



## Human Behavior in Mass Emergency

Sociologists have long drawn attention to the regularities and patterns in human behavior that are made apparent when disasters occur. Though some disasters are expected (such as regular flooding or wildfire events) they are not events that occur with temporal precision. People cannot mark their calendars with the exact day and time a disaster will occur; they cannot know the severity of an event prior to impact. Yet, as Russell Dynes explains, despite the lack of ability to forecast disaster events and the effect they will have on the social and built environments, these situations are *repetitive* [1]. What this implies is that there are generalizable structures in how the events unfold and in how affected populations react.

## Human Language

The patterns that exist in human behavior during times of mass emergency extend beyond physical actions performed in particular situations. The way we communicate through language is also rife with pattern. As Charles Fillmore states: “a grossly underestimated portion of speech behavior consists of the performance of rehearsed speech routines.” [2]. What Fillmore is indicating through this assertion is that much of the language humans produce is formulaic and automatic. When we communicate about a topic, we do so with a degree of predictability—in both grammatical construction, and word choice.

## Twitter Communication in Crisis

The research I report on here involves incorporating elements of both the sociology of disaster and linguistics. Past research by colleagues and myself has shown that in mass emergency situations, people in affected areas turn to the popular microblogging service Twitter to gather and disperse various types of information [5,7,8]. In continuing with this vein of research, and performing discourse analysis on communications sent during six particular mass emergency events via Twitter, I have identified twenty- seven types of information that contribute to situational awareness.<sup>1</sup> Furthermore, this analysis has revealed regularities in the amount that these types of information communicated in particular emergency events. For example, during two separate flooding events that took place in the Red River Valley region of the United States in 2009 and 2010, I find that for each flooding event, over 40% of the information contributing to situational awareness are comprised of three information types. This indicates

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<sup>1</sup> Situational awareness is the combination of knowing what is in one’s vicinity, understanding how elements are positioned in relation to one another, and knowledge of environmental factors [4].

that during massive floods, Twitter users are largely interested in communicating particular types of information. It is these common elements of disaster situations that provide researchers with understandings of how we can contribute to disaster mitigation and recovery through the use of technology. By first making sense of what information people care about in times of mass emergency, and then identifying generalizations and patterns in how information types relate to specific disaster events, we can begin the process of building computational tools that can automatically extract those particular pieces of information that affected populations find personally meaningful in particular time- and safety-critical situations. Previous research has shown that it is possible to automatically classify tweets that contain information relevant to situational awareness [6]; the goal is to now expand upon and broaden this research.

For example, we can imagine a time in the near future during a massive flood in which threatened populations need to know the level of a river as it relates to their location, where shelters are set up, or which roads are closed. These are all types of information broadcast via Twitter. The goal is for an individual who finds him/herself in a dangerous situation to be able to locate the particular information he or she needs to make the most informed decision. By using our knowledge of both the information people communicate on Twitter, as well as how that information is constructed linguistically, we can begin to form the foundation of tools that can provide important, detailed information to those faced with the need to make quick, informed decisions.

## Conclusion

I am interested in further theorizing about the structures in behavior we can identify during times of mass emergency. My approach involves taking into consideration the behavior people exhibit when they use Twitter in times of mass emergency, and thinking about how we can use behavioral patterns to not only create computational tools, but in how we can extend current sociological theory.

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