

## IPAM 2013 RIPS-LAPD Project

### Linking Social Media to Crime & Disorder.

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### Introduction

The ‘Arab Spring’, London riots and ‘Occupy Wall Street’ movements emerged rapidly and unexpectedly during the Spring and Summer of 2011. Though radically different in their on-the-ground behavior and outcome, a consensus has emerged that social media technologies, such as Twitter, Facebook and their analogs, played decisive roles in initiating and perpetuating each of these instances of social unrest. Without the rapid and diffuse communication capabilities made possible by social media, the story goes, the small events that were the trigger of protest may never have nucleated into full-blown social disorder.

Since 2011, the perceived importance of the link between social media and crime and disorder has only grown in magnitude. Many police departments now regularly monitor social media feeds in an attempt to anticipate problems and develop appropriate responses. However, there are several theoretical and practical questions that remain to be answered. Foremost is whether social media uniquely facilitates crime and disorder. If it does not, then monitoring social media feeds may yield little benefit. If it does, then there is also the practical matter of how police can monitor the sheer volume of data involved. Consider that nearly 85 million geo-located tweets occurred in the Los Angeles area during the month of June 2012 (Semiocast 2012). At present, law enforcement agencies can at best scrape the surface of the torrent of social media data.

The 2013 RIPS-LAPD team will build a functioning Twitter scraper using the public Twitter API. The focus will be on the collection of geo-located Tweets and the quantification of spatial, temporal and content data. The students will then assess the relationship (if such exists) between social media activity and both historical crime data and weekly (daily?) crime extracts. Appropriate methods for comparison may draw on both discrete and continuous dynamical models. RIPS-LAPD students will develop a functioning web-based interface deployable by the LAPD to do automated monitoring of Twitter content for triggers of crime & disorder. The interface may employ methods necessary for detecting spatial or temporal activity patterns, topic modeling, change-point detection, and/or ‘quick look’ capability such as pulling tweets in real-time in the vicinity of an ongoing crime.

This project will build on mathematical and computational models from several different domains: (1) non-linear time-series modeling; (2) non-linear PDE and stochastic point-process

modeling of spatio-temporal crime pattern formation; and (3) unsupervised pattern detection methods such as machine learning.

Computations may be done in Matlab, Mathematica, C, C++, R, Java, or other appropriate computational language. Development of the software tool will require deployment in Java, Javascript, or Ruby.

Key Milestones:

1. Build baseline Twitter scraper using Twitter API.
2. Review theory of crime pattern formation.
3. Execute comparisons between Twitter events and crime.
4. Develop web-deployed Twitter monitor with 'alerts'.
5. Presentation at LAPD.

## References

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