Harnessing Geo-Social Networks and Photovoice for Health Surveillance, Mapping, and Analysis

In the past few years, I have focused on applying spatial analysis to public health problems in the context of building a predictive early warning system for malaria, mapping spatial patterns of drug addiction and serious mental illness to support clinical dual diagnosis hypothesis, impact of accessibility to health services on infant and maternal health and climate change impacts on vulnerable populations.

Over the past few years, I have noticed a dearth of relevant health data especially in Africa and Asia. There is also a problem of spatial scale since most readily available health data is aggregated to coarser scales. Therefore, I am proposing to examine newer sources of data generated via social media, activity tracking with mobile apps and Photovoice to study societal health and wellness (Eysenbach et al., 2008; Hay et al., 2013; Lazer et al., 2014; Stoové et al., 2014). Social media and online communities are popular in developed countries. Social media hashtags can be created to describe disease outbreak and can be mapped providing a near real-time visualization of the outbreak. Real-time information (like tweets) is becoming a popular source of public health information as they serve as early warning for the public. Fitbit and other mobile apps enable users to tap on the device or the phone’s GPS and track workouts enabling users to create maps of their workout routes. Photovoice technique entails equipping study participants with cameras, allowing them to record, discuss, and communicate to others the realities of their lives. It has proven to be a useful technique for gathering primary research data that can generate new understanding about issues the participants consider important.

The term Web 2.0 describes an active creation of content by individuals on the web. Web 2.0 includes social networking communities (e.g., Facebook), social rating websites (e.g., Digg), customer review websites (e.g., Yelp), photo and video sharing networks (e.g., Flickr and
YouTube), blogs (e.g., Huffington Post), and information aggregators (e.g., Wikipedia). Individuals can share their knowledge and experience, and create a rich array of user-generated content. Also they perceive information they receive from “a person like me” to be extremely or very credible. A Pew study (2009) showed that 61% of American adults seek health information online and 37% have accessed user-generated health information online. Sites such as PatientsLikeMe enable patients to engage in dialogue with each other and share health information and advice including information on treatment and medication. Given that most social media information such as (publicly posted) Twitter can be geotagged, it is possible to tag infections (as well as symptoms) with labels such as flu, cold, enterovirus, or asthma to plot on a map in real time to create a spatial distribution of the disease as well as potentially predict the future trends. In addition, social media data can provide public health practitioners with a quantitative indicator of sentiments that are location specific ranging from anxiety, anger, or negative emotions to feeling safe, and great. This indicator could help to alleviate anxiety and correctly communicate the risk associated with any disease outbreak. Programs such as Smart Chicagorun by Chicago Department of Public Health and New York City Department of Health and Mental Hygiene have used social media data to identify cases of foodborne outbreaks. The challenges in using social media data are that data needs to be monitored for quality and reliability, and the users’ confidentiality and privacy need to be maintained. We examine studies done in this area to draw insights on pros and cons of this technique.

PhotoVoice is a tool used to study communities, public health, and education among other social issues Newman (2010). PhotoVoice is a method that enables people to define for themselves and others, including policy makers, what is worth remembering and what needs to be changed. (Wang, 2004). Photovoice can be used to examine how people experience the places that impact their lives. Usually, participants are given directions to capture events or triggers to their illness or environmental settings. For example, asthma patients can capture pictures of smog and air pollution in specific regions of Shanghai. It can be integrated with maps to enrich the analysis and facilitate a better understanding of people experiences. It is especially a great tool in developing countries since it provides a better picture of the reality of sanitation, water and air quality and other environmental variables leading to diseases and illness. We will explore how Photovoice has been used in community-based participatory research (CBPR) and how to integrate it with spatial information to create useful mashups and make it a part of our visual mapping experiences.

Fitbit and other mobile apps enable users to tap on the device or the phone’s GPS and track workouts enabling users to create maps of their workout routes (Shneiderman et al., 2013). These offer a map of the urban environment from the perspective of health and fitness. We will discuss how such data can be used to provide fitness routes to various demographics and fitness levels. What is the urban fitness map for an asthma patient versus a fit youth wanting a workout? We believe that such apps are going to be dominant given the popularity of Apple Watch, Fitbit and other devices.
References