

# CENTER FOR DATA SCIENCE AND PUBLIC POLICY

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POSTED ON FEBRUARY 21, 2016 BY RAYIDGHANI

## Developing Predictive Early Interventions/Warning Systems to Prevent Adverse Interactions with the Public

### The Challenge

Recent high profile cases of law enforcement officers using deadly force against civilians and other instances of police misconduct have caused a growing political and public uproar. These incidents lead to mistrust between citizens and the police, leading to further negative interactions. By developing a system to predict which police officers are at risk of engaging in negative interactions with community members, police departments can provide targeted early interventions to prevent such interactions, rather than responsively dealing with the officers after an incident occurs.

### Existing Solutions

Many large police departments have developed “early interventions systems” to try to identify officers who are most likely to have adverse interactions with the public (adverse interactions include violations of department rules of conduct, unjustified use of force, civilian or officer injury, and discourteous officer behavior). These systems flag recurring complaints against officers and notify supervisors when certain thresholds were reached, such as a certain number of use-of-force complaints over a given period of time, so those supervisors could implement targeted interventions. The main problems: these systems are neither predictive nor do they identify incidents that can be prevented.

### Our Solution

By analyzing comprehensive data (including HR data, arrests, dispatches, citations, complaints, internal affairs investigations) from police departments, a predictive, early warning system can be used to target resources for officers who would most benefit in terms of reducing adverse interactions with the public. This system will:

- **Decrease the probability that an officer has an adverse interaction with the public** – We can improve over the threshold-based systems currently used in many police departments by identifying and using only the factors that are most predictive of whether an officer will have a negative interaction with a member of the public.
- **Enable police departments to target limited resources on the officers that most need additional training** – Supervisors will be able to use this system to see which officers are most in need of counseling, training, or other assistance to best prepare them to deal safely and positively with individuals in their communities.

### Work and Results from Charlotte Mecklenburg Police Department

In April 2015, The White House and LJAF co-hosted a gathering of police chiefs, data scientists, and technologists to help departments improve community-police interactions through data. One of the key outcomes of the gathering was the finding that police departments urgently want more proactive EWS systems but lack the data science and technology expertise to build them.

In collaboration with the White House Police Data Initiative and the Charlotte-Mecklenburg Police Department (CMPD), the Center for Data Science and Public Policy data scientists worked over summer 2015 to implement a prototype early warning system.

We worked with CMPD to extract data from their internal systems including officer demographics, training, payroll, on-the-job actions, internal affairs data, dispatch data, negative interaction reports

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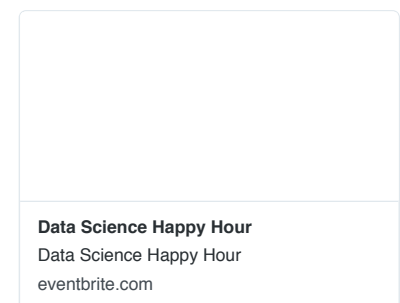
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29 Mar

and augmented it with publically available data. During the initial phase of this project, our team performed an initial analysis for CMPD, identified the data and system requirements for building such a system at scale, and learned how to successfully partner with police departments to build a new EWS system. This phase included **data collection, data integration, data transfer, anonymization, and exploration; evaluation of the accuracy of CMPD's existing EWS; development of the data infrastructure to allow faster integration of data from other departments in subsequent phases** and extensive relationship building with additional police departments to pave the way for later scaling.

We then developed a prototype that used data from CMPS to focus on two main problems:

- **Which officers are likely to have an adverse interaction in the next two years?**
- **Which dispatches are likely to end up having an adverse interaction?**

Our current results show that we can increase the **the accuracy of the CMPD system by 15-20% while reducing false positives by 55%**. This allows CMPD to identify more officers early as well as reduce the risks and costs of interventions targeted at officers who are not at risk.

### Partnerships with Other Departments

Using the prototype system implemented for the Charlotte-Mecklenburg Police Department (CMPD), we are working on extending the systems to police departments of different sizes. We are extending this work with a number of police departments (Nashville Police Department, LA Sheriff's Department, and Knoxville Police Department) and are in discussions with additional departments (New Orleans, Seattle, Oakland, Provo, NY among others) to explore how to help them improve their systems.

### What's next

The next phase of this project involves rolling out the prototype to additional cities. The eventual outcome of this project **is a nationally deployable software platform that will integrate with the existing data systems of police departments and provide them with early warning alerts concerning officers who are at high risk of negative interactions with the public.** This software platform will be **scalable, adaptive, and data-driven** and will give police departments new opportunities to deploy targeted interventions before adverse incidents occur. In addition to the early warnings, this new system will also include a user interface that will provide clear, **interpretable indicators for why a given officer has been flagged, thus allowing the police department to better understand the context for the risk assessment of a particular officer. When implemented,** this new system will be critical in decreasing negative interactions between police officers and the public and improve the relationships between police and the public.

We are also deeply committed to the open sharing of information and best practices in the social impact sphere. The DSaPP team plans to expand on the relationships built through the Police Data Initiative, the White House, and the partner-city police departments to disseminate information about our work and results to the departments that have expressed interest in collaborating on this effort. In addition to making the fully built system available to police departments nationwide, we will also make all of our open-source code freely available on GitHub so police departments can use our work to build their own EIS if they choose. We will publish information about our project in leading data science conferences and journals in order to get the extended data science community excited about the open-source code and our work in this space in the hopes of augmenting our work with input from the larger data science community.

At the end of this project, we hope to produce the prototype of a system that, once deployed, would allow police chiefs across the nation to see which of their officers are in need of training, counseling, or additional assistance to make them better prepared to deal safely and positively with individuals and groups in their communities. Police departments will move from being responsive to negative officer incidents to being proactive and preventing them from happening in the first place.

**Funders/Investors:** If you are interested in supporting this work and helping us turn this into software, please contact us at [dsapp@uchicago.edu](mailto:dsapp@uchicago.edu)

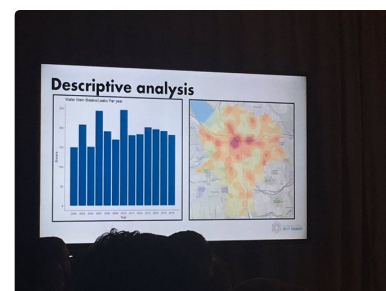
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For more technical details, [read our paper](#) being published at a data science conference.

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