field interviews
- Time and date
- Weather
- Geography
- Gang intelligence
- Criminal histories
- Etc.

Statistical model (many types) → Estimates of future crime & criminal risk (predictions) → Interventions & assessment
Predicting Robberies: Hot Spots or PP?
Predicting Robberies: Hot Spots or PP?
The Future Will Not Look Like *Minority Report*

• *Unless the maps can start telling us where and when to go to pick up the criminals, we are just getting hot spots, and we’ve done hot spot policing for years.*
  – Paraphrase of a comment from the Shreveport Predictive Policing Experiment
  – This would require several thousand-times increases in predictive accuracy

• Instead, need to ask “how do we identify and resolve problems driving crime risk?”
Using Data as a Business Process

- Data collection
- Analysis
- Tailored Displays
- Police Operations
- Intervention
- Criminal Response
- Altered Environment

Data flow:
- Data collection -> Data
- Data -> Analysis
- Analysis -> Tailored Displays
- Tailored Displays -> Police Operations
- Police Operations -> Intervention
- Intervention -> Criminal Response
- Criminal Response -> Altered Environment
- Altered Environment -> Data collection
Using Data as a Business Process (2)

- **Situational Awareness**
  - Provide tailored information to all levels

- **Generic**
  - Increase resources in areas at greater risk

- **Crime-specific**
  - Conduct crime-specific interventions

- **Problem-specific**
  - Address specific issues driving crime risk

Communicate with public about uses of data, along with privacy & civil rights protections
Also Generically Referred To As “Dashboards” in the Information Systems Business

Source: "3 Dashboards" by Kate07Iyn - Jinfonet Software. Licensed under Creative Commons Attribution-Share Alike 3.0 via Wikimedia Commons - http://commons.wikimedia.org/wiki/File:3_Dashboards.JPG#mediaviewer/File:3_Dashboards.JPG
From Dashboards to Real-Time Operations and Decision Support Centers

“... nerve centers that include predictive crime software..., additional cameras, gunshot detection systems, and mobile phones to officers in the field who receive real-time notifications and intelligence data at their fingertips”

https://www.youtube.com/watch?v=54-z8_s9Nbc
SDSC Technologies

Genetec
Citigraf
situational awareness maps and surveillance camera displays

ShotSpotter Displays

HunchLab Predictions

Source: SecurityInfoWatch.com

Also: access to datasets (CLEAR), including a network analysis tool and an app on events, persons, and warrants of interest
SDSCs Have Helped Enable Much More Rapid Decision Cycles...

COMPSTAT
Data on delays of a month or greater
Planning on a monthly or greater basis

Weekly
Meetings on topics like shootings
Assigns resources over next week

Daily
Meeting on events within the past day
Assigns resources over next day

Real Time
Monitoring of radio, cameras, & dashboard,
Assigns resources right now
Including Near Real-Time Monitoring, Response, and Other Ongoing Activities

<table>
<thead>
<tr>
<th>24x7 monitoring</th>
<th>Immediate response</th>
<th>Ongoing analyses &amp; information sharing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Calls for service and radio traffic</td>
<td>Directing units</td>
<td>Preparing slides for briefings</td>
</tr>
<tr>
<td>Live map of calls, units, and other data</td>
<td>Assisting units</td>
<td>Crime analyses &amp; investigations</td>
</tr>
<tr>
<td>4 surveillance camera feeds</td>
<td>“Virtual chases” – tracking suspects across cameras</td>
<td>Ad-hoc meetings – “get info out of notebooks”</td>
</tr>
<tr>
<td>ShotSpotter</td>
<td>Analytic support</td>
<td></td>
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</tbody>
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## Examples of Issues & Responses at Daily Meetings

<table>
<thead>
<tr>
<th>Issue</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cars stolen after being left with ignition on to warm up</td>
<td>Distribute flyers to residents warning them about the risk</td>
</tr>
<tr>
<td>Shot Spotter hits (no victims found)</td>
<td>Send warning letters to owners</td>
</tr>
<tr>
<td>Patterns of crimes (recent spikes or computer predictions)</td>
<td>Concentrate resources in hot spots and times of the pattern</td>
</tr>
<tr>
<td>Open-air drug dealing at gas stations</td>
<td>Send resources to gas stations</td>
</tr>
<tr>
<td>Crimes on commercial properties</td>
<td>Send warning letters to owners and set up meetings</td>
</tr>
<tr>
<td>Shooting, with a risk of retaliation</td>
<td>Meet with those at risk</td>
</tr>
</tbody>
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Top Policing Strategies to Enable, Based on Evidence

From the *Better Policing Toolkit*, an upcoming site providing tips and articles on strategies

- **Reduce crime in places:** Problem-Oriented Policing
- **Reduce individuals’ risk:** Focused Deterrence
- **Improve community relations:** Legitimacy Policing
- **Solve serious crimes:** BJA’s *Homicide Process Mapping* guidebook
- **Not recommended:** Zero tolerance / aggressive policing
The Future of Data Will Include Civil Rights and Privacy Disputes

• “We regard as inevitable, particularly with the technology’s widespread adoption and attendant increased publicity, Fourth Amendment–based lawsuits challenging its use.”
  
  – From License Plate Readers for Law Enforcement
  
  – But widely applicable... and focusing on uses can help
Bottom Line on Privacy Policies

**Don’ts**
- Allow just about anyone to access the data
- Keep as much data as possible forever
- Allow just about any data use
- Not sure about what will be done with data, other than catch bad guys – maybe
- Don’t talk to anyone about what you’re doing

**Do’s**
- Access policies / authentication measures
- Restrictions on collection and retention
- Auditing of collection and use
- Defined use cases, e.g.–
  - Search for social media threats at major public events
- Talk with community and experts about what you’re doing in advance
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*Need a user / activity focus – in other words, a focus on what you will do with the data – to do these properly.*
What We Would Like to See With IT Investments

- Department Investments
- Department Activities
- Outputs
- Outcomes

Should be a clear storyline (logic model) linking investments to activities, to outputs, to improvements in outcomes (i.e., performance metrics)
What We Would Like to See With IT Investments

**Department Investments**
- Personnel
- Training/Ed.
- IT
- Planning
- Facilities
- Equipment

**Department Activities**
- Proactive
- Reactive
- Support

**Outputs**
- Proactive activities
- Cases cleared
- Community collaborations
- Capabilities developed
- Data shared & used

**Outcomes**
- Less crime & fear of crime
- Offenders held accountable
- Improved legitimacy
- Greater capabilities
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**IT in support of:** to improve quality of life by protecting life and property; detecting, solving, and reducing crime; reducing fear of crime; and enhancing security and safety in cooperation with citizens and the community

- Created from analyzing ten agencies’ mission statements
Questions? (johnsh@rand.org)

Search: RR-233
Search: RR-467
Search: RR-569
Search: RR-645
Search: RR-928
Search: RR-2301

Report on video analytics & sensor fusion forthcoming